

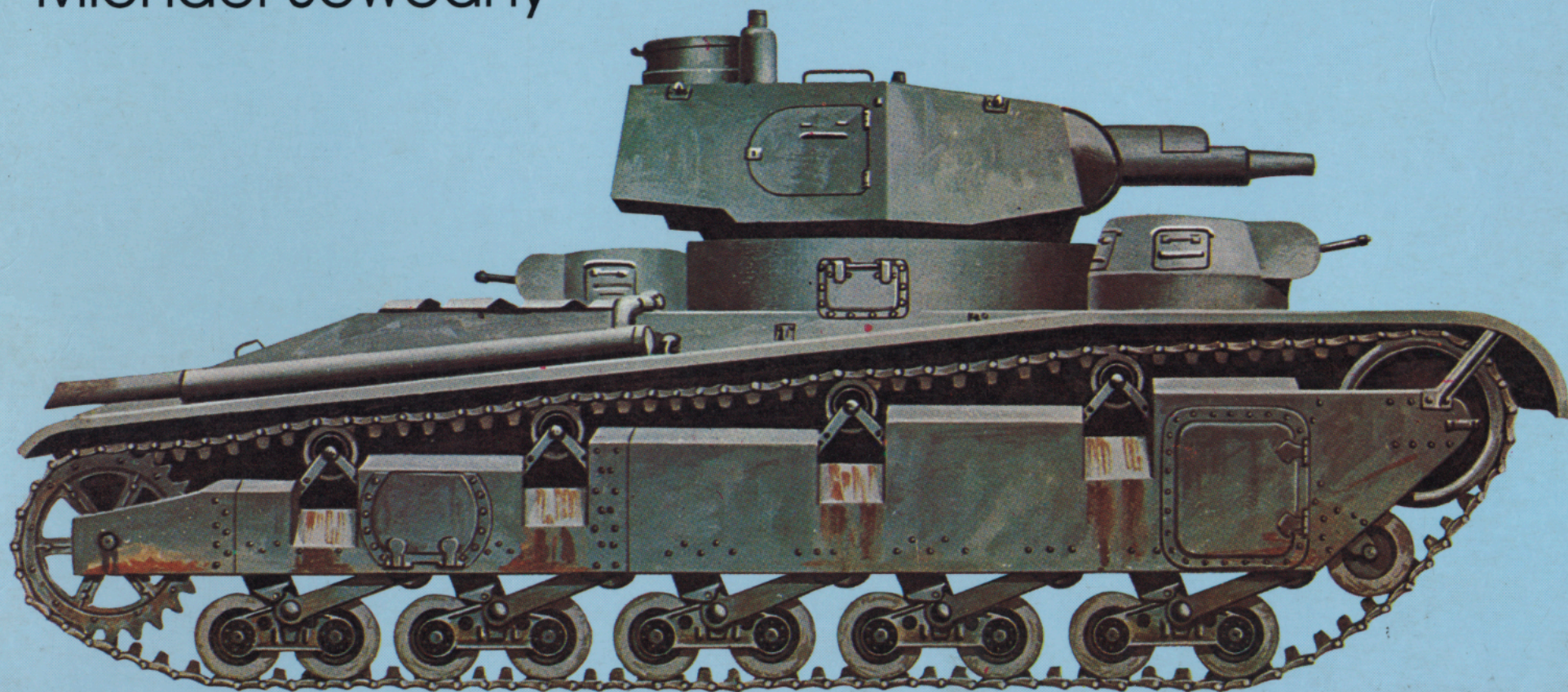
Sowodny

GERMAN ARMORED RARITIES

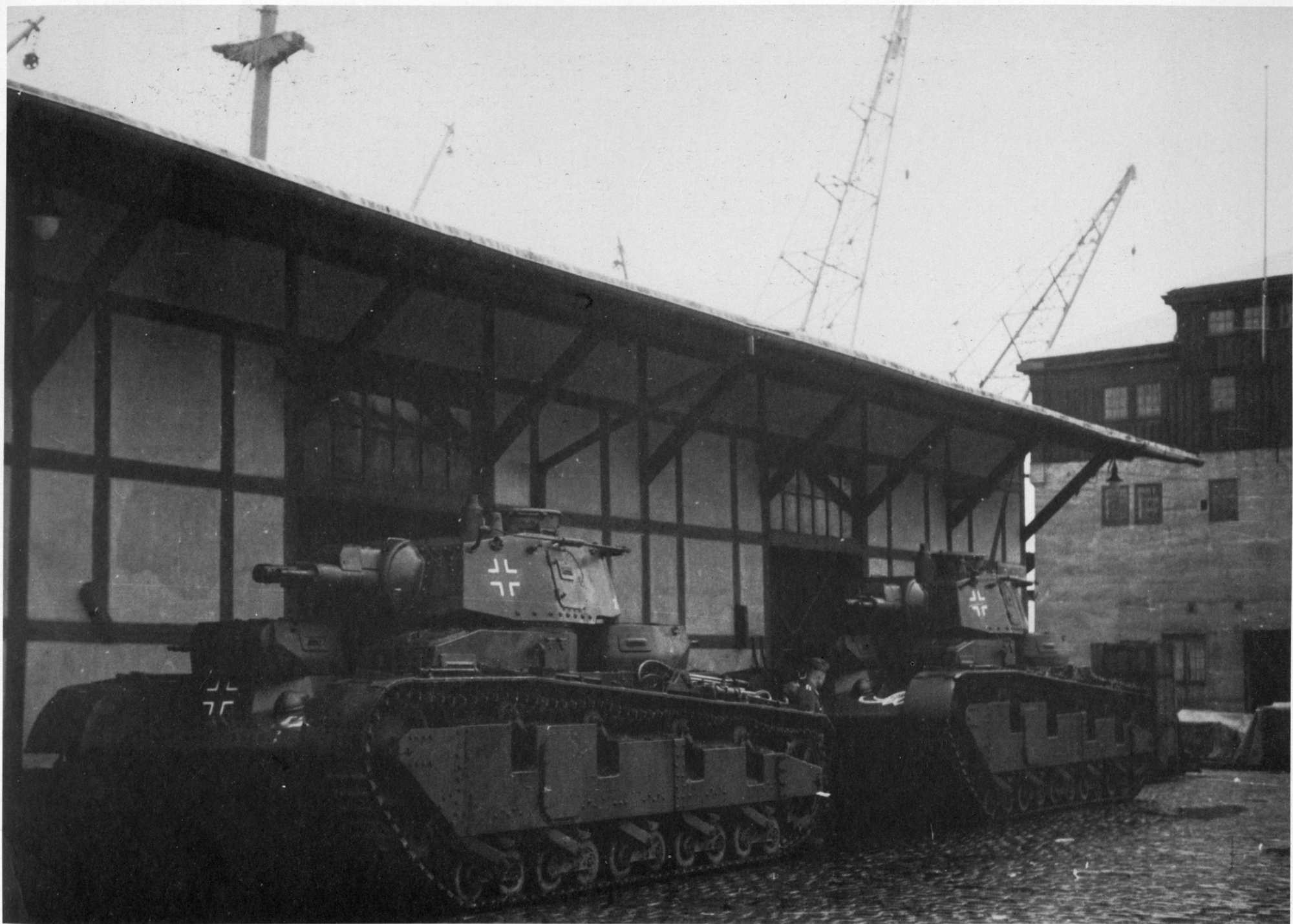
Schiffer Military History

# German Armored Rarities 1935-1945

Michael Sowodny









# German Armored Rarities 1935-1945

Neubaufahrzeug, Luchs, Flammpanzer,  
Tauchpanzer, Krokodil, Leopard, Löwe, Bär, and  
many other experimental vehicles and armored  
projects

by Michael Sowodny

*For propaganda purposes, three of the impressive-looking Neubaufahrzeuge, already built in the early thirties but having only meager combat value, were shipped to Oslo during the Norwegian campaign. (BA)*

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Translated from the German by Ed Force

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## Foreword

The efforts to continue the development of the Panzer I and II, which had been regarded from the start as only transitory solutions, and in particular the development of an urgently needed armored scout car ("Luchs"), are portrayed, as well as the strivings for uniformity in Panzer III and IV on the one hand and V ("Panther") and VI ("Tiger") on the other.

The invasion of Britain that was discussed in the autumn of 1940 brought about intensive development of floating and diving tanks, which later gained importance again as the deep wading capability of the heavy tanks that exceeded the load limits of many bridges, and to this day is taken for granted as one of the requirements of a modern tank. A series of tanks was fitted with flamethrowers instead of their primary weapons, in order to give flamethrowers off-road capability and bring them into action with armored protection; other viewpoints were influential in the mounting of rocket launchers on tank chassis, which, to be sure, did not get beyond the project stage.

In view of the growing Allied air superiority, the call for effective Flakpanzer vehicles became more and more urgent and manifested itself in a number of such developments, many of which have already been portrayed in Volume 51 of this series. Several other interesting projects will be portrayed here.

The conclusion will consist of several drawings of heavy tanks about which little or nothing was previously known. They will serve as documents of what arose on the drawing boards of the designers without being able to be turned into reality.



# The Neubaufahrzeug

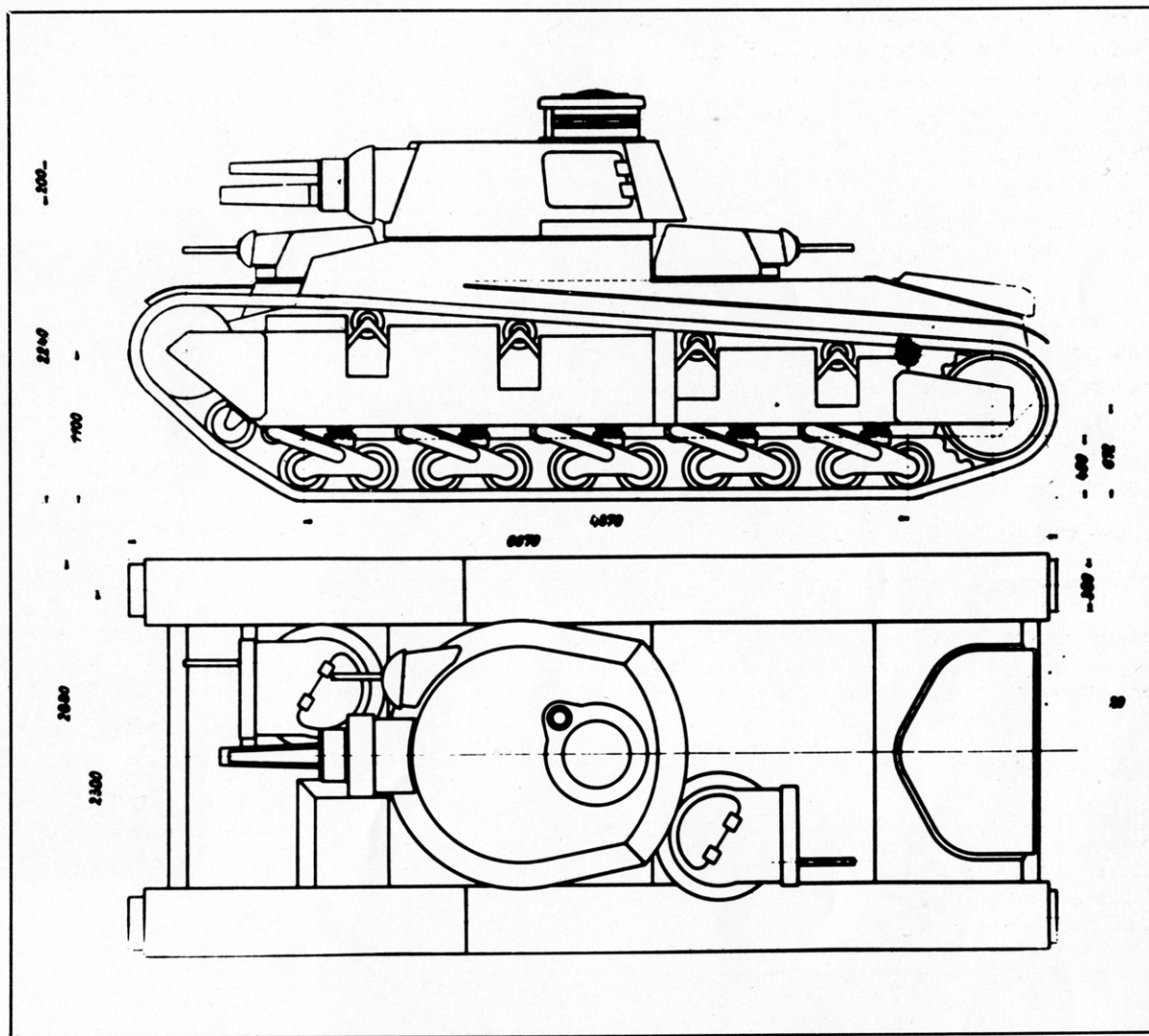
In 1933 the OKH awarded a contract for the development of a new heavy tank based on the experience gained from the heavy tractor (1927-29). The designs for the Neubaufahrzeug (the project was carried out under this name) were to be built by the firms of Rheinmetall and Krupp.

The running gear of the tank resembled that of the VK 2001, also built by Rheinmetall. It consisted of five double-roller trucks and four return rollers that held the upper part of the tracks. The main turret was designed differently by Rheinmetall and Krupp. Krupp armed its tank with one 105 mm KwK and one coaxial 37 mm gun, while Rheinmetall planned on one 75 mm KwK with a 37 mm gun above it. Two machine guns, based on British (the "Independent" tank) or Soviet (T 32) models, were placed in separate, additional bow and stern turrets, identical to those of the Panzer I. In the inside of the tank, 80 rounds for the 75 or 105 mm tank gun and 50 rounds for the 37 mm gun could be carried, as well as 6,000 machine-gun bullets. The Neubaufahrzeug was armored relatively weakly, with 16 mm plate on the front and 13 mm on the sides. Because of this, the tank, based on its dimensions, had a low gross weight of 23 tons.

By 1935, a total of five prototypes of the Neubaufahrzeug had been built. Two of them had the Rheinmetall and three the Krupp turret. Since at that time there was no motor producing the required power available, six-cylinder BMW aircraft engines were

used at first; later they were replaced by Maybach HL 108 motors that produced 280 horsepower. The two Rheinmetall vehicles, whose armor plate was made only of soft steel, were used for training pur-

poses at Putlos. The three other tanks, with the Krupp turret, were shipped to Norway in April 1940, essentially only for demonstration purposes, to give the illusion that heavy tanks were on hand.



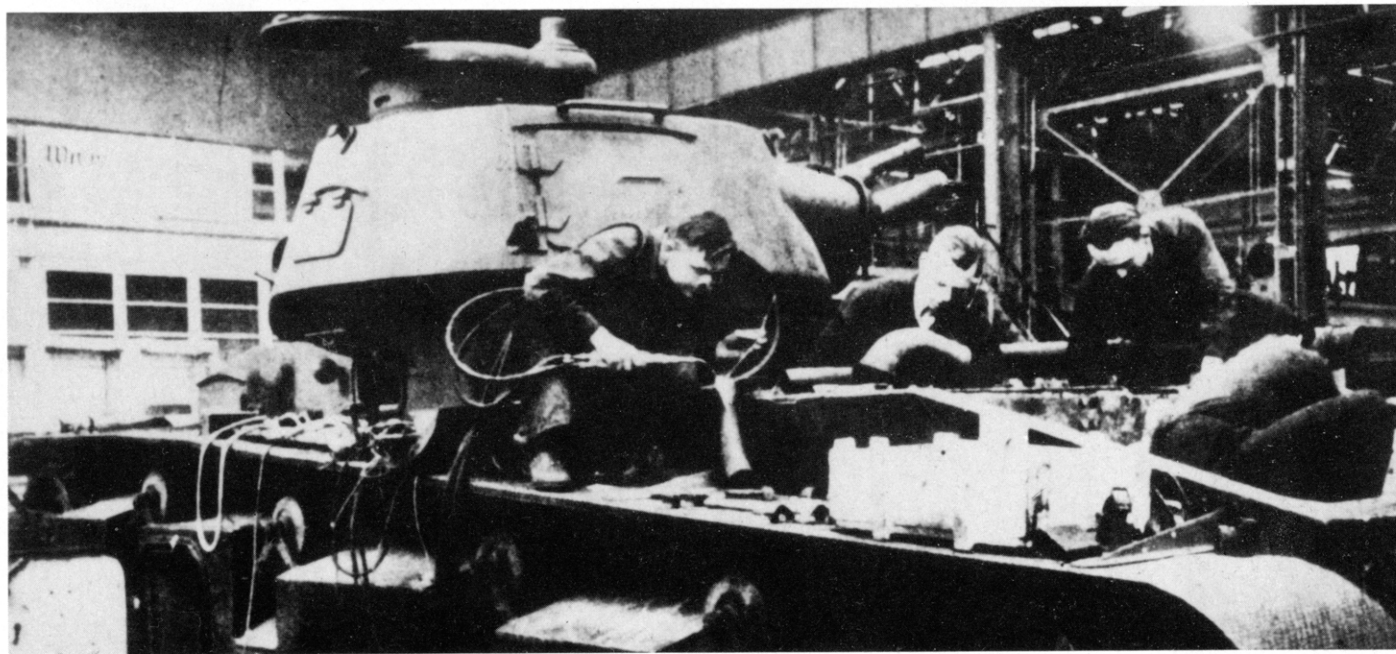




*These two front views show the different arrangement of the weapons of the Krupp (left) and Rheinmetall (right) vehicles. The field of elevation for both vehicles ranged from -10 to +20 degrees. The 75 mm KwK L/24 gun used by Rheinmetall had a maximum range of two kilometers, while the 37 mm KwK L/46.5 used in both vehicles had a range of one kilometer. (2 x BA)*



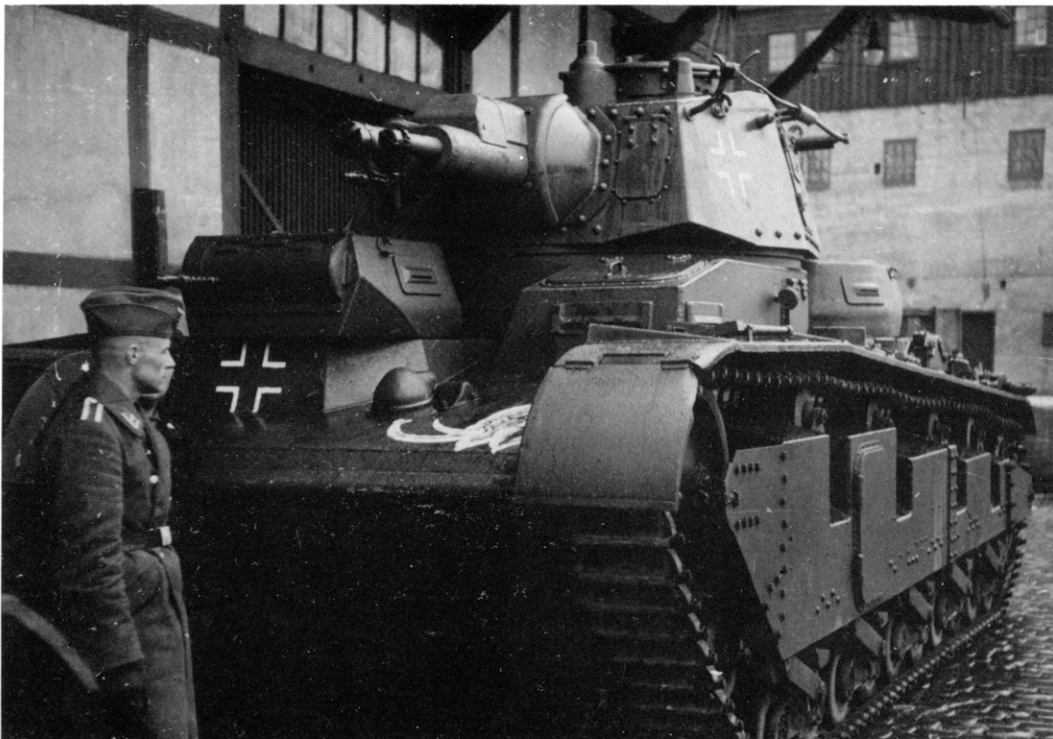
*Right and below: These two pictures show the construction of the Neubaufahrzeug at the Rheinmetall factory. The builders are presumably working on the installation of the six-cylinder BMW aircraft engine, which produced 300 horsepower and gave the tank a top speed of 30 kph (1 x BA, 1 x IWM)*



*Below: In April 1940 all three Neubaufahrzeuge with the Krupp turret were shipped to Norway. Here one of these tanks is seen shortly after loading.*





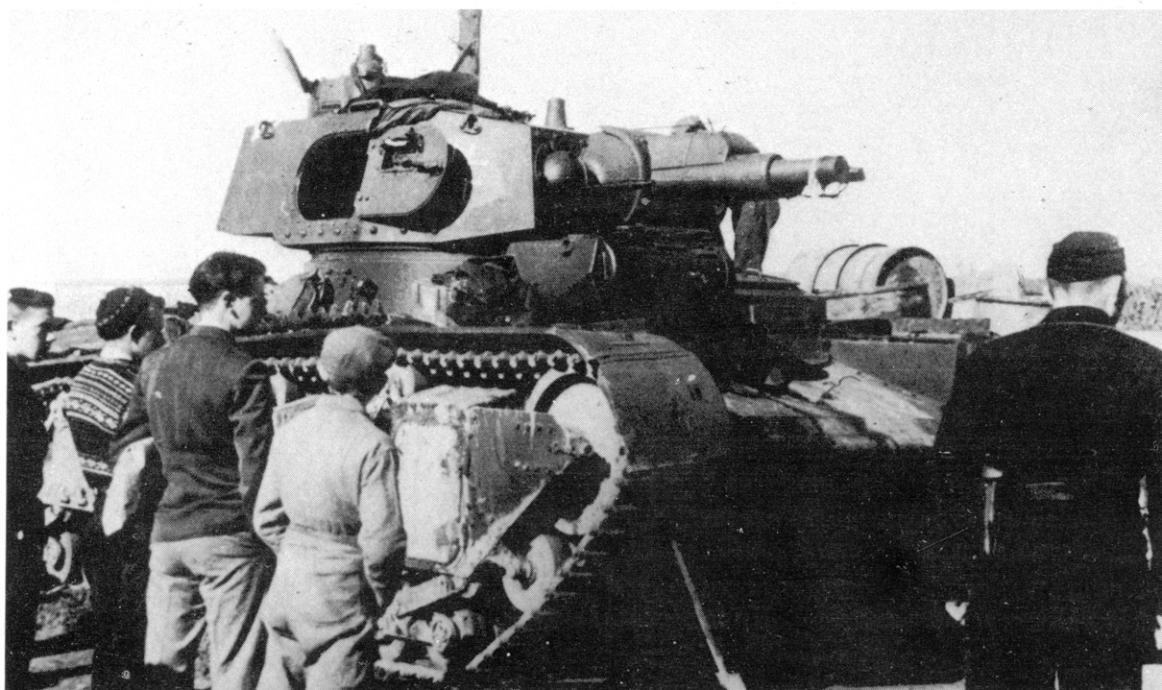


*These three photos show the Neubaufahrzeuge in the harbor area of Oslo. In the picture at the upper right, the arrangement of the main turret and the two machine-gun turrets can be seen. The Neubaufahrzeug had ungreased link tracks which were driven by toothed wheels located at the rear, while in all other tanks the drive wheels were at the front. The crew consisted of six men. The radio equipment consisted of a twenty-watt UKW transmitter with a range of four to six kilometers and a similar receiver. (3 x BA)*



*This picture shows all three vehicles shortly after being shipped out. They were supposed to make it look as if large numbers of heavy tanks were available, and thus were often displayed. Because of their light armor plate (13 to 20 mm), though, the combat value of these vehicles was meager.*





Upper left: After seeing action in the Oslo area, a Neubaufahrzeug supported an attack of four Panzer I and II tanks against British troops who landed at Andalsnes on April 17, 1940. This Neubaufahrzeug, though, had to be abandoned after it had gotten stuck. Here a Neubaufahrzeug rolls through a Norwegian town. The gun is protected from dust by a muzzle protector. Behind the tank is an Armored Command Car I Type B, of which in all only 200 were built. (BA)

Above and left: Here are two more pictures of these tanks in Norway. The two Neubaufahrzeuge that remained after the loss of one at Andalsnes were stationed at Akershus Fortress (Oslo) until the end of 1940. Later they are said to have taken part in the attack on Russia within Panzer Group I (von Kleist) and were lost near Dubno on June 28, 1941.

# Aufklärungspanzer (Armored Scout Car) VK 601/1801

In 1939 the Daimler-Benz firm and Krauss Maffei were contracted by the HWA to develop the Panzer I further into both a light scout car (VK 601) and a heavy machine-gun carrier (VK 1801).

The first project was, as suited its intended use, relatively lightly armored (10-30 mm), so that its total weight was no more than eight tons, but it had a powerful Maybach motor that produced 150 HP. On the basis of these design features, the VK 601 had a high top speed of 65 kph. In addition, the designers laid out the vehicle so that it could also be used by the paratroops as an airborne tank. The armament was considerably better than that of the Panzer I. It consisted of a newly designed large-caliber machine gun (EW 141) and a coaxial MG 34 of the earlier type. In all, 46 of the VK 601 were built as an experimental series. Two of these were sent to Russia for troop testing (by the 1st Panzer Division) early in 1943, while the rest were reserves for the LVIII. Panzer Corps and took part in the fighting in Normandy in 1944.

In the development of the VK 1801, on the other hand, emphasis was placed on having the vehicle's armor plate as heavy as possible, not less than 80 millimeters, so as to offer protection from the anti-tank weapons of the time. The total weight of the ve-

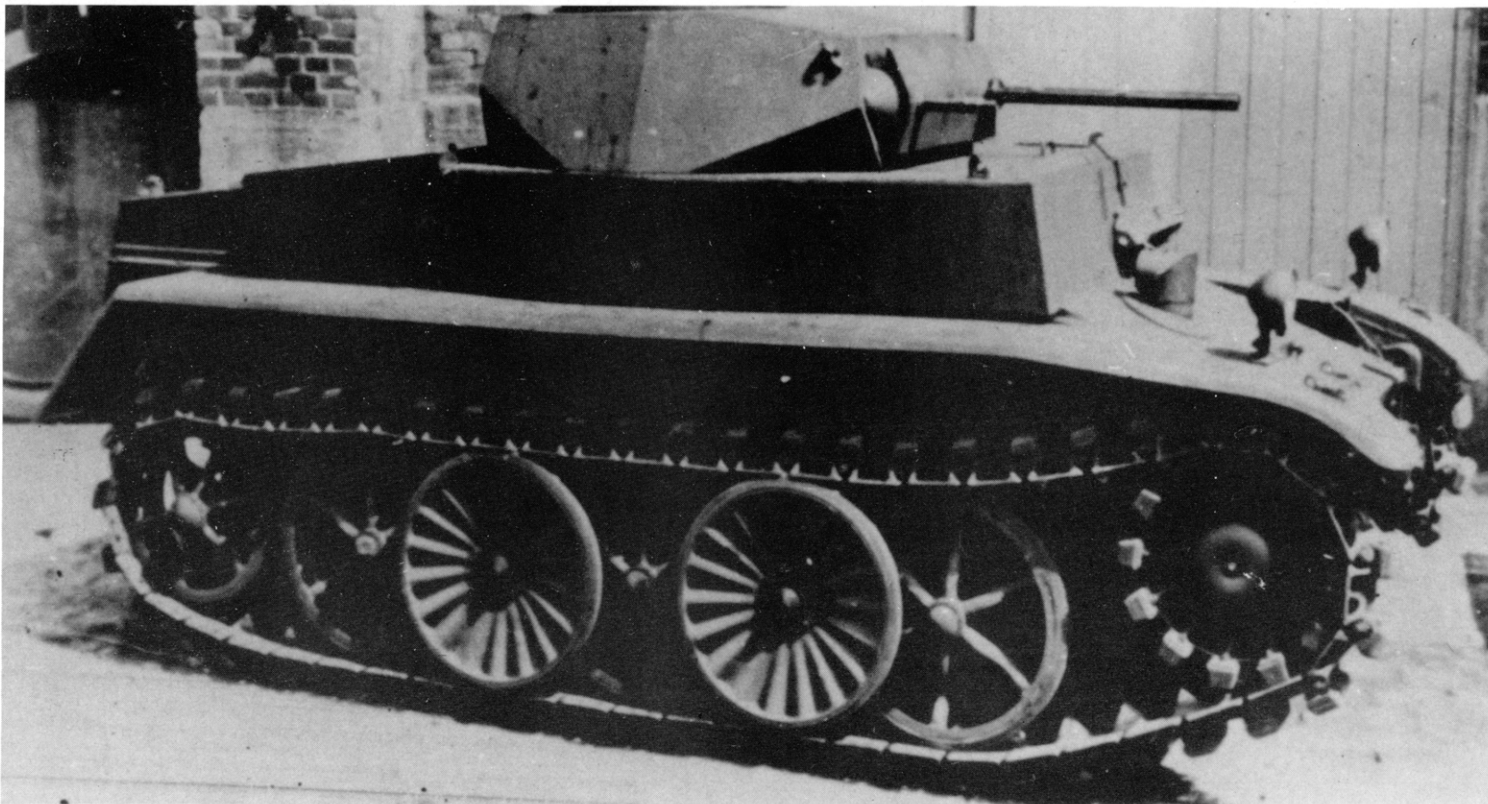


*One of the few action photos of the VK 601, probably taken during the Allied invasion of Normandy. The vehicle had a two-man crew. The driver was housed in the right side of the hull, and the commander sat directly behind him in the turret. He could observe his surroundings through eight periscopes (Kinon blocks) arranged in a circle in the cupola. (IWM)*

hicle was therefore high, at 21 tons. Since the same motor was installed as in the VK 601, the vehicle was underpowered, with a power-to-weight ratio of 7.1 HP per ton, and it could only reach a top speed of 25 kph. The armament consisted of two MG 34 guns, both mounted in the turning turret.

Since such a support vehicle had already been left behind by other developments for the infantry, only 30 of the VK 1801 were built, all being delivered in 1940. Eight of them saw service along with the VK 601 with the 1st Panzer Division in Russia in 1943.

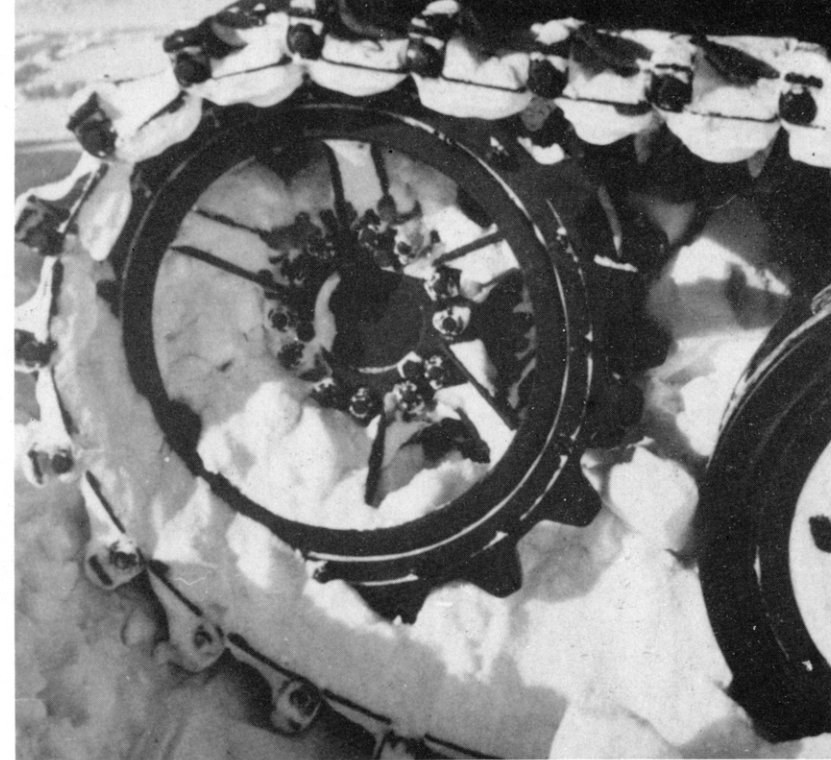
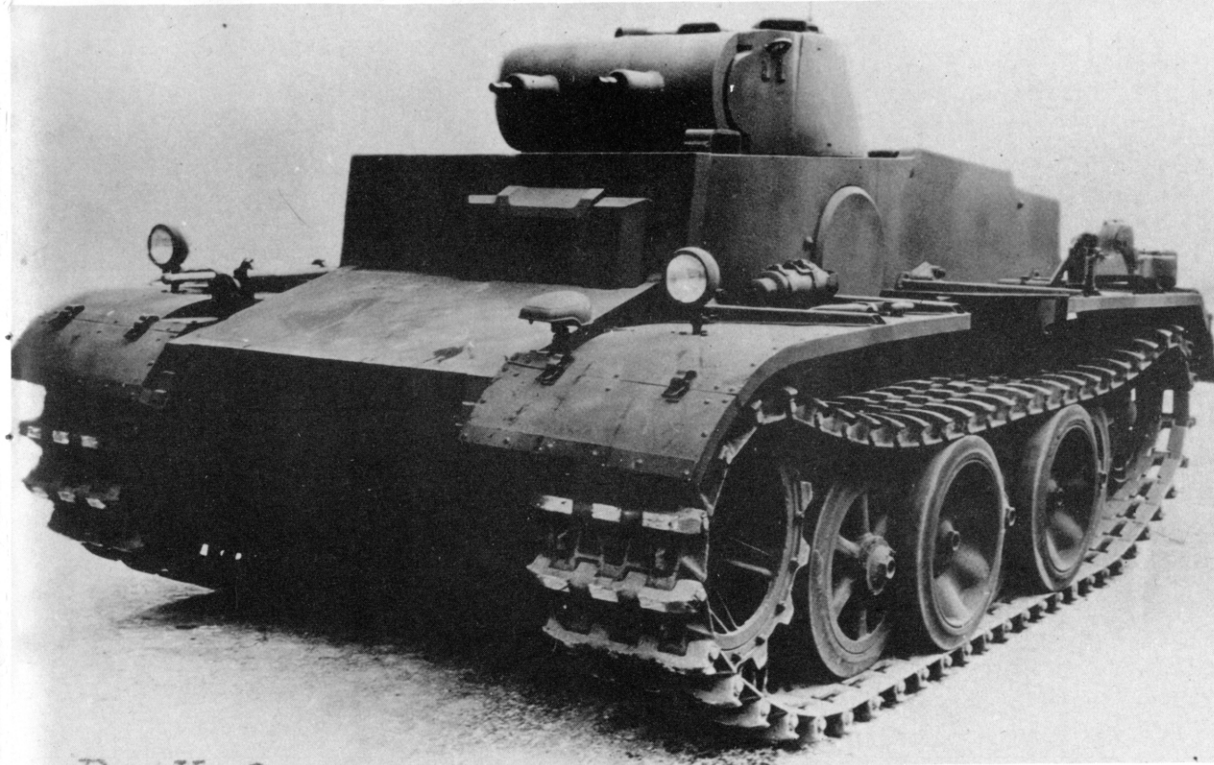




A VK 601 in the factory grounds of its builder, Kraus Maffei, still without any armaments. Because of its high top speed of 65 kph, self-lubricating tracks were planned at first (as can be seen in this picture). Later, though, they were replaced by tracks of the older type. The last vehicles in this series were fitted with a more powerful Maybach HL 61 motor and were designated VK 602. (BA)

Numerous VK 601 were lost in action in Normandy, and some of them were captured by the Allies. The road wheels of the first series of the box running gear are missing, as is the armament from the turret. Note also the launchers for smoke bombs, mounted on the track aprons in this type of vehicle. (RAC)





*Above: In order to keep the ground pressure of the 21-ton machine-gun carrier (VK 1801) as low as possible (it was 0.46 kg/sq. cm), the vehicles were equipped with what, compared to the Panzer I, were relatively broad tracks (0.54 m). Note also the unusual arrangement of the rounded entry hatch on the sides of the hull. (BA)*

*Upper right and right: In January 1942 driving tests in snow were undertaken with the VK 1801 at St. Johann in Tirol. In the lower picture, the tank is just being cleaned of ice and snow. The entry hatch and the armor plate of the roller shield can be seen. Of particular interest is the handhold above it, which could if necessary also be used as a step. The upper picture shows details of the running gear. This consisted, as in the VK 601, of five overlapping road wheels, sprung by transverse torsion bars. (2 x BA)*





# VK 901/1601

In 1938 the HWA called for a light, track-driven reconnaissance vehicle. For it, contracts were given to the Sauer firm of Vienna and to Daimler-Benz/MAN. While the Sauer firm projected a completely new wheeled/tracked vehicle, the combination of Daimler-Benz and MAN used the Panzer II, Type D as the basis for what was designated the VK 901.

In 1939 the first chassis of the VK 901 could already be delivered for testing. Instead of the required top speed of 60 kph, though, the vehicle could only reach 50 kph, since the Maybach motor's output of 145 HP was no longer sufficient for the vehicle's weight of 9.2 tons. The armament consisted of a 2 cm KwK 38 and a coaxial MG 34. In 1940 the pro-

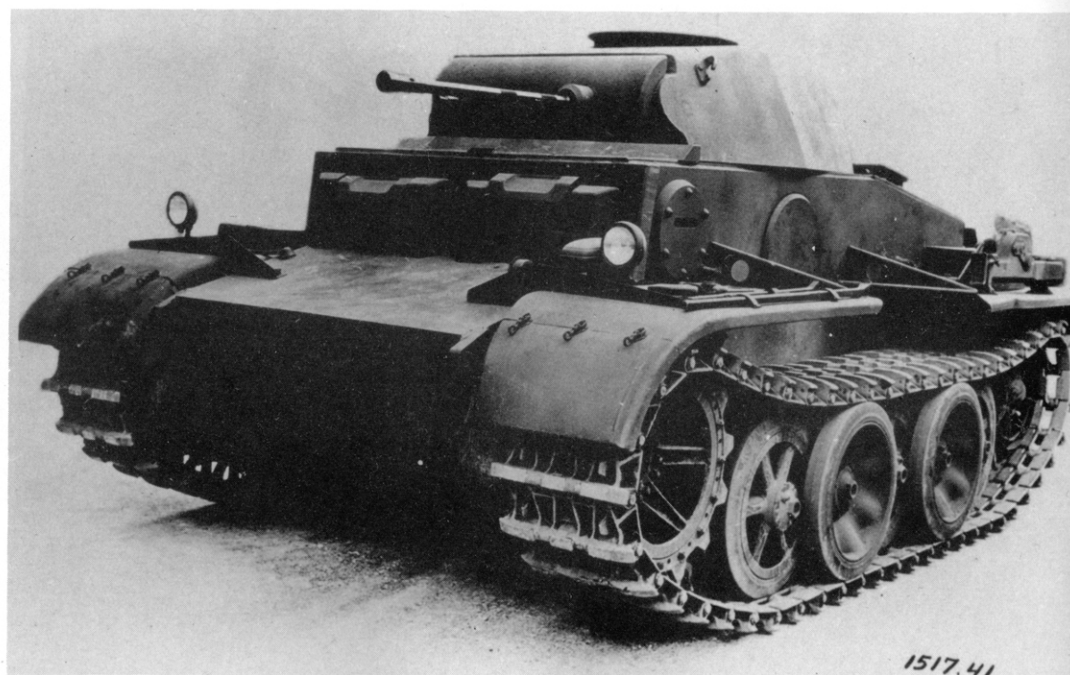
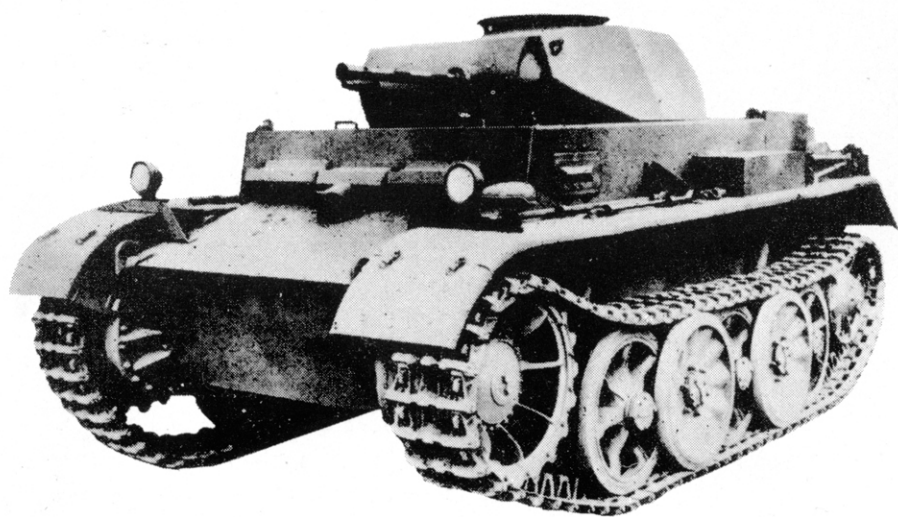
duction of a 0 series of 75 vehicles began, but after the twelfth vehicle, the production was halted, and none of the twelve saw active service.

In 1941 the VK 901 was modified into the VK 903, which differed from its forerunner in technical details. The newly developed Maybach HL 66, producing 200 HP, was to be installed, which would allow it to reach a top speed of 60 kph. But since this tank was already obsolete at this point in its development, only one prototype was ever built.

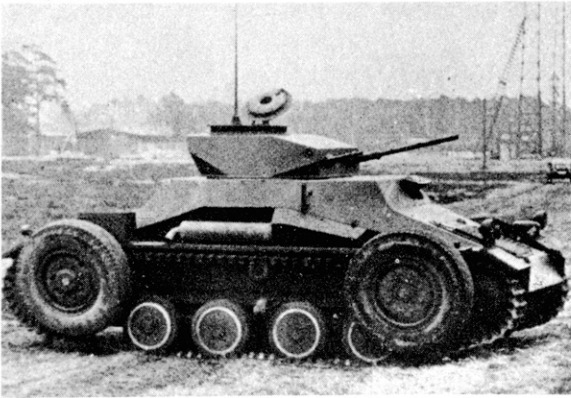
Running parallel to this development was that—also based on the Panzer II—of a “most heavily armored” type (VK 1601). In addition to a 0 series of 30 vehicles, which was built beginning in June 1940, the

HWA also awarded a contract for 100 more of them, but the contract was withdrawn. Aside from the considerably heavier armor, the technical details (motor, etc.) were those of the VK 901, as was the armament. The relatively high fighting weight of 17 tons limited its top speed to 30 kph. No active service of the VK 1601 with the troops is known.

*Below: The VK 901, developed from the Panzer II in 1938, was an attempt to fulfill the wishes of the HWA for a track-driven armored scout car. The thickness of the armor was 15 to 20 mm, which allowed a light fighting weight of only 9.2 tons. Yet the required top speed of 60 kph was not attained.*



# VK 1301 Luchs and other Recon- naissance Tanks



Above: Another concept of a track-driven reconnaissance tank was proposed by the Sauer firm of Vienna. Their newly developed vehicle could run on either wheels or tracks. Accordingly, the top speed of the 6.5-ton tank was 80 kph with wheels or 30 kph with tracks. The turret of the armored scout car was almost identical to that of the VK 901. Since the production of the first prototypes lasted until June 1942 and the vehicle was outmoded by then, so no further development was done.

Opposite page, picture at right: The heavily armored development of the VK 901 was the VK 1601 (frontal armor: 80 mm, VK 901: 30 mm.). As in the VK 1801, the rounded entry hatches were set in the sides of the hull. The tracks, 0.23 m wide, were unlubricated and twice driven. The crew consisted of three men. The armament consisted of a 2 cm KwK 38 and an MG 34 mounted beside it. (BA)

Since all the wheeled vehicles previously used as armored scout cars had had major difficulties with the extremely unfavorable terrain in Russia, the need for a track-driven reconnaissance tank became more and more urgent. For that reason, the HWA ordered that the work on the VK 1301, which had been in progress since 1939 already, should be hastened. This vehicle's development had been based on the experience already gained from the VK 901 prototype. The tank was to correspond to the dimensions of the VK 901, but its fighting weight of 12.9 tons was some 2.7 tons more than that of the VK 901. In 1942 a prototype of the VK 1301 in soft-steel construction had been finished, and it was being tested exhaustively.

After a few minor improvements, the vehicle (VK 1303) went into series production as Panzer II, Tyle L (Luchs). The weight of the "Luchs" (Lynx) was one ton less than that of the VK 1301. The front armor plate was 30 mm thick, and the rest from 12 to 20 mm. The four-man crew had a 20 mm KwK 34 and a MG 34 mounted next to it as their armament. The 200 HP Maybach HL 66 engine already installed in the VK 903 gave the vehicle a top road speed of 60 kph.

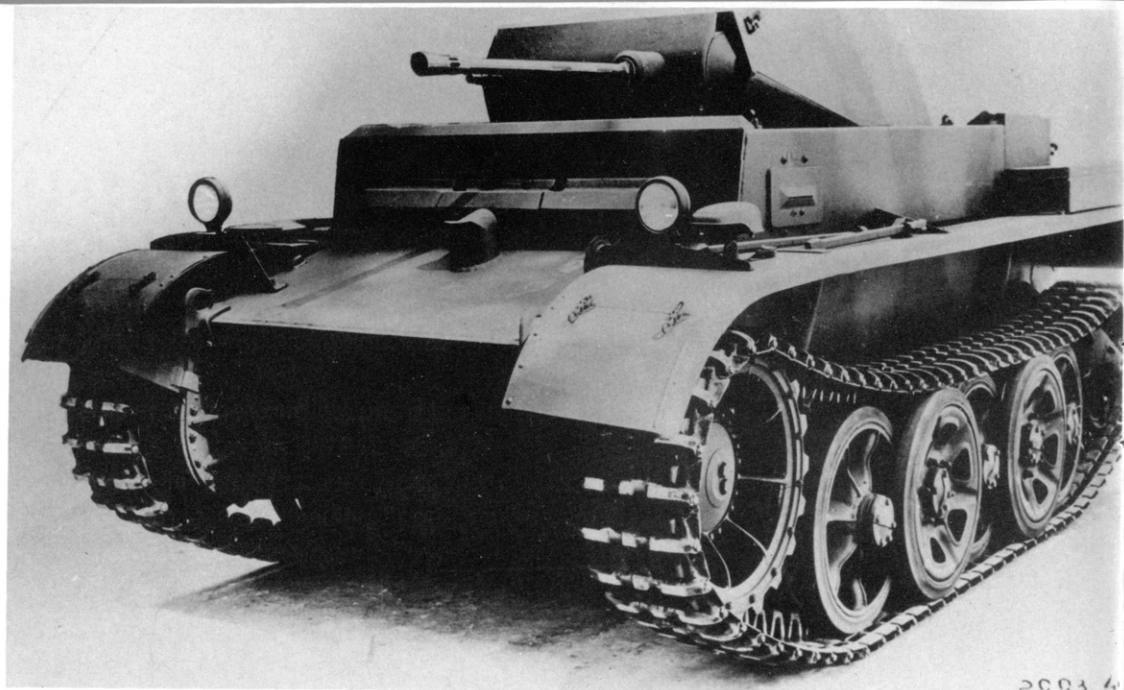
All of the 100 "Luchse" that were built were utilized exclusively by reconnaissance units. There it soon became clear that the armor plate, like the armament with the 20 mm KwK, was inadequate. In order to improve the latter situation, a turret was built that was open at the top and carried the 50 mm KwK/L/60 formerly used in the Panzer III. But this version, of which 31 were delivered by the beginning of 1943, also fell short of fulfilling the needs of the troops.

The "Luchs", though, was only a maksehift solution anyway. The "Leopard" had been intended as the genuine reconnaissance tank. This decision was based on the experience gained with the VK 1601, which were evaluated in the VK 1602. Two versions of the "Leopard" were then developed: a light, thinly armored, fast-moving 18-ton type and a heavier one of 26 tons, which was to have armor plate of 20 to 60 mm (hull) and 50 to 80 mm (turret), and to be armed with a 50 mm KwK. While the troops pleaded for the lighter version, Hitler decided in favor of the heavier type in the summer of 1942. But then it was found that such a tank, aside from its armament, was very similar to the "Panther", and so the "Leopard" project was halted in January 1943, so that a reconnaissance version of the "Panther" could be developed instead. For this purpose, the HWA suggested that the turning turret with 50 mm KwK 39/L60, projected for the VK 1602 and later used in the eight-wheel "Puma" armored reconnaissance vehicle, be adopted. This project too was not followed up.

In the spring of 1943, after the production of the "Luchs" had been halted and the "Leopard" project had been abandoned, the Bohemian-Moravian Motor Works were commissioned to construct a transitional solution in the period from January to April 1944 on the chassis of the Czech Panzer 38 (t), with [p. 14] a new body, as a light reconnaissance tank. The armament to be installed was the 20 mm gun in a



hanging mount, already used in the four-wheel Sd.Kfz. 222 scout car. Toward the end of 1944 the BMM was working on a scout car on the chassis of the "Hetzer" tank, which was to use a short 75 mm KwK on a fixed mount instead of the 20 mm hanging type. Series production was planned for mid-1945.



Above: A picture of the only completed VK 1301, including turning turret with full armament. (BA)

Left: The running gear of the VK 1301 was also subjected to thorough winter testing in St. Johann in Tirol in 1942. For these tests the vehicle was fitted with a temporary upper body that was to protect the crew from the cold a little. This body also enclosed the driver's seat, in front of which large windows with wipers were fitted in order to provide good visibility. (BA)



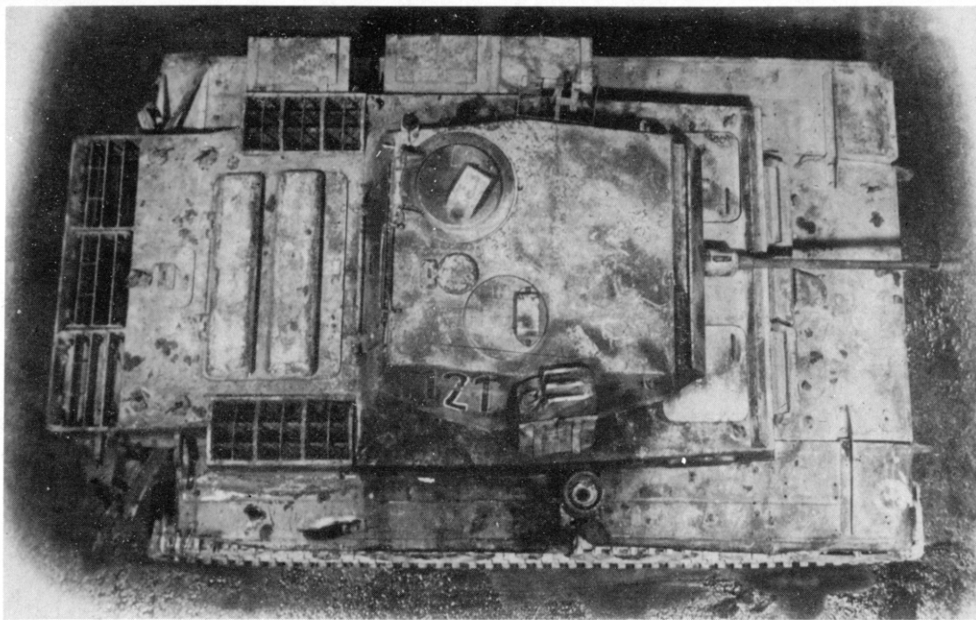
*This VK 1301 charges over the deep snow of the terrain at top speed. The exhaust system of the tank was mounted at the rear, and can be seen here. (BA)*



*This picture shows the VK 1301 already fitted with the planned turret, but as yet without weapons. (BA)*



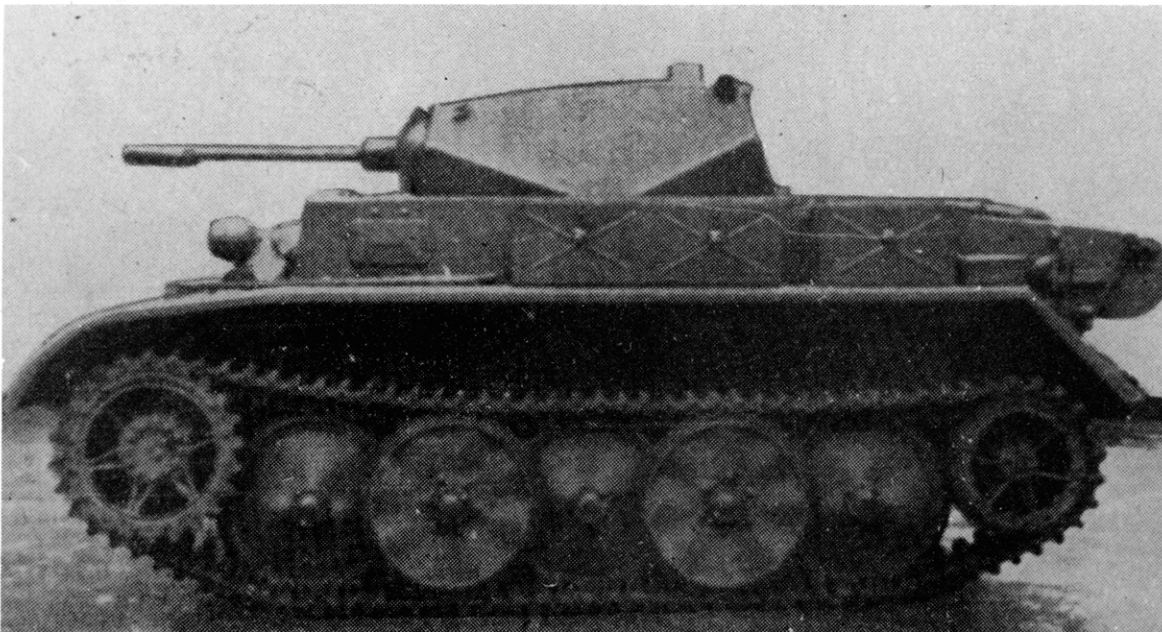




*Above: This view gives a good impression of the layout of the vehicle. The entire rear section was taken up by the engine, whose air-intake and ventilation openings, protected with grids, can be seen clearly. The body, unlike that of the VK 1301, extended out over the hull so it could hold the newly designed turret. (RAC)*



*Above: This side view from the rear clearly shows the exhaust system and the large entry hatch in the back wall of the turret. In addition, the crew could also get into the tank through a hatch on top of the turret. Appropriate to its use as a reconnaissance tank, the "Luchs" had a powerful radio, the umbrella antenna of which can be seen clearly here; it was also used in the "Panther" command tank. (BA)*

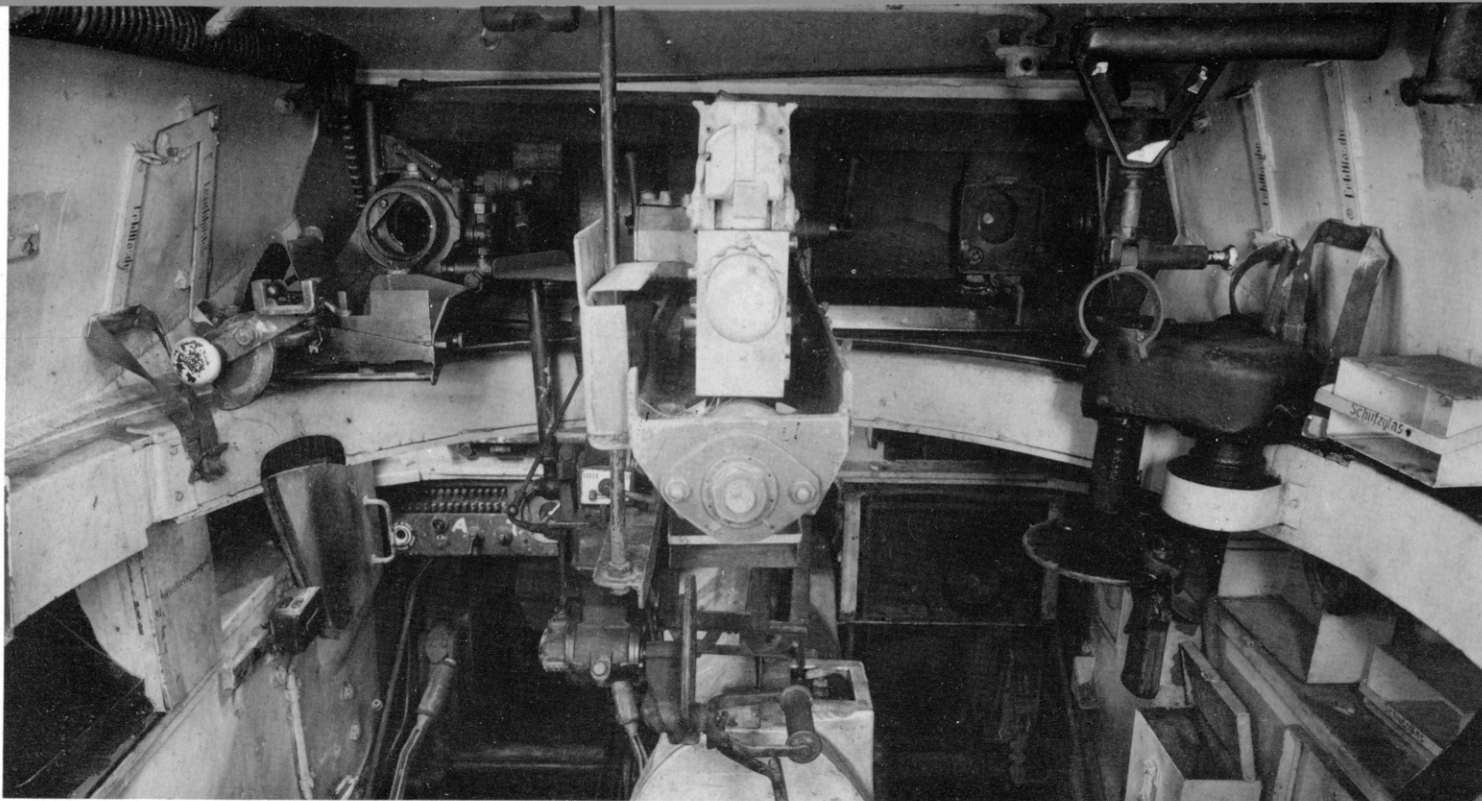


*Left: A side view of the Panzer II L ("Luchs"), later built in a small series. Unlike the VK 1301, the "Luchs" had full disc wheels. They had rubber tires and were mounted on transverse torsion bars. The first and last road wheels were also supported by one shock absorber each. (BA)*



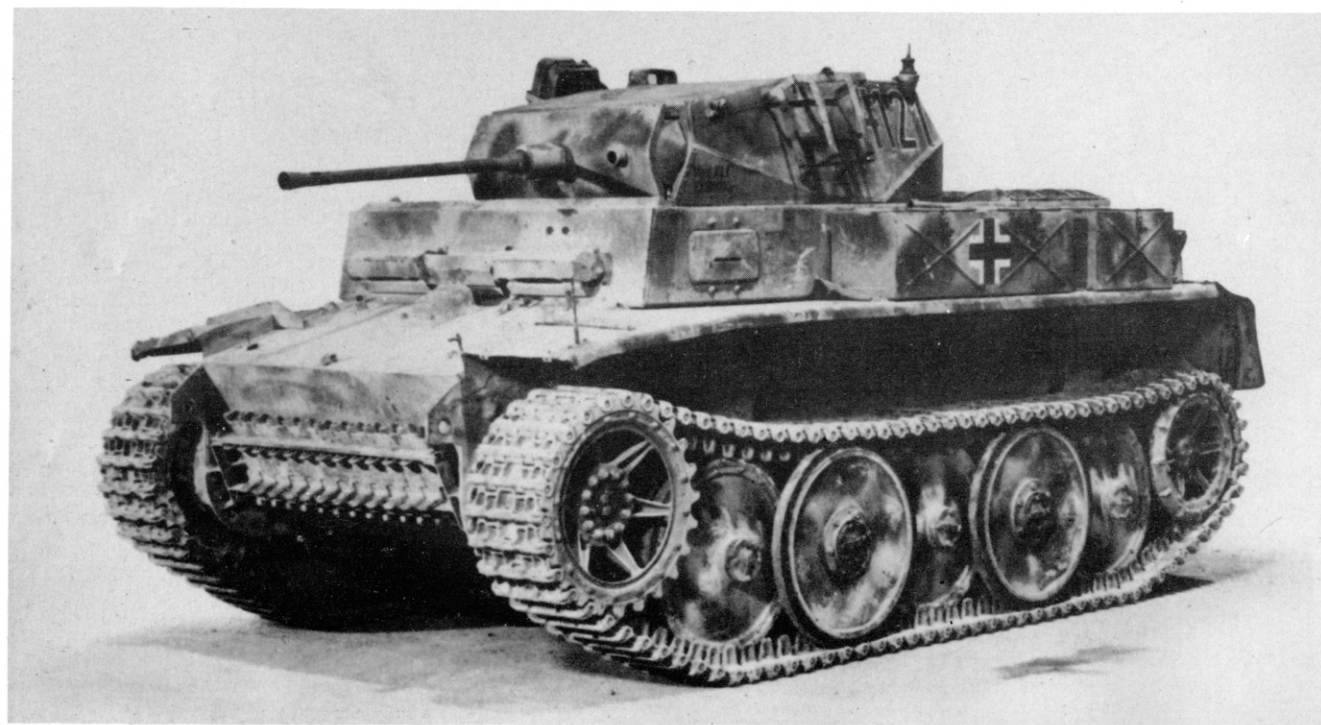
*One of the extremely rare action photos of the "Luchs". It was used almost exclusively in Russia. The design of this tank had been made with the extreme climatic conditions of Russia in mind. Thus, it had a cooling-water exchanger that allowed it to be filled with already warmed cooling fluid from other vehicles when the outdoor temperatures were low. The armor plate, with a maximum thickness of 30 mm, was extremely meager. For extra protection, pieces of a Russian tank's tracks have been added above the driver's visor on the hull, just below the bottom of the turret. (BA)*

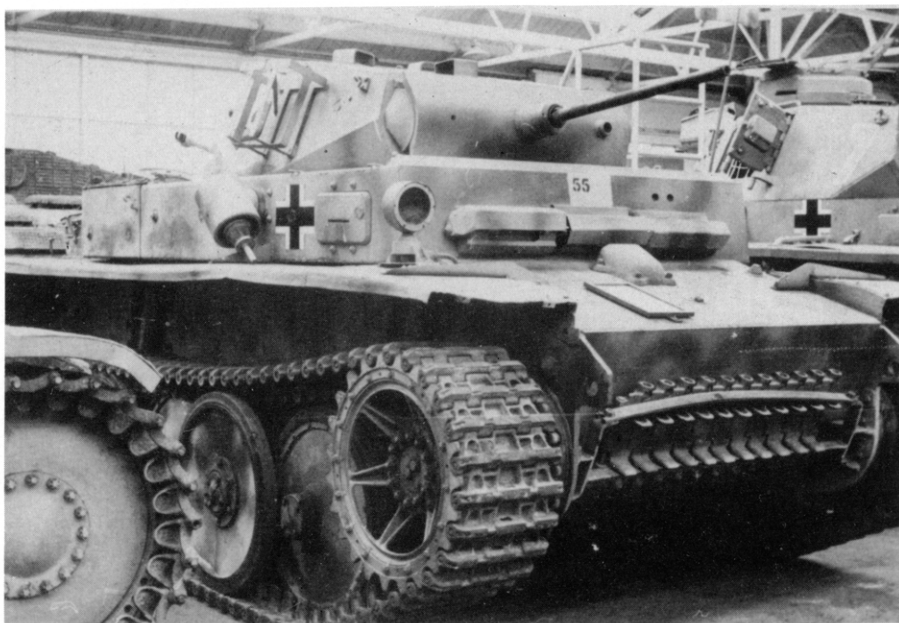




By the end of 1943, a total of 100 Panzer II Type L, armed with a 20 mm KwK, had been delivered to the troops by MAN. Unlike the VK 1301, the main armament of the "Luchs" was not mounted to the right, but located in the middle of the cylindrical mantlet. The racks attached to this tank could hold reserve fuel canisters. With a fuel supply of 235 liters and a consumption of 150 liters per 100 km off the road, the "Luchs" had a range of 175 km. (IWM)

Left: A look inside the turret of the "Luchs". In the center is the 20 mm KwK, which was adjusted to the right elevation by handwheels. To the left of it are the attachments to which a MG 34 could be fitted if necessary. In all, the "Luchs" carried 330 rounds of 20 mm ammunition and 2,250 machine-gun bullets. (IWM)



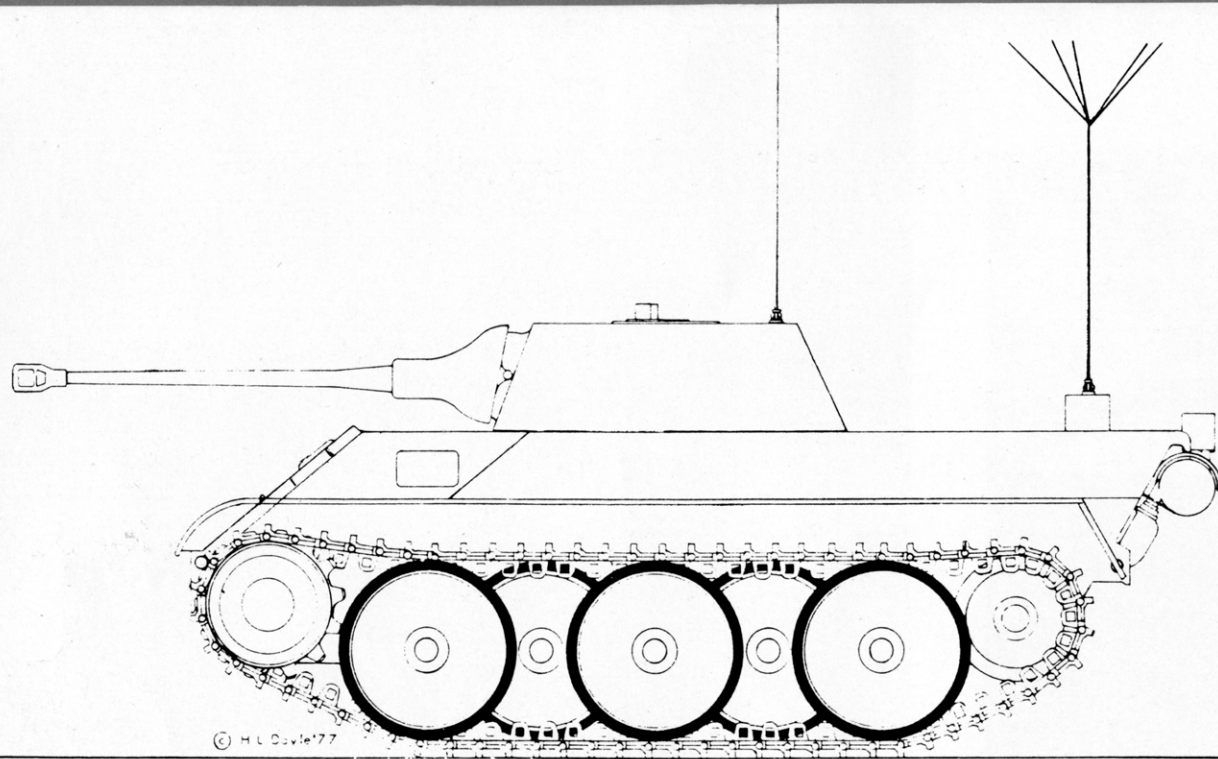


Above: Probably the only surviving "Luchs" tank is seen today at the Royal Armored Corps Tank Museum in Bovington, England, along with numerous other German armored vehicles.

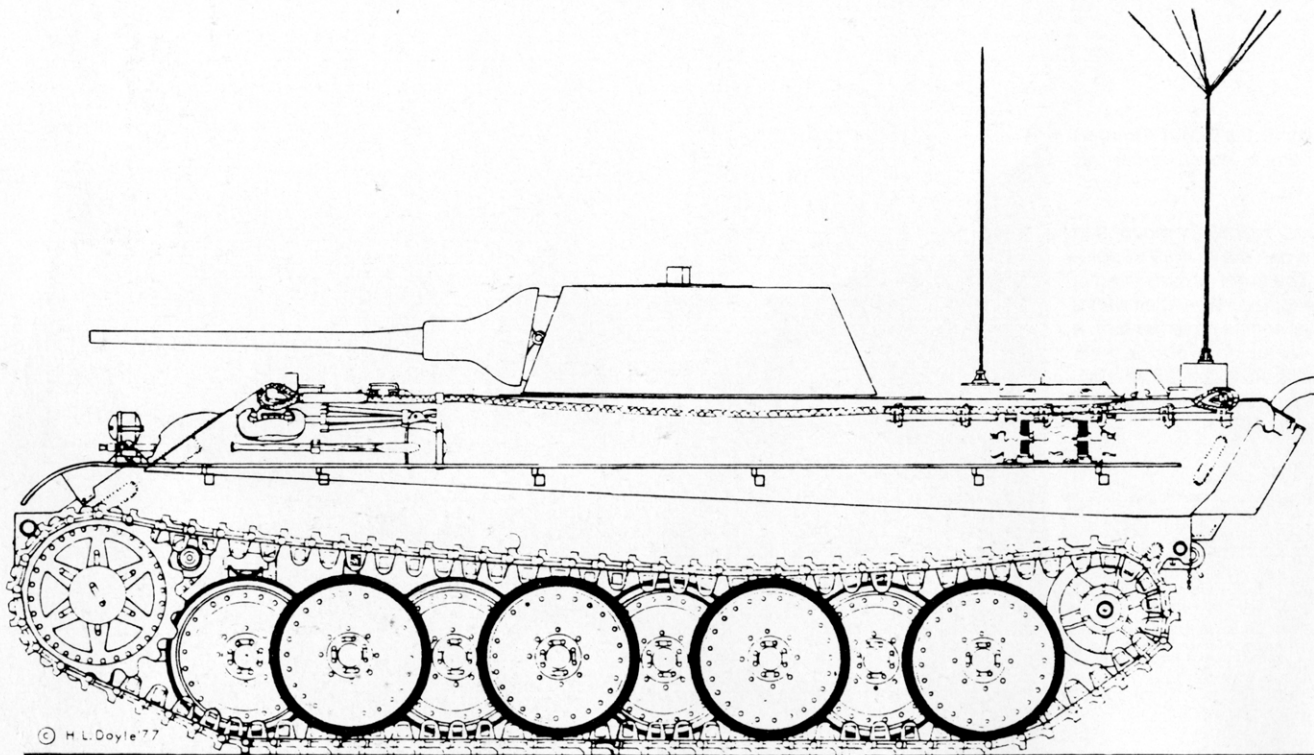
Upper and lower right: After "Luchs" production ended, but a real successor model had not yet been found, so the Bohemian-Moravian Motor Works created a makeshift solution early in 1944, using 118 chassis of the Panzer 38 (t) tank. The turret already used in the four-wheel armored scout car was used; it was open at the top and was fitted with a 20 mm KwK 38 L/55 beside a coaxial MG 42. The Praga EPA/2 engine gave the tank a top speed of 42 kph, and the armor plate was relatively thin, measuring 15 to 30 mm. Thus, this vehicle was inferior to the "Luchs" in every way. The Aufklärer 38 (t)—nowhere near all of which reached the troops—was used as of April 1944 by the armored reconnaissance units on both the eastern and western fronts. (2 x BA)







Since the "Luchs" tank was insufficient in both armor and armament, the MIAG firm was awarded a contract to design a successor model. For it, the VK 1601 was developed further into the VK 1602. This vehicle, also known as the "Leopard" reconnaissance tank, is shown in the upper drawing. But since there was a certain parallelism with the simultaneous development of the "Panther", the project was halted while still on the drawing board.



Instead of that, the possibility of designing a "Panther" reconnaissance tank was investigated (see lower drawing). This path too was not followed in the way illustrated, since the projected 50 mm KwK was regarded as an unduly weak armament. Instead, a prototype of the "Panther Armored Reconnaissance Car" was prepared. This vehicle was based on the "Panther" Type D but, instead of the 75 mm tank gun, was fitted with a dummy weapon.

# Special Types of the Panzer III, IV and V VK 2001

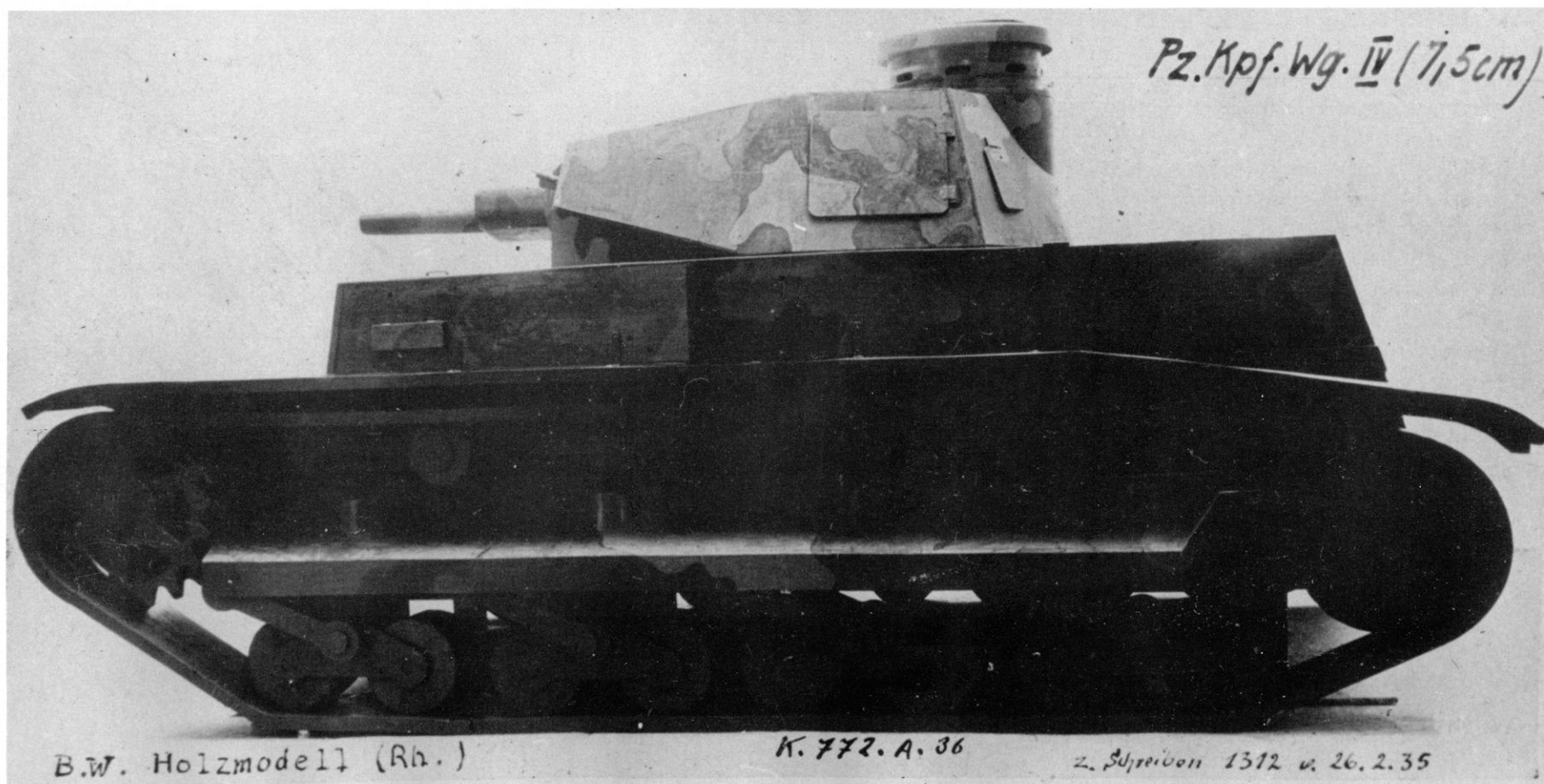
When the In 6, under Generalmajor Lutz and Oberstleutnant Guderian, conceived the creation and equipping of the German armored troops in 1931-32, two tank types were projected, a lighter, faster battle tank with armor-piercing weapons (Panzer III) and a support tank with a large-caliber tank gun (Panzer IV). For the development of the latter, which was carried on until 1935 under the camouflage name of

"Bataillonsführerwagen" (BW), and for which the HWA anticipated a weight of 18 tons, the firms of Rheinmetall and Krupp were given contracts.

The prototype built by Rheinmetall (VK 2001 RH) had a chassis of four trucks, each with two rubber-tired road wheels, very much like those of the "Neubaufahrzeug" developed by the same firm (see above). The tank had a 300 HP motor, which gave it

a speed of 35 kph. But after several modifications, it was the Krupp design (VK 2001 K) that was put into series production later.

It should be noted that, in addition to the two firms named above, MAN was also involved in the development of a similar 18-ton tank. This design (VK 2001 MAN), though, did not result in the building of a test vehicle.



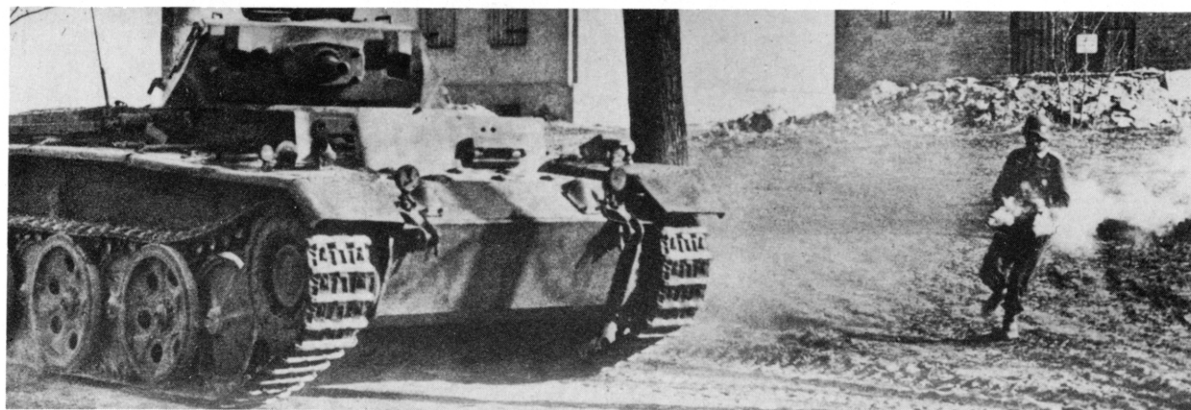


# The Panzerkampfwagen III/IV

In 1941 the HWA sought to achieve a certain uniformity in the Panzer III and IV, which would hopefully result in many advantages for their production. It was believed that, with the two vehicles built the same (except for their armament), production would be increased, repairs of damaged vehicles hastened, and training time shortened. In addition, the HWA was convinced that this would provide great flexibility in production, since the emphasis could be shifted to either one of the two types as needed.

A uniform box running gear was planned for the two vehicles, resembling that of the halftrack vehicles. The Famo firm had already gained experience in this realm and attained a decrease in roll and ground pressure, as well as a higher limit of wear. Several test vehicles with this new running gear were built on the basis of Panzer III and tested. Krupp was also working intensively on the Panzer III/IV.

Along with the further development of the previous Panzer III/IV, there were already numerous other designs based on the uniform chassis of Panzer III/IV. Some well-known types were the Sturmgeschütz III/IV assault gun, with a 75 mm L/70 gun, built by the Alkett and MIAG firms, a 105 mm assault howitzer, likewise made by Alkett, a heavy armored howitzer with its own ammunition transporter, made by the Stahlindustrie GmbH, and a Sturmpanzer III/IV.



*The few Panzer III chassis with Famo box running gear were used almost exclusively for training purposes at various troop training bases. The lower picture shows practice in attaching a hollow charge to the engine compartment of a tank. The prototypes had the same turret as the Panzer III Type J, with the short 50 mm KwK L/42 (2 x IWM)*

These efforts for uniformity were particularly urgent under the pressure of the conditions in the spring of 1944, yet the development of the Uniform Chassis III/IV was halted in October 1944, because there was no further demand for these obsolete tanks and their self-propelled mounts and other variants. Only the

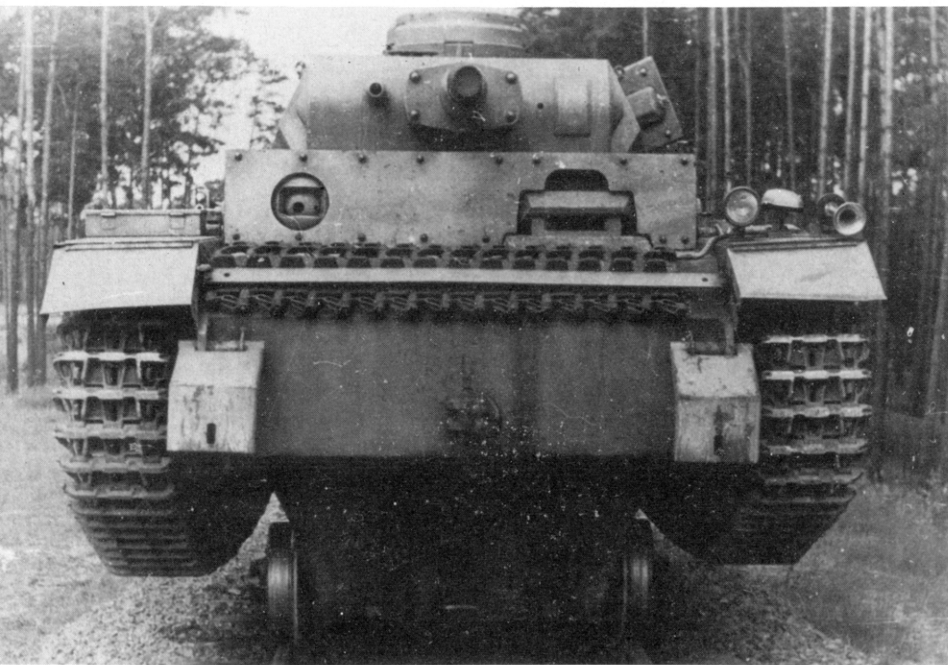
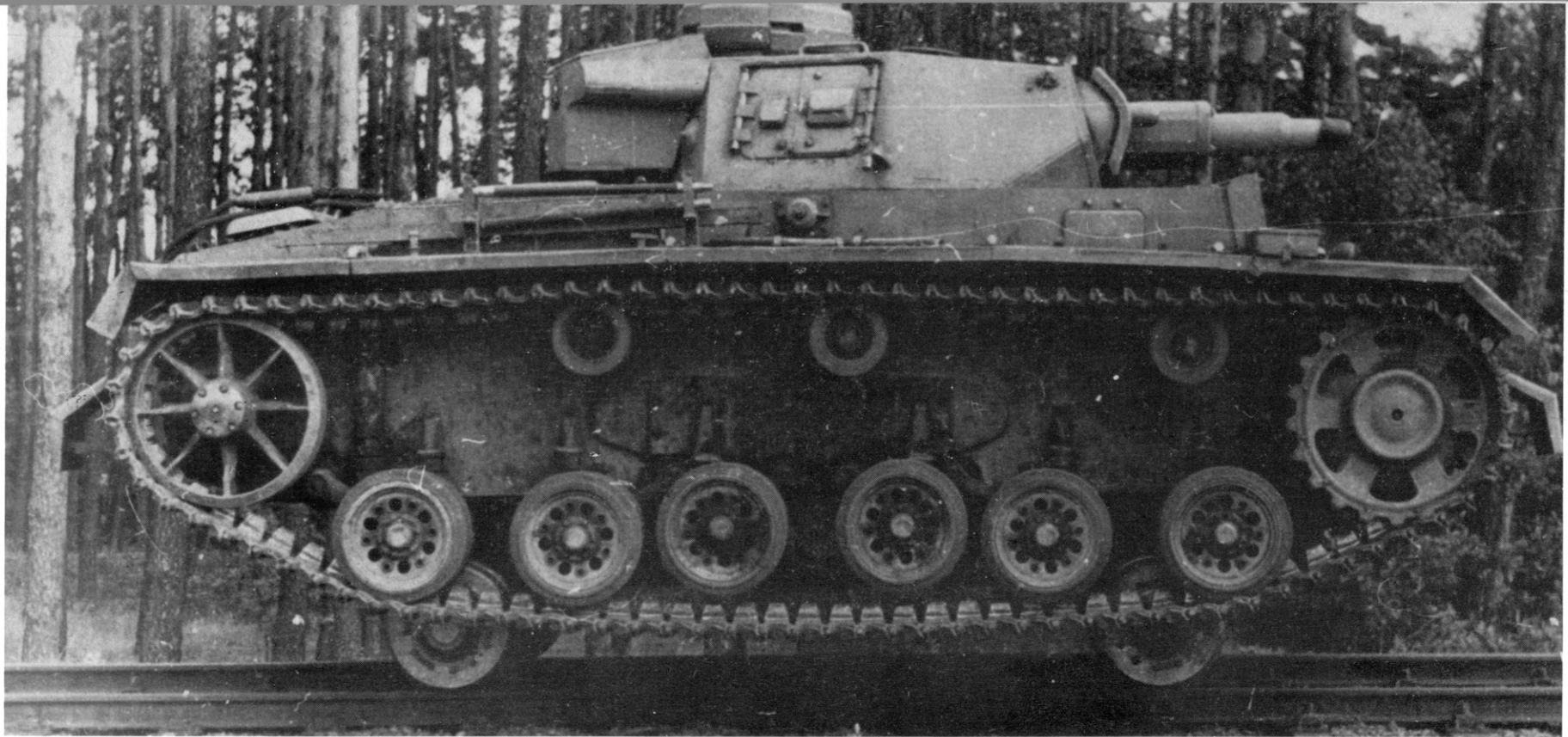
chassis of the Czech 38 (t) and the Panther/Tiger were to remain in use for armored scout cars, self-propelled gun mounts and assault guns.



*The Panzer III with Famo running gear was also used for testing purposes, as seen here in the winter of 1943, to test the tank trailer sled built by the Ambi.-Budd.-Werke. This device was connected to the tank by a towbar three meters long. It was meant to provide effective infantry support for the tank in the winter conditions of Russia. This project too, sensibly, never went into production. (3 x BA)*







*In 1942 the Sauer Werke of Vienna developed a Panzer III railcar. A prototype was finished in mid-1943 and introduced to the HWA by the Arys troop training center in October of that year. The vehicle was meant to secure railroad lines in partisan areas, especially in Russia. To fit on the rails, the arrangement of the road wheels had to be modified from the usual pattern. Note the "buffers" on the front and back. (BA)*

*Left: Front view of the rail Panzer III. It had the turret of Panzer III Type N, with a 75 mm KwK L/24. The rail running gear, retractable by a lifting apparatus, was driven by the engine via four screw spindles. On test runs, speeds up to 100 kph were attained on railroad lines. Only a few prototypes of this vehicle were ever built. (BA)*

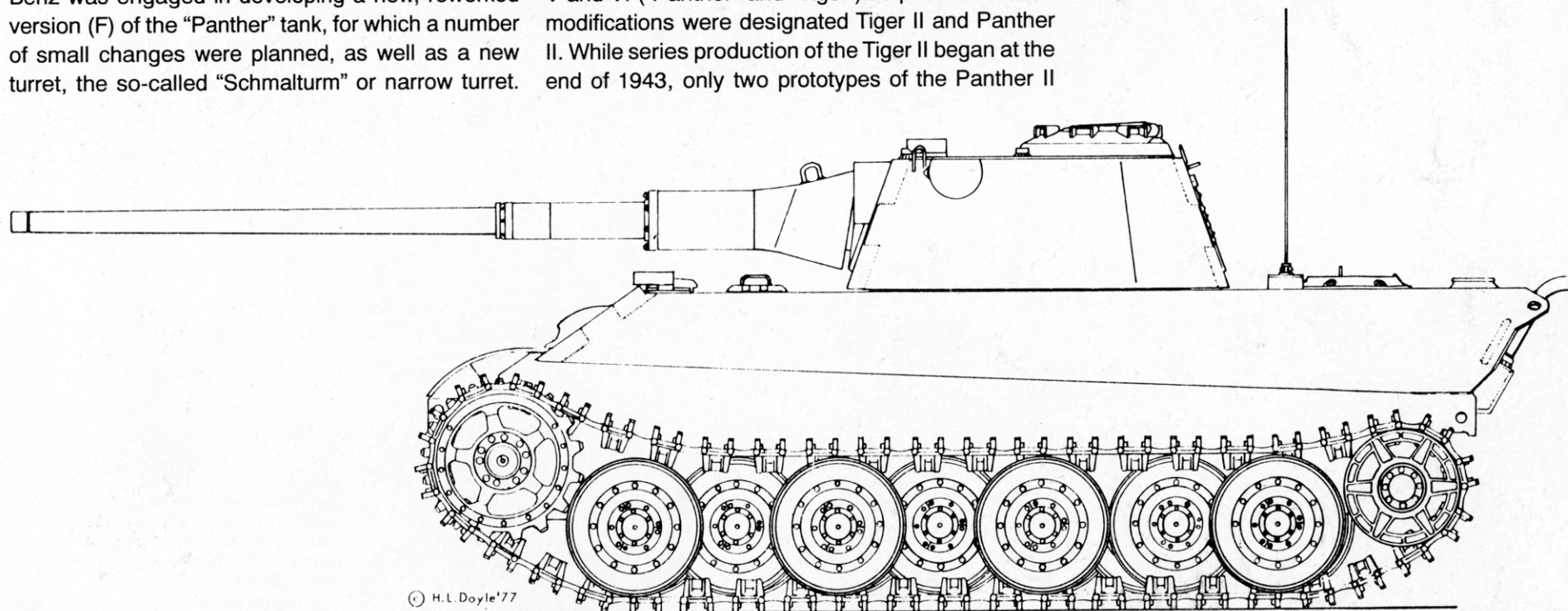
# Panther with Narrow Turret and Panther II

For the Panther, too, successor models were in the works by the end of the war. In 1944 Daimler-Benz was engaged in developing a new, reworked version (F) of the "Panther" tank, for which a number of small changes were planned, as well as a new turret, the so-called "Schmalturm" or narrow turret.

This was meant, in comparison with the old turret, to offer a smaller surface to be hit, and to be more heavily armored. Yet the space inside was not to be decreased, and a turret weight of eight tons was not to be exceeded. Instead of the roller mount used before, a "pig's-head" mount was planned, such as was used in the Tiger II, since it was much more likely to deflect shots. The turret was also prepared for the installation of the infrared night-vision device, which was then being developed.

As with Panzer III and IV, and for the same reasons (simplified production, easier service and repairs), the HWA required as much uniformity of Panzer V and VI ("Panther" and "Tiger") as possible. These modifications were designated Tiger II and Panther II. While series production of the Tiger II began at the end of 1943, only two prototypes of the Panther II

had been built by the end of the war. The narrow turret already described was intended to be used on the Panther II. The installation of a recoil-free 88 mm KwK, as in the Tiger II, was investigated. In place of the box-type running gear of the Panther I, the "Staffel" running gear of the Tiger II was to be used, as it was considerably simpler and therefore could be built more quickly and cheaply. The fighting weight of the Panther II was about 50 tons, some seven tons heavier than the Panther I.



*A design drawing of the "Panther II", of which only two prototypes had been finished by the end of the war. One of them was taken to the U.S. Armored Troop School at Fort Knox, Kentucky, where it remains to this day.*





*Several Type G "Panthers" were fitted, for testing purposes, with the narrow turret planned for Type F.*

*The narrow turret was much more heavily armored than the earlier "Panther" turret; the front armor was 120 rather than the previous 80 mm thick, the side armor 60 instead of 45 mm. In place of the roller mount, it used the "pig's-head" mount, which deflected shots much better.*



*On the side and rear walls of the turret there were openings for machine pistols, since such an additional close-combat weapon had proved to be necessary, especially on the eastern front.*

*The narrow turret was also supposed to be used on the projected "Panther" II, where the possibility of mounting the 88 mm KwK used in the "Tiger" II, instead of the formerly usual 75 mm KwK, was to be explored. (2 x BA)*

# Flamethrowing Tanks

In order to make the flamethrowers used by the engineers for attacking buildings and bunkers more mobile, and especially to allow their use from a protected position, several tanks were equipped with a flame nozzle instead of their main weapon. These modifications were often undertaken by the troops themselves, using Panzer I to III, but some were also made by the industry.

In the Afrikakorps, Panzer I Type A tanks were fitted with a Flamethrower 40, which was installed in place of the righthand machine gun (shown in Volume 18, page 47). Ninety-five Panzer II, Types D and E, were also equipped with flamethrowers. The Flammpanzer III built on the basis of the Panzer III Type M was the only rebuilt tank that was produced in quantity by the industry. One hundred Panzer III tanks were supplied without weapons late in 1942 by the MIAG firm of Braunschweig to the Wegmann AG in Kassel, which equipped the tanks with the flamethrowing apparatus. In place of the 50 mm KwK they had a 14 mm flamethrowing pipe. The container that held the burning fluid was located inside the tank. The flamethrowing tanks were meant to be used in the built-up area of Stalingrad.

In December 1942 the first two companies could be supplied with these vehicles, but because of the war's events, the tanks never reached their original area of use. Since the vehicles also failed to meet



the troops' requirements, a number of them were soon rebuilt into normal battle tanks. Despite these negative experiences with the Flammpanzer III, Hitler ordered in November 1944 that the flamethrowing apparatus left over from rebuilding the Flammpanzer III be installed in available tanks. In all, 35 Panzer III (with two flamethrowers in their turrets), Sturmgeschütz III and Jagdpanzer 38 (t) "Hetzer" (with the gun replaced by a flamethrowing pipe) were rebuilt. Hitler even wanted the Jagdtiger to be rebuilt into a flamethrowing tank, but his wish was not fulfilled.

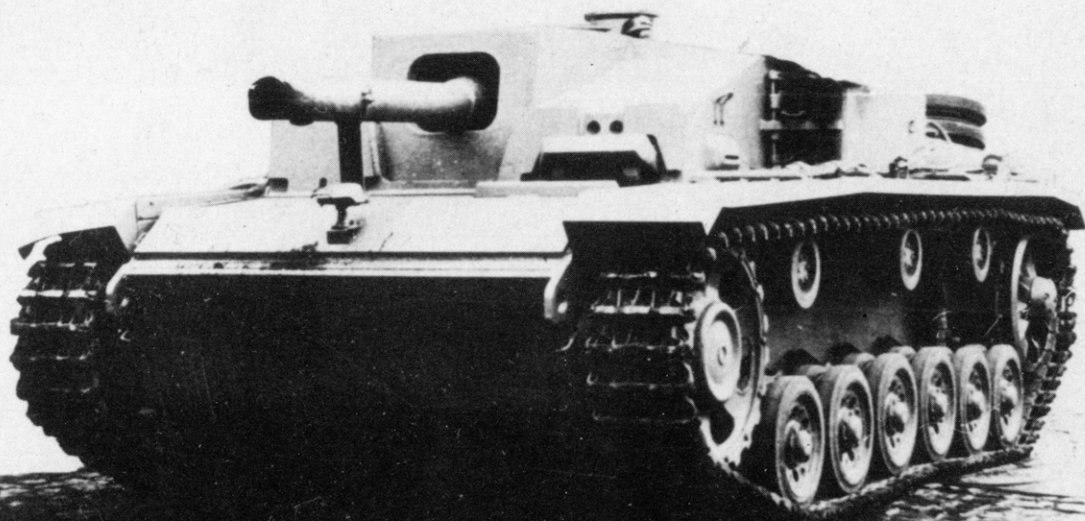
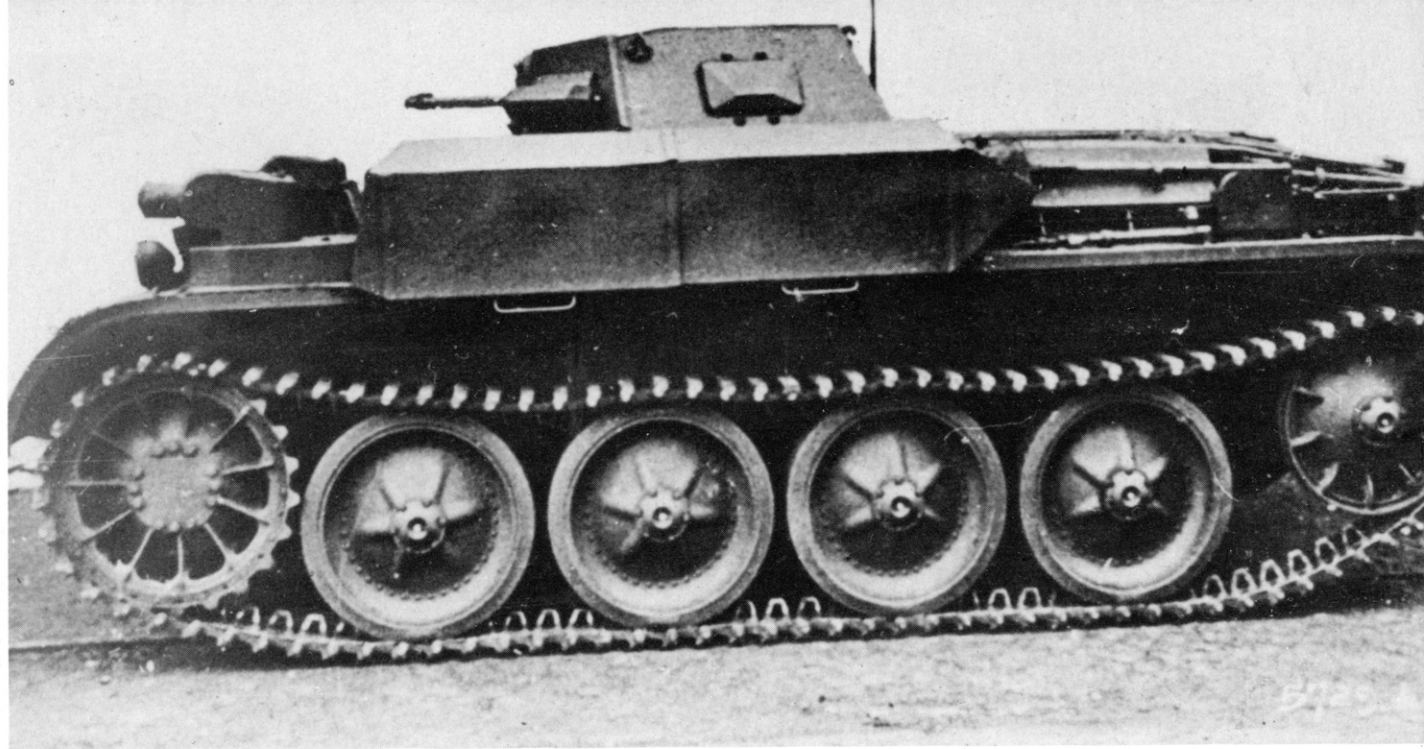
*This factory photo shows a newly delivered Flammpanzer III. One hundred Panzer III Type M were fitted with a flamethrowing apparatus by the Wegmann firm of Kassel. (BA)*





*Some of the heavy "Char B1" tanks captured in France were also rebuilt and used as flamethrowing tanks. The 75 mm howitzer at the front of the tank was replaced by a flamethrower. (BA)*

Ninety-five Panzer II Type D and E tanks were each fitted with two flamethrowers, one mounted in the gun mount and the other in a separate turret at the front of the tank. This apparatus, though, has a meager range of 25 meters. (BA)



In November 1944, Hitler ordered that available flamethrowing apparatus be mounted to available tanks in place of their primary armament. This process included the Sturmgeschütz III. A Sturmgeschütz thus modified is shown in this picture. The exact number of rebuildings of this kind, though, is not known. (BA)





*The flamethrowing tank most widely used by the troops was the Flammpanzer III. It carried 1,020 liters of inflammable oil in two containers, which were installed inside the tank. The three smoke-cartridge launchers attached to the turret walls can be seen clearly here. Almost every armored unit had a platoon with five flamethrowing tanks. (BA)*



Two Flammpanzer III at a troop training center. The four-digit numbers on the turret can no longer be identified. The burning oil carried inside the tank was directed into the pipe by a pump and there ignited by high-tension electricity (1,000 V, 300 A). The flamethrower was operated, via foot pedals, by the tank commander, who also had to operate the machine gun, elevation apparatus and turret turning apparatus. The flamethrowing pipe had a field of elevation from +20 to -10 degrees. Thus, targets of varying heights and ranges could be attacked. After every burst of fire, though, the air was so full of smoke that the day was turned to night and new targets could scarcely be seen. (BA)





*Here a Flammpanzer III of the 44th Infantry Division is seen. The burning oil capacity of 1,020 liters allowed eighty bursts of flame, each two to three seconds long. These vehicles, though, did not live up to the troops' expectations. For that reason, some of the Flammpanzer III tanks were soon (1943) rebuilt into normal battle tanks.*

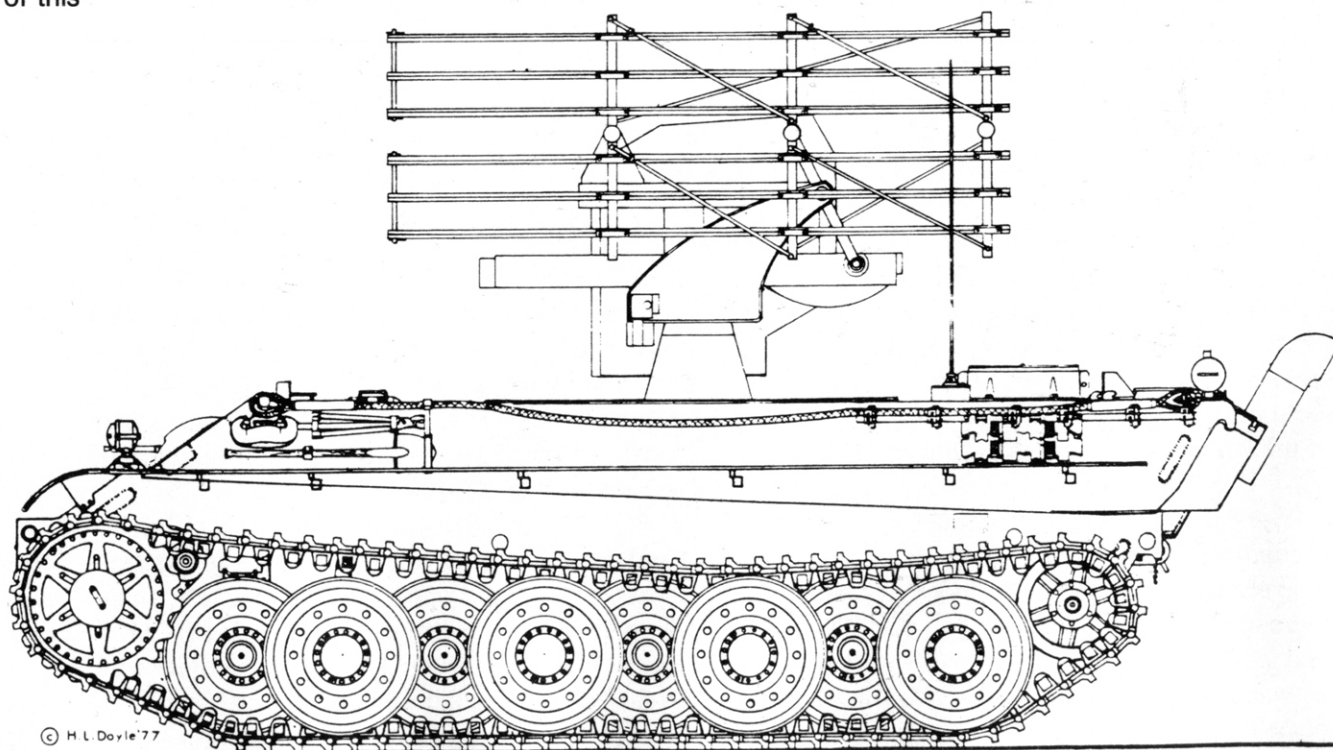
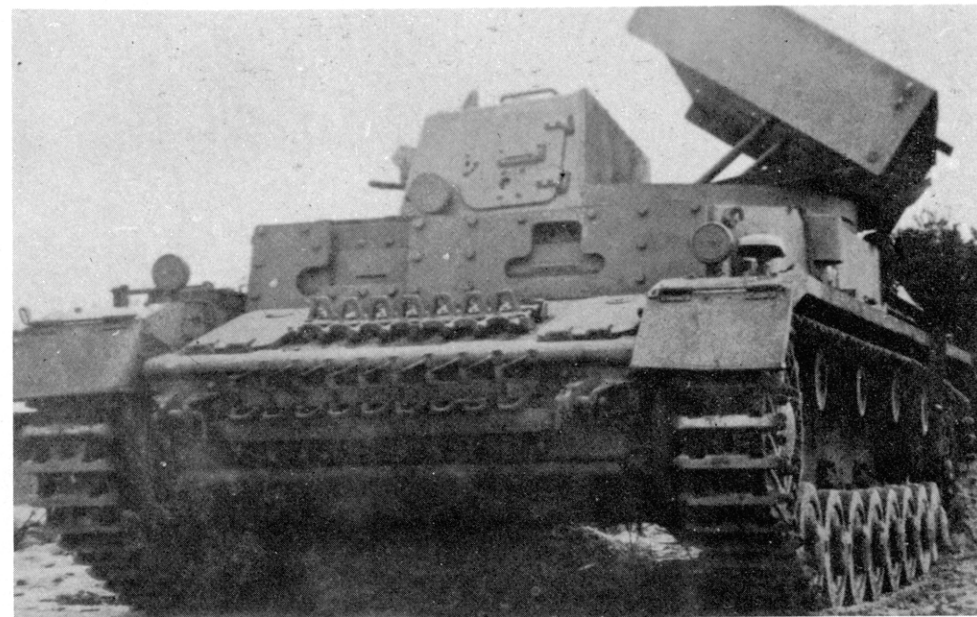
# Rocket Launchers

Toward the end of the war, the possibility of installing launching frames for rockets on tank chassis, in addition to their customary use on the Schützenpanzerwagen, so that the launchers could be used in rough country and from protected positions. Thus, a number of captured French UE infantry tractors were fitted with 28/32 cm launching frames. These were mounted on a platform, on the rear of the vehicle, which could be raised and lowered depending on what shot angle was wanted. A rocket launcher was also mounted on the Panzer IV chassis in place of the turning turret. Prototypes of this vehicle were produced and used.

The Skoda firm also worked on a project in which the 105 mm rocket launcher was mounted on the "Panther" tank chassis. The launching chambers were attached to the mount of the 88 mm Flak gun. This was mounted in place of the turret and could be turned. Because of the constant shortage of "Panther" chassis, this design was not put into production.

*Right: Toward the end of the war, the Skoda firm designed a 105 mm rocket launcher that was to be mounted on the chassis of the "Panther" tank. The range of elevation of the launcher extended from -5 to +75 degrees. The chambers, 3.5 meters long, were welded together of steel angle irons.*

*Right: This picture shows the rocket launcher on a Panzer IV chassis. In front of the launching frame, which can be tilted at various angles by a hydraulic lift, is an armored cabin with a machine gun for the crew's use. The bow machine gun usually mounted on the Panzer IV has been replaced by a visor slit.*





# Diving and Swimming Tanks

After the end of the French campaign in the summer of 1940, Germany developed plans for crossing the English Channel and invading Britain (Operation "Sealion"). To do this, there was a need for amphibian and diving armored vehicles. In October 1940, an armored unit of volunteers was assembled at Putlos in October 1940 to be trained for the projected invasion of Britain. This unit was equipped with suitably modified Panzer II and III tanks.

The Waprf 6 had thus ordered floating units which could be disembarked from landing craft, and would be stable in a Strength 3 to 4 seaway, from the Sachsenberg firm of Roslau. In all, fifty-two of these floating units, which were held by the return rollers of the vehicles, were delivered to Putlos. The Panzer II tanks so equipped were driven in the water by two ships' propellers, which were linked to the drive wheels of the tank by a driveshaft. Since the tank would only be immersed in water up to the level of the track aprons, it was able to fight while in the water.

The Panzer III was to be landed in a very different manner. The tanks were to be equipped for diving to a depth of 15 meters, so that they could reach the beach by driving on the sea bed. For this, a complete waterproofing of the tank was necessary, and this was done with cable tar. The air intake over the engine compartment was also closed completely, and

the weapons were covered with rubber coatings to prevent water from entering them. The fresh air for the crew and the engine was supplied from the surface by a hose 18 meters long. On the end of the hose that projected out of the water there was a radio antenna that allowed the tank to be directed from the landing craft. The engine exhaust gases were to be discharged directly into the water. Thus, the exhaust pipes were fitted with one-way valves to prevent water from entering. During thorough tests, though, it was found that this system functioned only at shallow depths, and that the conduction of the exhaust to the surface at a depth of 15 meters was impractical.

When the Russian campaign drew near, the Tauchpanzer III was remembered, and the tanks were re-equipped for fording rivers. For this, the rubber hoses for the air intake were replaced by steel pipes 3.5 meters long. These Tauchpanzer III tanks were used by the 18th Panzer Regiment when they crossed the Bug on June 22, 1941.

The planning of Undertaking "Sealion" had inspired several German firms to begin designing genuine swimming and diving tanks. For example, an underwater diving vehicle (UT-Kampfwagen), which could operate like a submarine two to six meters below the surface, was developed. By means of trimming tanks mounted on the sides of the tank, the

height of the vehicle could be controlled, and in addition, they could be used to equalize possible differences in attitude by appropriate flooding.

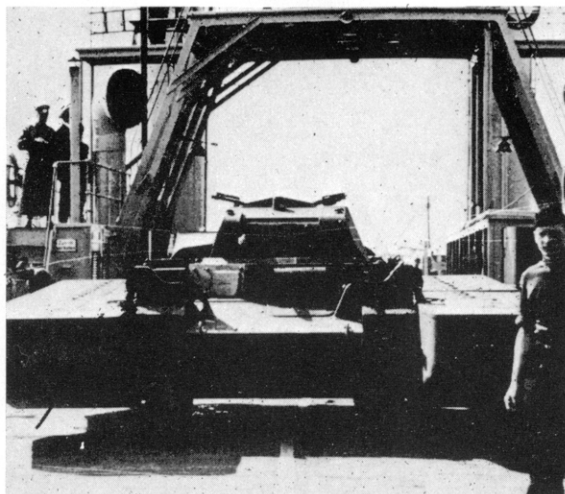
A different project was the "Krokodil" tank developed by Krupp in 1942. The vehicle was meant to be able to cross waterways up to twelve meters deep and one kilometer wide. Its weight was projected at 28 tons. The power unit for underwater driving was debatable: either a 100 HP battery-operated electric motor or a Diesel engine. Experience gained in submarines was to be evaluated for this purpose. A further project was the "Schildkröte" (Turtle) amphibian armored scout car developed by Trippel on the basis of its SG 6 amphibian; three prototypes of it had been built by 1942.

A different amphibian vehicle had been developed even before the war began, by the Alkett firm in cooperation with the Boitzenburger Binnenwerft; this was the Land-Wasser-Schlepper (LWS), of which 21 were built. The LWS was to be used, as seen by the OKH, as a towing tractor on the land and in shallow water, as well as a motorized towboat in the water itself, particularly for landing craft. These vehicles had a boat-shaped hull that was mounted on a stretched tank chassis.

In 1941, Magirus developed the LWS into the so-called Panzerfahre, using a Panzer IV chassis. When a deck was suspended between two such vehicles,

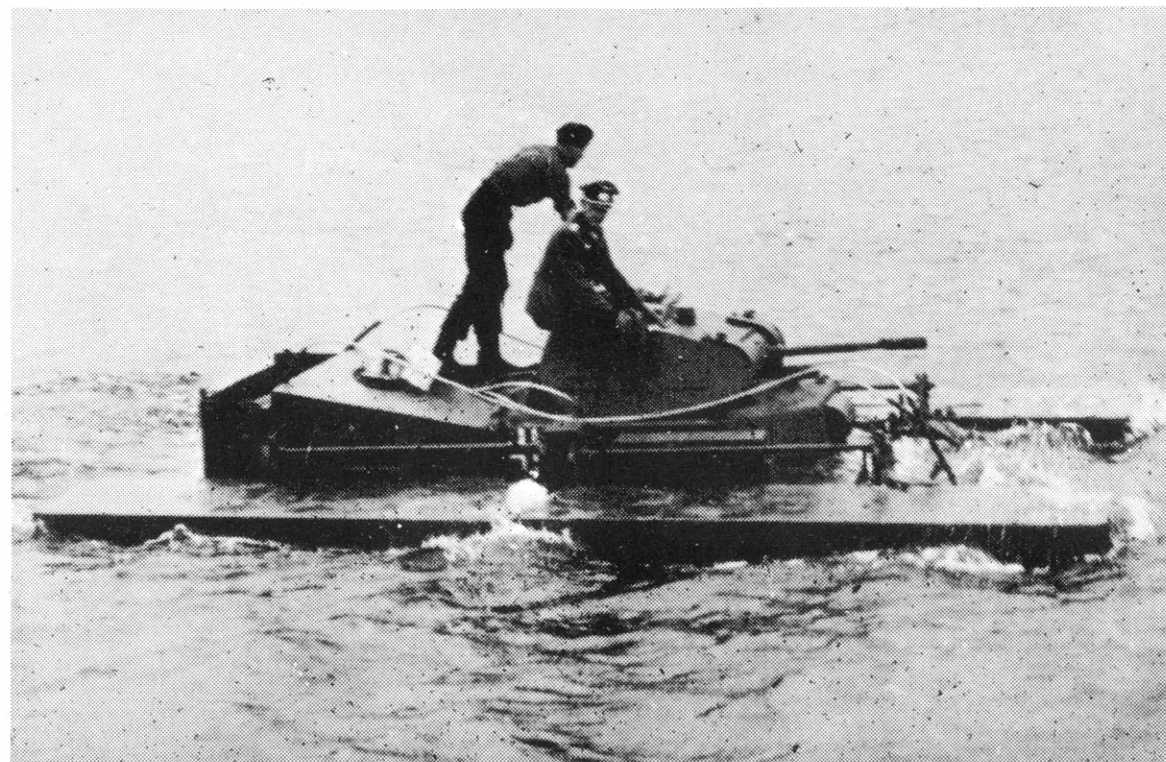
one could use it to ferry tanks up to the size of the Panzer IV. Unlike the LWS, the Magirus SW+MK was safely armored. By May 1942, two prototypes had been built, and they were then tested thoroughly. Meanwhile, though, the fighting weight of the tanks had risen and the carrying capacity of the armored ferry was no longer sufficient. Thus, this project was not developed any further.

Carrying-capacity problems of another kind occurred in the production of the "Tiger" tank, also begun in 1942, as it was too heavy for many bridges. Thus, the first 495 Tiger I tanks produced were equipped with [p. 35] a wading apparatus, which resembled that of the Panzer III described above and allowed the fording of rivers up to four meters deep. The air intake system consisted of a 4.5-meter stack on the back of the vehicle; the exhaust gases were discharged directly into the water. The engine compartment was carefully sealed off from the fighting compartment to prevent the poisonous exhaust gases from penetrating. Because of the high cost, the wading apparatus was later eliminated from the "Tiger", but it was projected again for the overweight "Maus" tank.

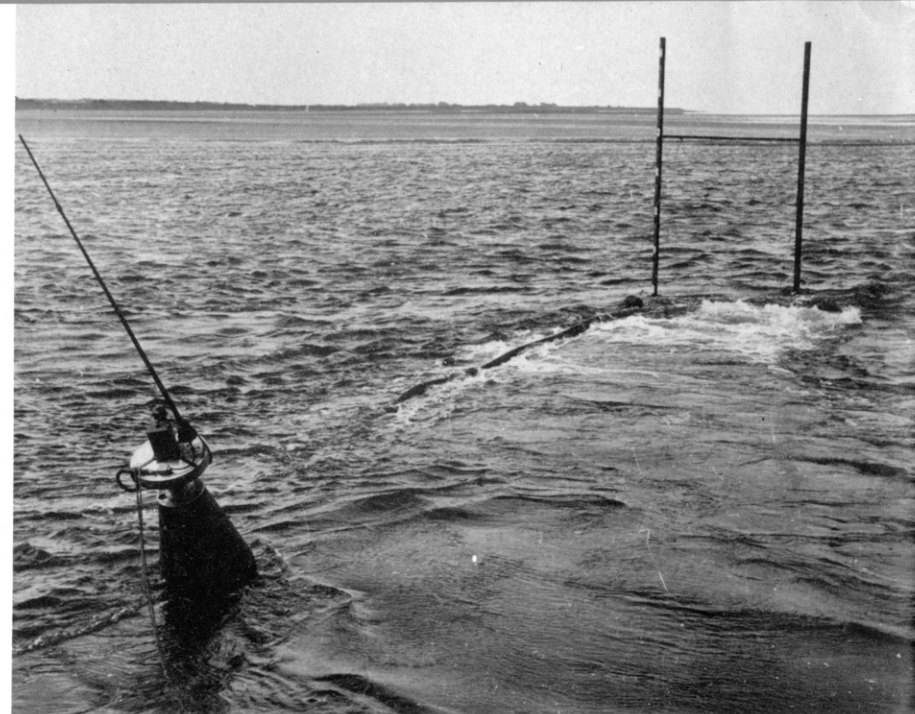


*Above: Front and rear views of the Schwimmpanzer II while being tested before entering the water. The floats attached to the lengthened return-roller axles were developed by the Sachsenberg firm of Roslau, had three chambers each, and were filled with small celluloid pipes. Originally, tanks made seaworthy in this manner were intended for use in the invasion of Britain. But when the German leadership changed its plans and gave up Operation "Sealion", the floats were removed and the vehicles used on the eastern front as normal Panzer II tanks.*

*Right: The Schwimmpanzer II during testing. As can be seen, only the chassis was under water. Thus, the turret was always able to fight. The rear area of the tank was covered with a sheet-metal deck and the ventilators for the engine and such were located there and protected from being entered by water. The exhaust discharge also presented no difficulties.*



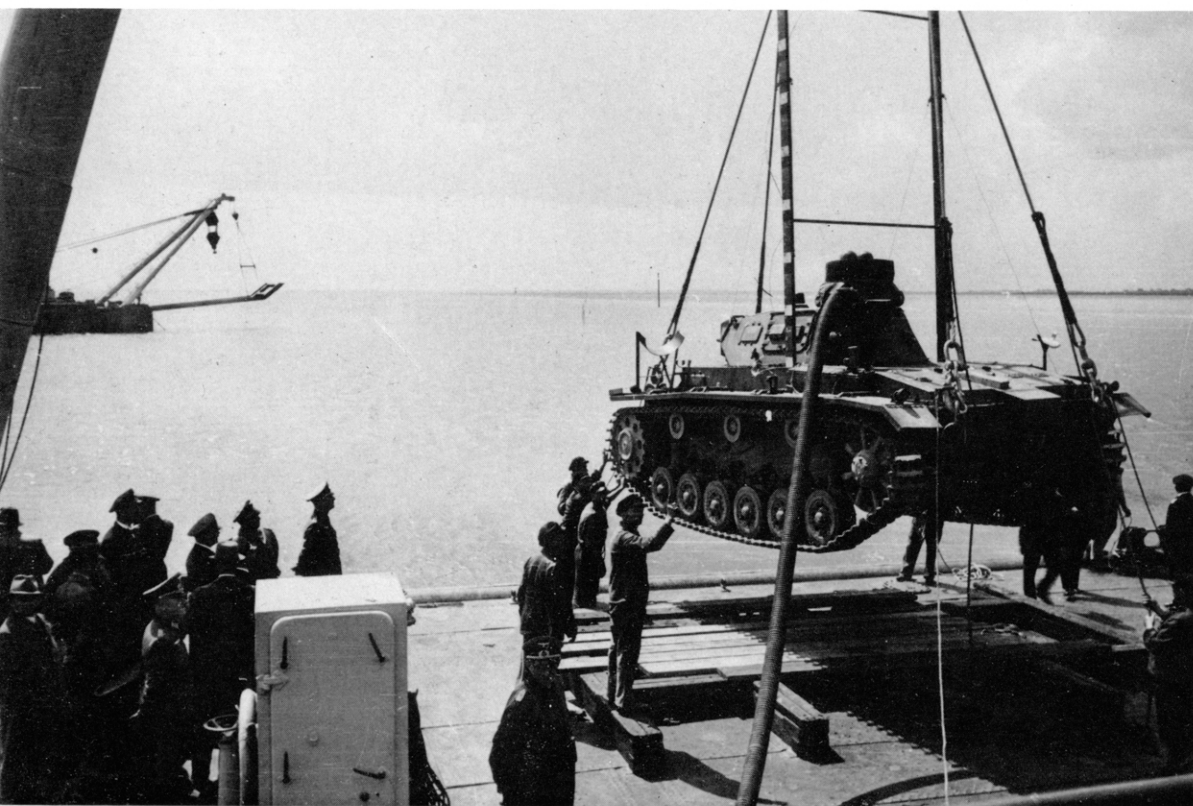


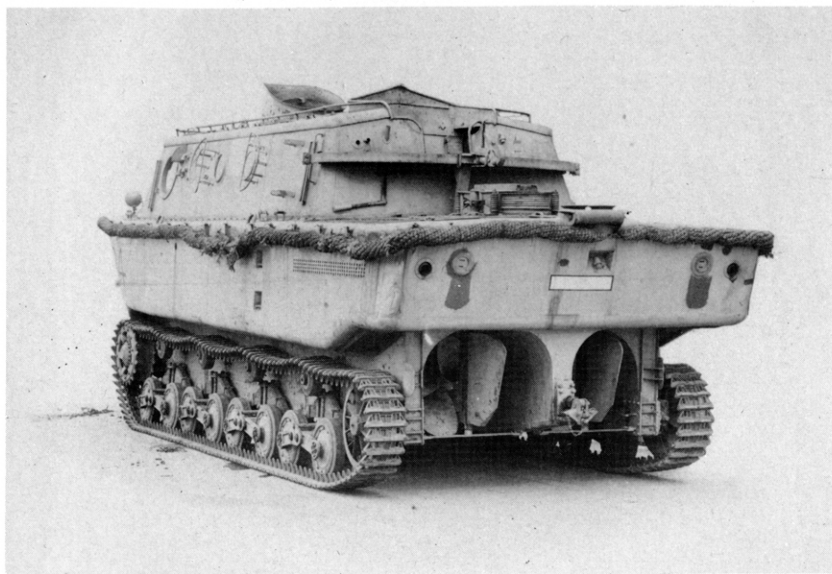


Upper left: On July 9, 1940, the Tauchpanzer III was displayed to Army and Navy officers near Wilhelmshaven. The 15-meter rubber hose, reinforced with iron rings, that provided fresh air can be seen, as can the watertight coverings of the weapons. Explosive fuses were placed in the coatings, so that after coming out of the water, the crew could blow off the protective covering to make the tank ready for action in the shortest possible time. (BA)

Above: Except for the measuring poles attached for the test run, nothing more of the submerged Panzer III can be seen. In the foreground is the buoy to which the air hose is attached, with the radio antenna by which the tank receives its steering commands. (BA)

Left: After all watertight coatings have been checked, the Panzer III is lowered into the water by a crane. It was planned that the vehicles were to get into the water on a ramp from their ship to go into action. (BA)



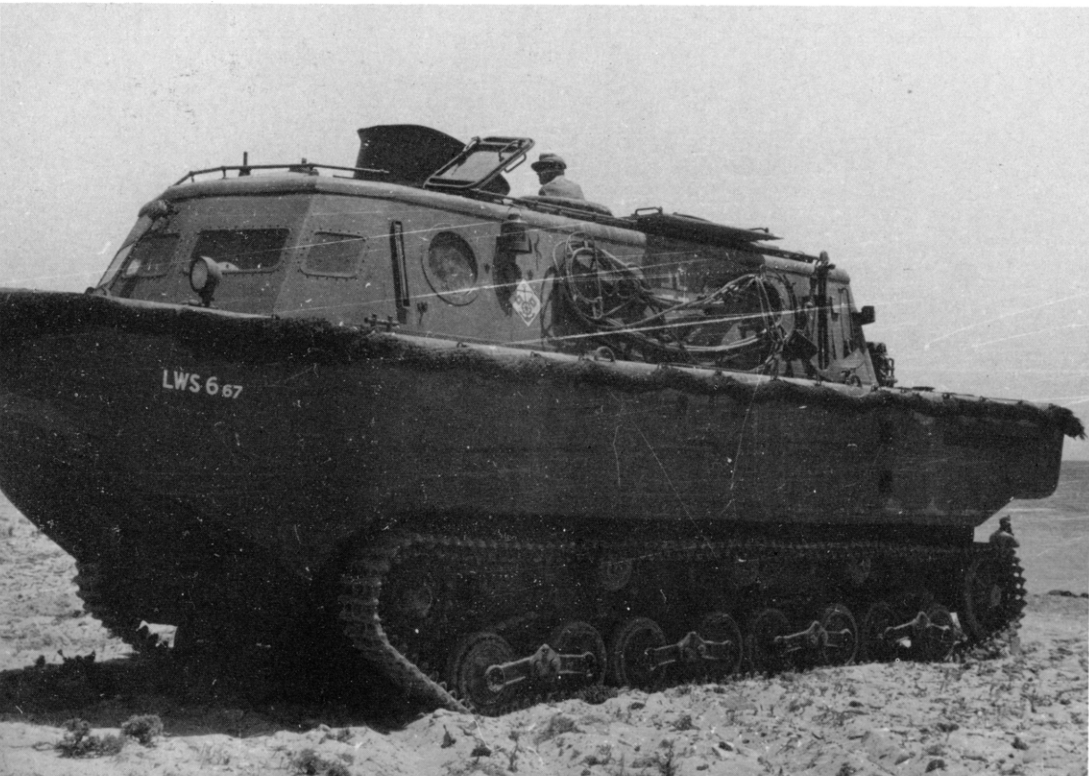


Above: In 1936 the firm of Rheinmetall-Borsig had already been directed to collaborate with other firms in developing an amphibian towing tractor, also called a land-water tractor. This rear view clearly shows the two screw propellers and the rudders. The engine exhaust was ducted off via two separate exhaust systems in the rear of the hull.

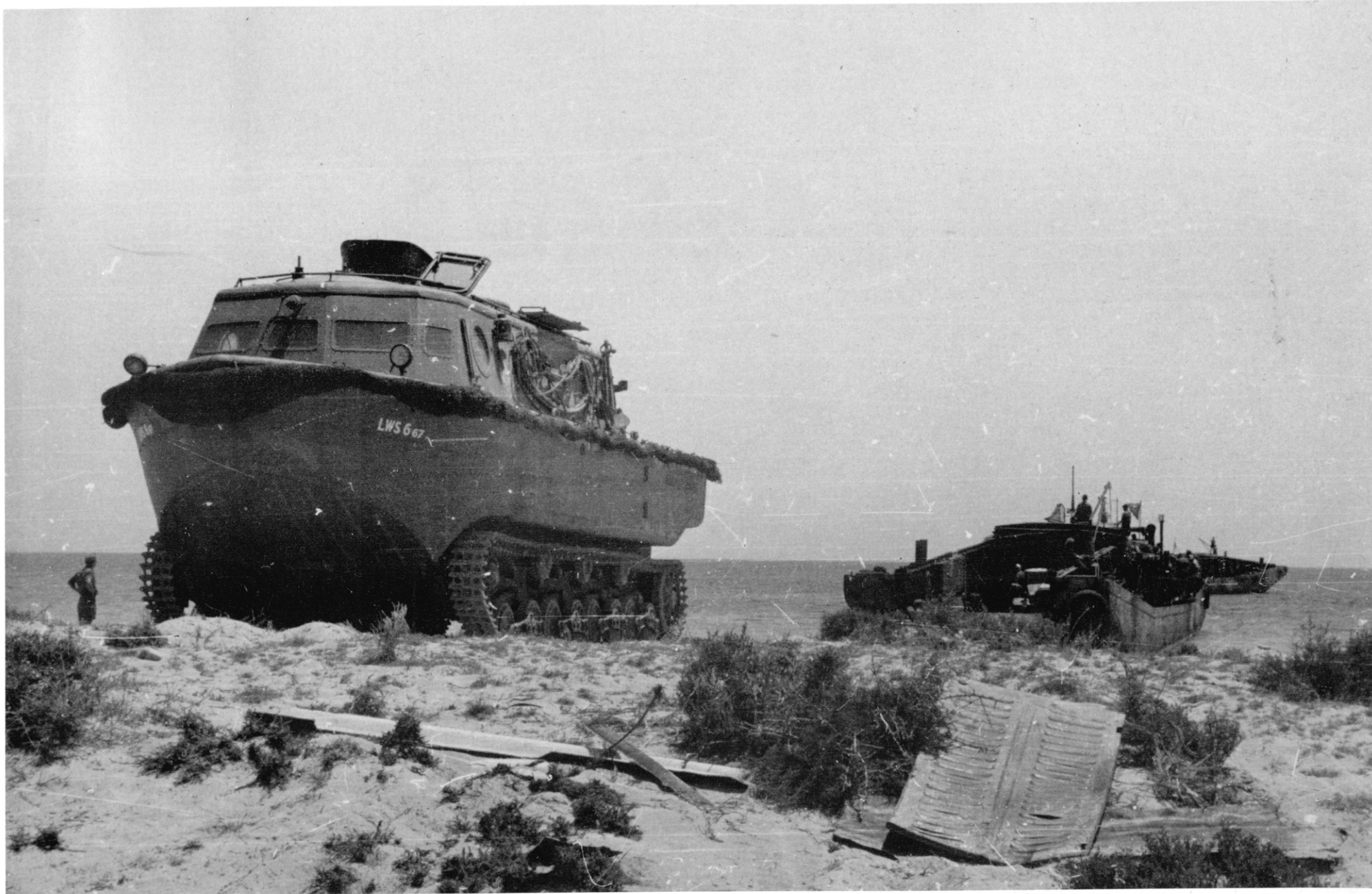
Upper and lower right: All Schwimmpanzer II and Tauchpanzer III had been assigned to Panzer Regiment 18 and remained with it after the plans to invade Britain had been given up. In the spring of 1941, the regiment was given the task of checking all the waterproofing on their Tauchpanzer III to determine their readiness for service. Instead of the previously used long rubber hoses (see upper right), they were now fitted with 3.5-meter steel pipes for wading rivers. After test runs in the Werbellin Lake, the tanks saw action crossing the Bug on June 22, 1941.





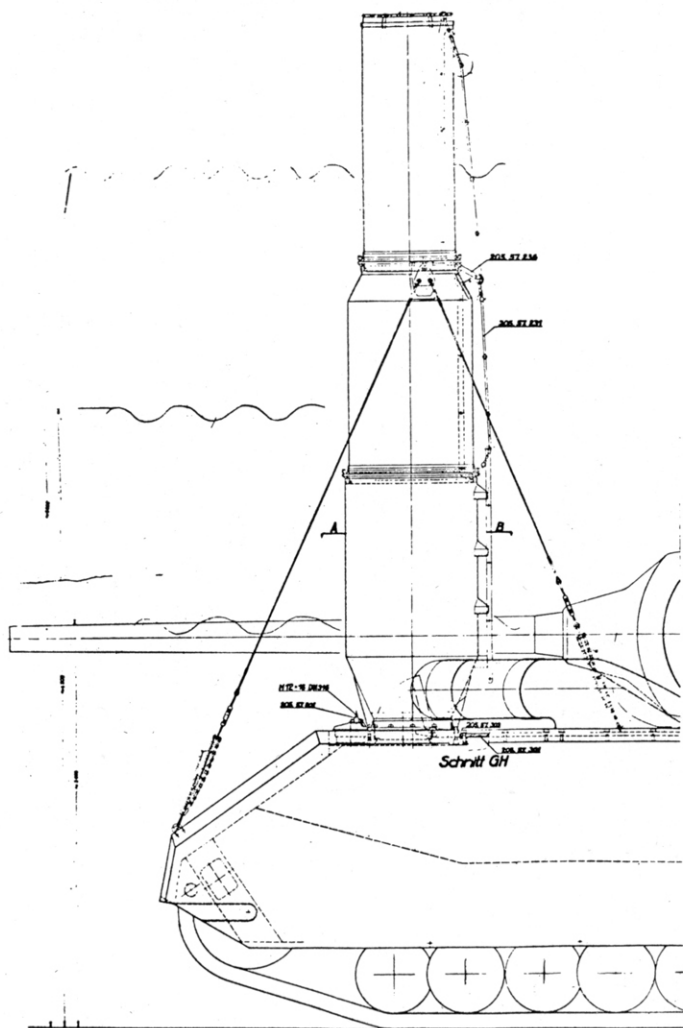
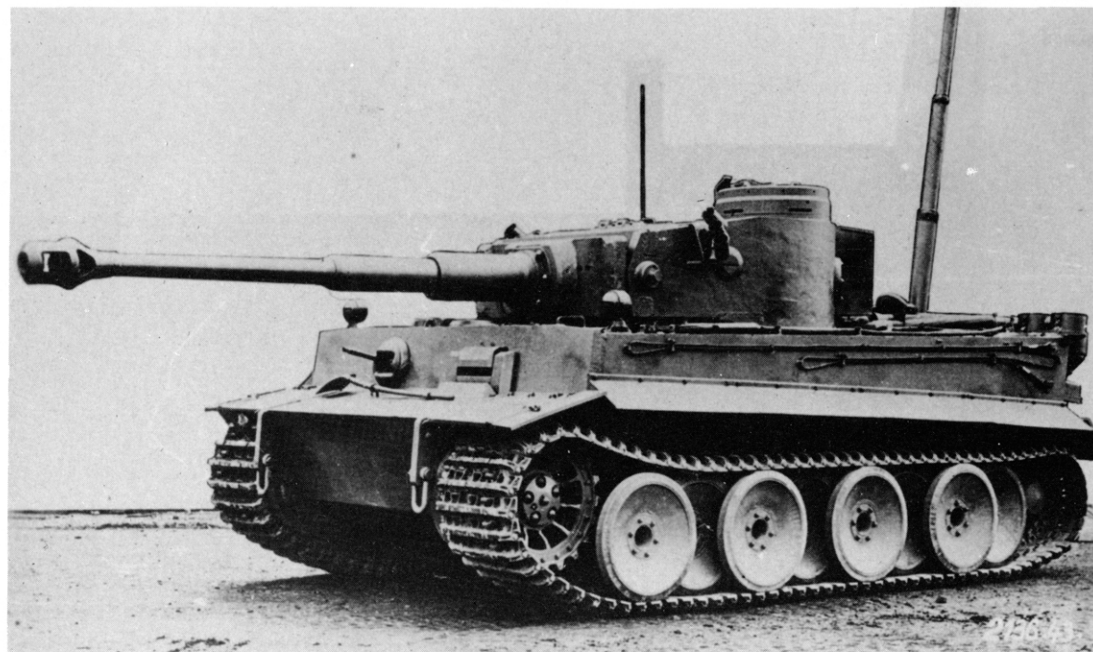


Side and front views of the Land-Wasser-Schlepper, which carried a crew of twenty men. The cooling air for the Diesel engine was discharged through the rear shaft of the two that are visible on the roof. The front shaft is for ventilation of the interior and has a 9.3 HP ventilator fan. On the sides, pieces of equipment such as ropes are attached. Seven prototypes were built; they had larger front panels than the later vehicles, and they were tested thoroughly in 1940. Later fourteen more Land-Wasser-Schlepper were built. The pictures show this later vehicle. (3 x BA)



Some of the 21 Land-Wasser-Schlepper were assigned to the shipyard companies of the landing engineer battalions. The vehicles were used primarily in the eastern theater of war, such as in the occupation of the Baltic islands in 1941. The LWS was to be used as a towing tractor on land and a motorized towboat on the water. For these tasks, the vehicles were equipped with a powerful winch. (BA)





Since the load limits of many bridges were insufficient to carry the 56-ton "Tiger" I, the first production run was equipped with a wading system, which allowed them to ford waters up to 4.1 meters deep. On the grounds of the Henschel factory in Haustenbeck, extensive diving tests were carried out with the "Tiger" in 1942 and 1943. It was determined that the tank could spend up to two and a half hours under water with its engine running. In this picture, the ventilating pipe attached to the rear body can be seen very well. (BA)

Upper left: The further development of the unarmored Land-Wasser-Schlepper resulted in the two prototypes of an armored ferry built by Magirus and tested in the summer of 1942. Propulsion in the water was done by the main engine (Maybach HL 120), and the land or water drive train was chosen by the gearbox. To cool the engine, air ejection shafts were attached to the top of the vehicle.

Left: A wading apparatus for water depths up to eight meters was also planned for the 200-ton "Maus" tank. It was intended to allow the tank to cross waterways under its own power (see drawing). It was soon recognized, though, that the cooling and exhaust problems of the Diesel engine could not be overcome without great trouble. It was then considered that the electric motors of the Diesel-electric powerplant of the "Maus" might be powered through cables from the Diesel engine of a second tank on the shore for underwater movement.

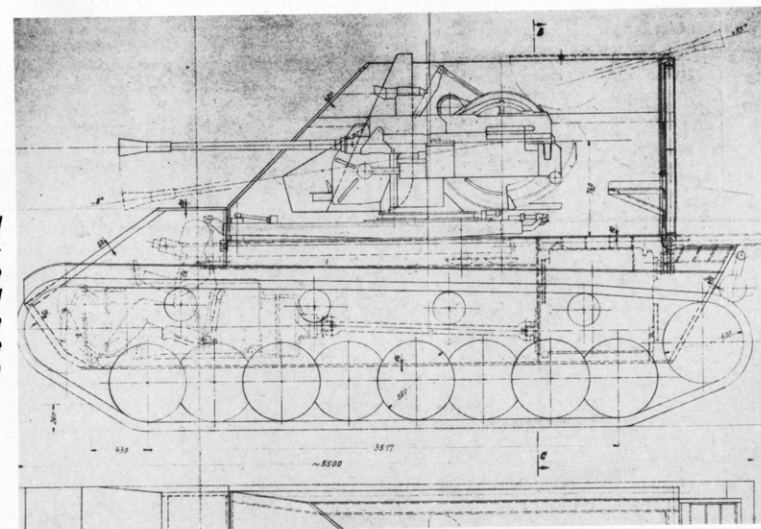
# Flakpanzer Projects

In 1942 it had already become clear that the armored units, exposed to fighter-bomber attacks, could only be protected from this danger by mobile Flak units. But since the development of a suitable Flakpanzer would take some time, a transitory solution was found by mounting quadruple 20 mm and single 37 mm Flak guns on Panzer 38 (t) and Panzer IV chassis. At first the weapons were merely surrounded by side walls that had to be folded down in action (Flakpanzer "Möbelwagen"); later the guns were installed in open-top turning turrets (Flakpanzer "Ostwind" and "Wirbelwind"). These vehicles all went into series production and have been described in depth in Volume 51. Along with them, though, there also existed a number of interesting project studies that will be examined somewhat more closely in the illustrations that follow.

What was wanted as a final solution was a Flakpanzer with a closed gun turret. Only two designs of this type, the "Kugelblitz" and "Coelian" Flakpanzers, developed beyond the drawing-board stage to the building of prototypes or of a wooden model in 1:1 scale.

The "Kugelblitz" Flakpanzer had been developed since 1944 at the Daimler-Benz factory in Berlin-Marienfelde. The chassis used was that of the Panzer IV. The Flak turret was a new design that pointed the way to the postwar era. The intended weapon was a twin 30 mm AA gun that had been developed by the Rheinmetall firm from the 30 mm Flak MK 103. The most modern feature of this weapon was the belt feed for the ammunition. It made this gun the first belt-feed type in the German Army, giving it a cadence of 425 rounds per minute with a range of 5,700 meters.

*Typical of the many designs of self-propelled armored gun mounts with light anti-aircraft guns was this design by the Krupp firm. According to factory data, the Device 338 V4 was planned as its weapon. The hull has angled armor plates, like the "Panther" tank. The chassis of the vehicle shows similarities with the Panzer IV, though the road wheels overlap here. (BA)*

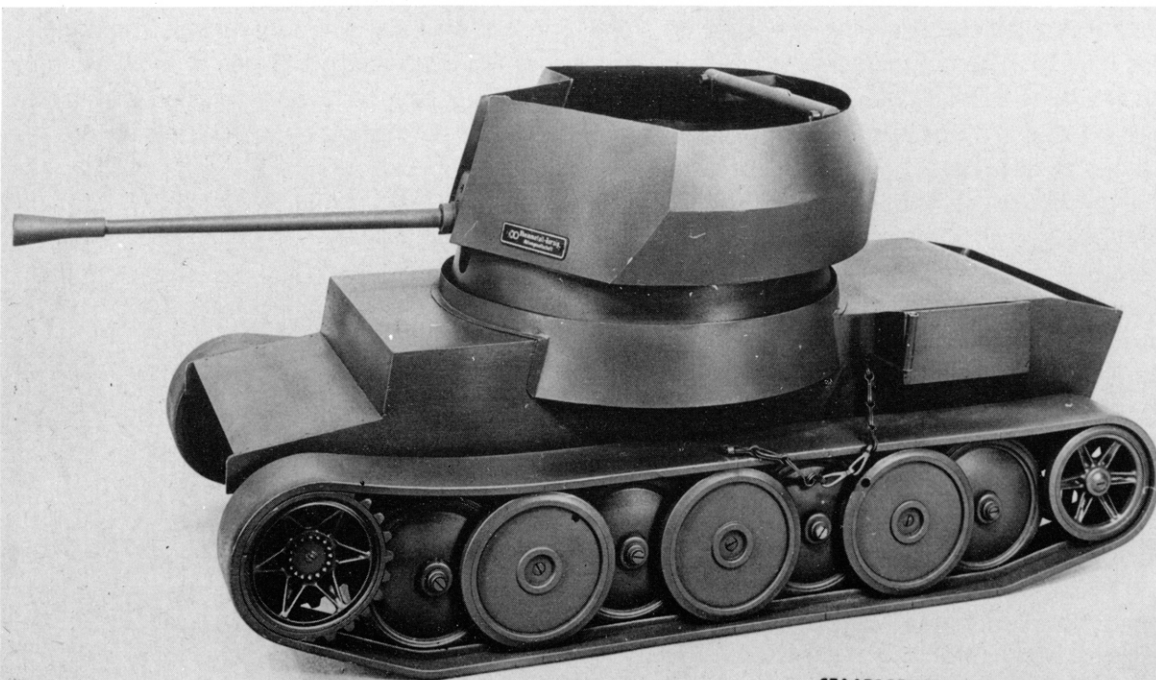


The twin guns were mounted, fixed in place, in a closed "skullcap" housing. The "skullcap" was anchored in a stumpy protective cover and had an elevation range of -7 to +80 degrees. A hydraulic elevating apparatus allowed an aiming speed of 60 degrees per minute. The commander and aiming gunner both sat in the turret. At the end of 1944, five more prototypes of the "Kugelblitz" were produced. Series production was to begin in February 1945, but the events of the war prevented this.

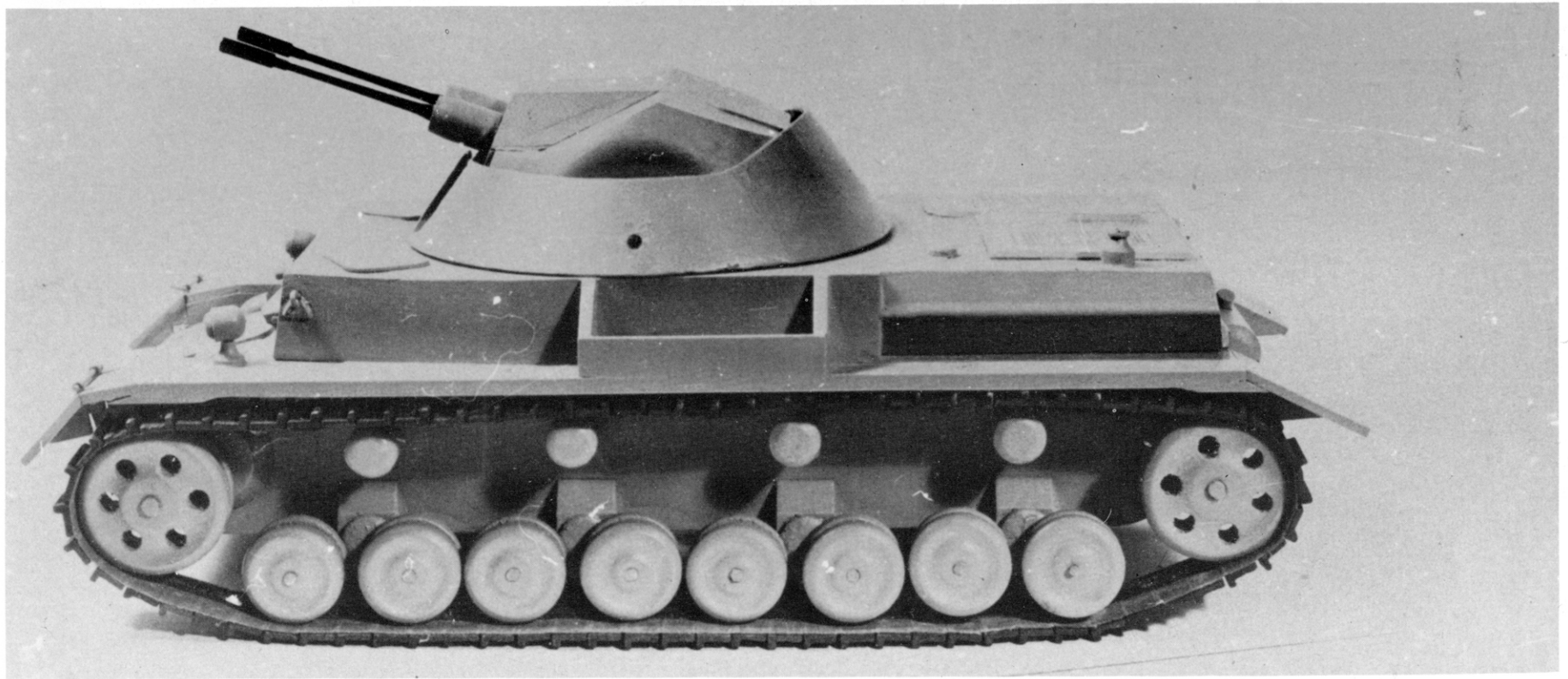
Since the beginning of Flakpanzer development in 1943, there had also been discussion of the possible use of the "Panther" chassis as a carrier for anti-aircraft guns. The installation of weapons of various calibers (37, 55, 88 mm) was tested. While the 55 and 88 mm Flak guns were to be installed in open-top turrets similar to that of the "Wirbelwind", the twin 37 mm guns of the "Coelian" Flakpanzer were to be installed in a closed turret. The firms of Krupp and Rheinmetall-Borsig collaborated on the design of the "Coelian". To be sure, the further development of the vehicle, after a "Panther" Type D had been fitted with an appropriate dummy turret, was halted at the end

of 1944, since the Inspector General of the Panzer Troops had regarded the firepower of the 37 mm gun as too meager compared to the weight of the vehicle. Instead, the further development of a Flakpanzer on the "Panther" chassis, which had been in progress since mid-1944, was urged. It was to carry twin 55 mm guns—likewise in a closed turning turret—but the work could not be finished before the war ended.





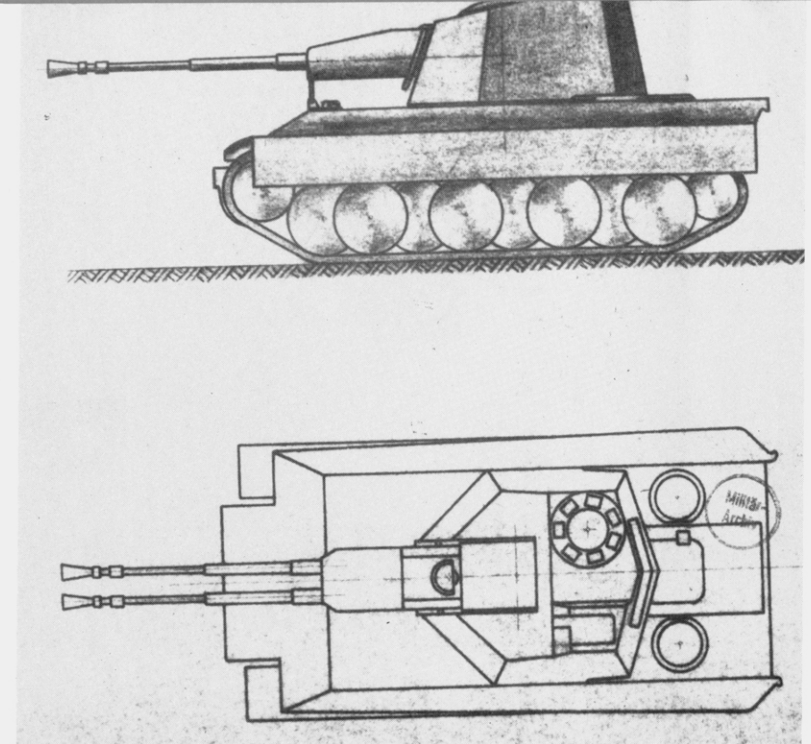
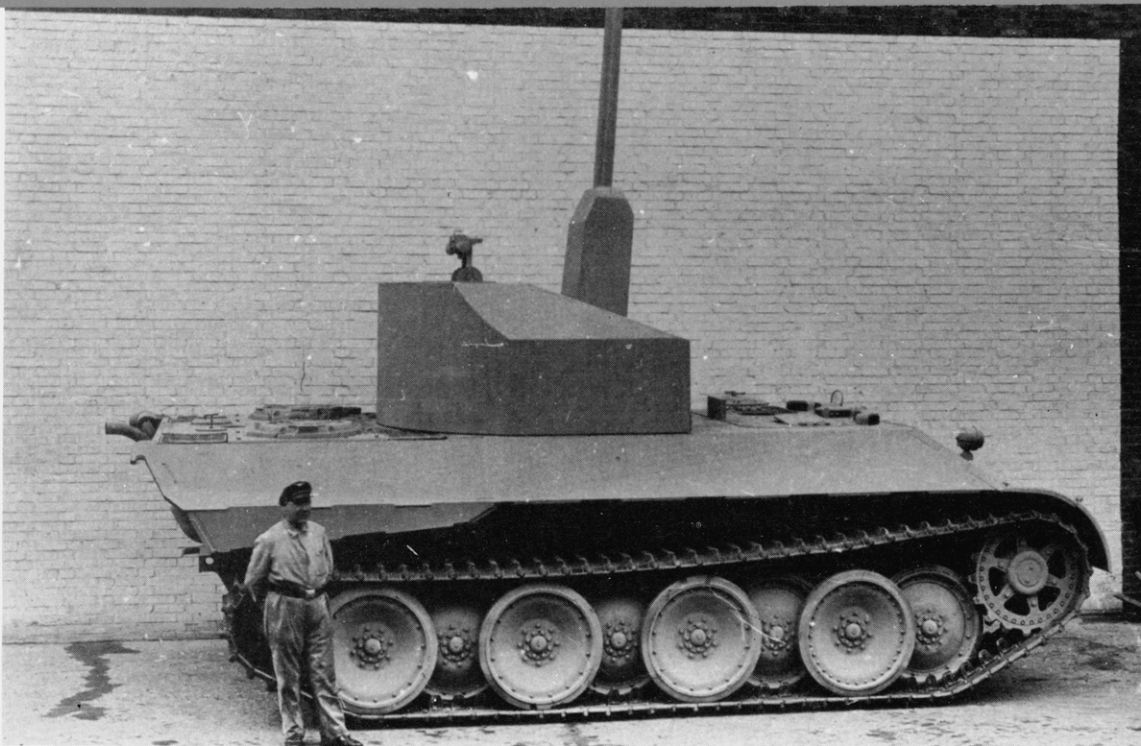
These three pictures show the Rheinmetall-Borsig firm's attempt to mount the 37 mm Flak gun in an open-top turning turret, on a chassis, lengthened by two road wheels, of the "Luchs" reconnaissance tank. Since the hull of the "Luchs" was considerably narrower than that of the Panzer IV, the turret projects over the tracks at the sides. More detailed information about this vehicle has not been found. (3 x BA)



*This wooden model represents the "Kugelblitz" Flakpanzer, of which five prototypes had been built by the German Iron Works in Duisburg before the war ended. At the end of 1944, they, along with several "Möbelwagen", "Wirbelwind" and "Ostwind" Flakpanzers, were assigned to a newly organized Armored Flak Replacement and Instructional Unit at the Ohrdruf troop training center in Thuringia. The "Kugelblitz" had a very low silhouette; its height was only 2.3 meters. The 30 mm double gun was mounted in a rounded "skullcap" housing. The "Kugelblitz" Flakpanzer was a successful design in many ways, pointing the way to the Flakpanzer development of the fifties. (2 x BA)*







Left: In 1943, the development of the "Coelian" Flakpanzer was already underway. It was to have twin 37 mm guns in a closed turning turret. Designs for the turret were made by the firms of Daimler-Benz and Krupp. Early in 1944 the Krupp design was chosen. In the same year, the firm of Rheinmetall finished a mockup of the turret, which was mounted on a Type D "Panther" chassis for testing. The 37 mm twin Flak guns were to have a cadence of 2 x 500 rounds per minute. (2 x BA)

In mid-1944 the Krupp firm was instructed to undertake the installation of twin 55 mm Flak guns, instead of the 37 mm guns, on a "Panther" chassis. The drawing above shows side and top views of one suggested possibility. The tank was to have a four-man crew and an ammunition supply of 104 rounds. An elevation range of -5 to +80 degrees was planned for the 55 mm 58 Rh.D.V. 3 twin guns. The turret weight was estimated at 9,060 kilograms. (BA)

# Heavy Tank Projects

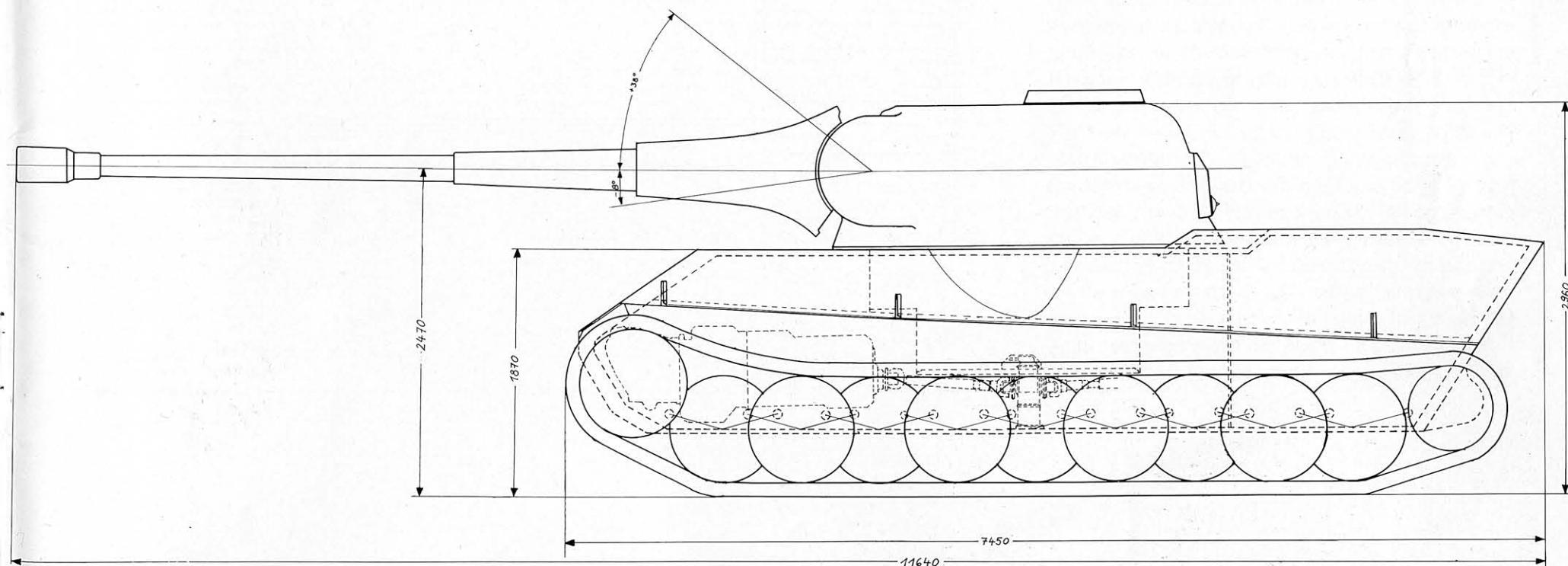
In the spring of 1942, the Krupp firm was working on the design of another heavy tank, which was designated "Löwe" (Lion) or Panzer VII and weighed more than the "Tiger". It was based on the VK 7001, for which a lighter (100 mm front armor) 76-ton and a heavier (120 mm front) 90-ton version were envisioned. A 105 mm L/70 KwK and a turret machine gun was planned for both. The crew was to number five men, the top speed was to be 26.8 kph (76-ton type) or 23 kph (90-ton type).

At that time, Hitler was already thinking in terms of as heavy armor and as large a caliber as possible,

at the cost of speed. Thus, the lighter version was dropped and the 90-ton tank was modified to carry a 150 mm KwK L/40 or L/37 gun, and front armor plate of 140 mm. The top speed was to be increased to 30 kph, and the ground pressure to a maximum of 1 kg/sq. cm, by increasing the track length by 4.96 meters and the track width to 900 or even 1,000 mm. Meanwhile, though, the decision had been made in favor of an even heavier tank weighing over 100 tons, the "Maus", for which Krupp provided a series of designs which were later rejected in favor of the Porsche design. It is interesting, though, that in June 1942 Oberst

Fichtner (HWA) suggested a shortened 80-ton version of the "Löwe" with an 88 mm KwK L/71, 140 mm front armor, and a top speed of 35 kph. Its performance data were amazingly like those of the later "Tiger II".

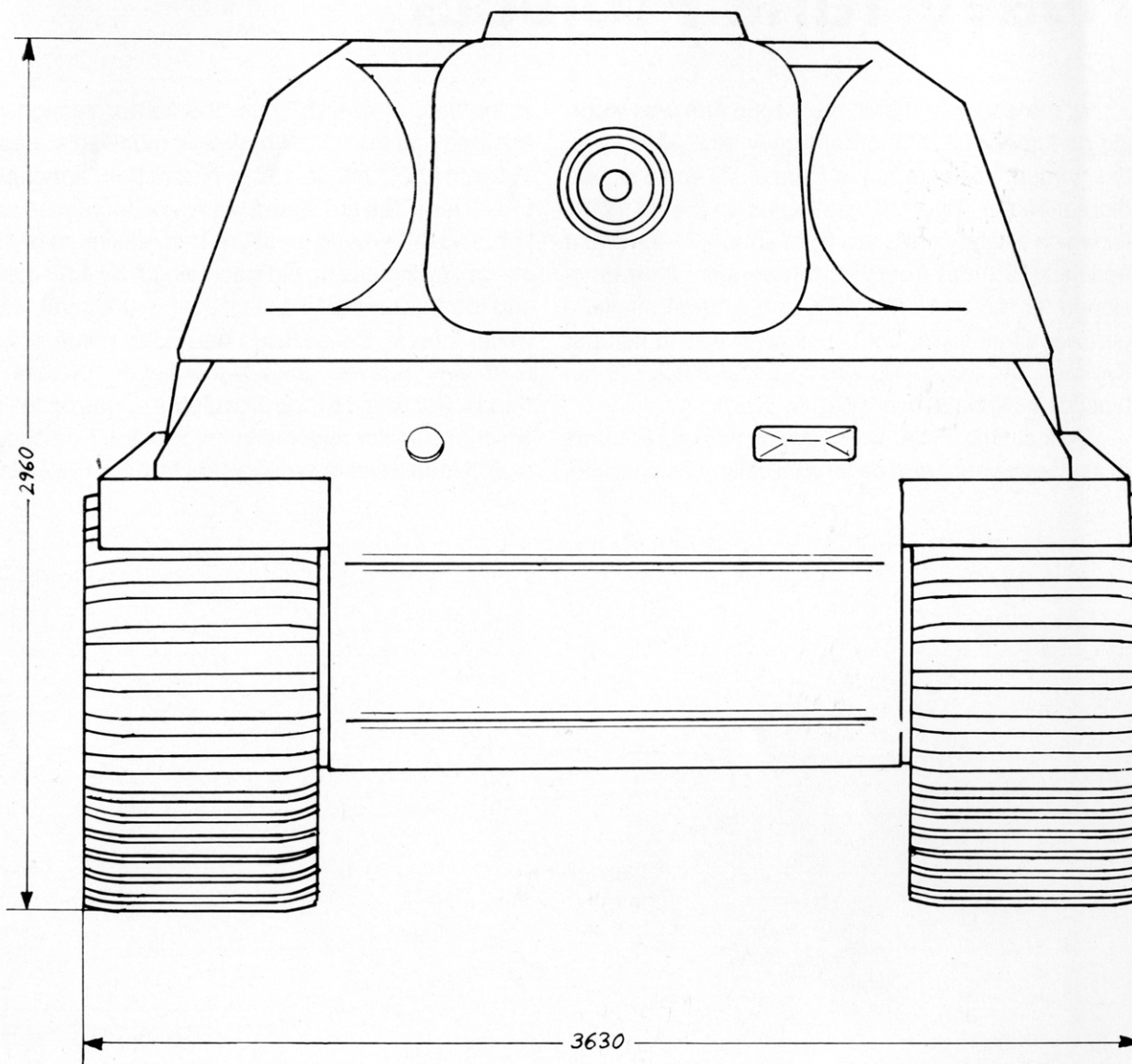
*This design drawing shows the first version of the 90-ton "Löwe" tank with 105 mm gun. This drawing and the following one (front view of the Löwe) are reproduced here for, we believe, the first time.*





The design of an armored 120-ton vehicle with a 305 mm L/16 gun and known as "Bär" (Bear) is dated May 10, 1943. It was to be driven by a 700 HP Maybach HL 230 engine and reach a speed of about 20 kph. The running gear was largely taken from the "Tiger". The rigidly mounted gun had an elevation range of 70 degrees and was to fire explosive shells weighing 350 kg (50 kg charge) 10.5 kilometers at a muzzle velocity of 355 meters per second. The "Bär" was never built (See inside back cover for interior drawing).

Probably the most unusual tank project was proposed by Dipl.-Ing. Grote, in charge of U-boat construction in Speer's ministry, in June 1942: a tank weighing approximately 1,000 tons in all (Project P 1000). The vehicle, 35 meters long and 14 meters wide, was to run on two wide track systems, each with tracks 3.5 meters wide. Two MAN Diesel engines of 8,500 HP each, or eight Daimler-Benz powerboat motors of 2,000 HP each, were to provide a top speed of 40 kph. The proposed weapons were 280 and 128 mm ships' guns plus eight 20 mm Flak or HD 151 guns in turning-ring mounts. In December 1942, Krupp offered an alternative design with somewhat different goals in mind, a vehicle of some 1,500 tons with 250 mm front armor, carrying an 800 mm gun and driven by two Diesel U-boat engines. Fortunately, it was soon realized that such monsters were a senseless waste of materials and the development was halted. Designs of these monsters have not been known before.



# Technical Data

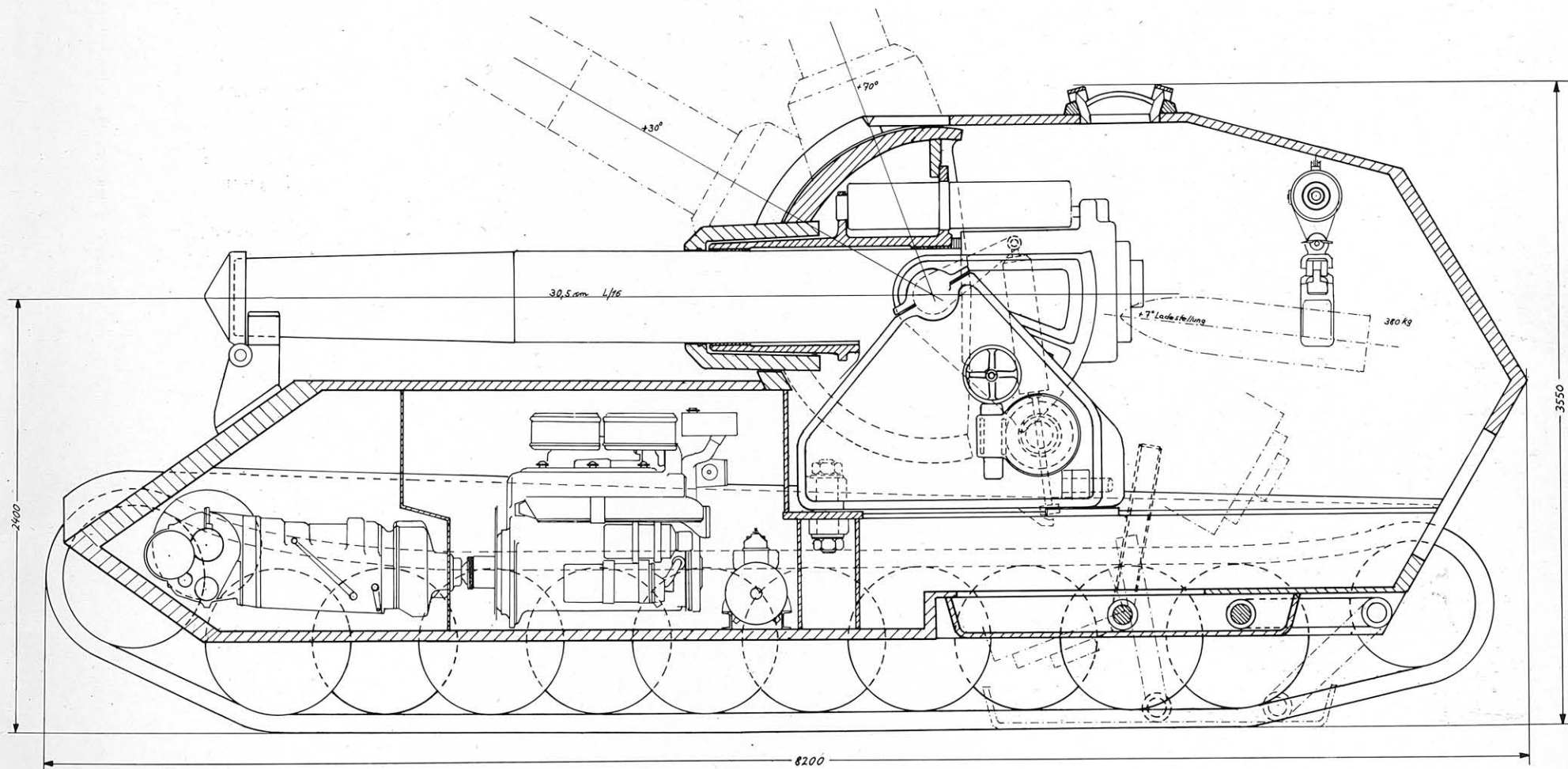
Type	Neubaufahrzeug	VK 601	VK 1801
Manufacturer	Rheinmetall(Krupp)	Krauss-Maffei	Krauss-Maffei
Year built	1935	1919-1941	1939-1940
Crew	6 men	2 men	2 men
Weight	23 tons	8 tons	21 tons
Length	6.65 meters	4.20 meters	4.37 meters
Width	2.90 meters	1.92 meters	2.64 meters
Height	2.90 meters	2.01 meters	2.05 meters
Engine	BMW 6-cyl aircraft, later Maybach V-12 HL 108 TR	in-line 6-cyl. Maybach HL45p	in-line 6-cyl. Maybach HL 45p
Cooling	Water	Water	Water
Power	290 HP	150 HP	150 HP
Transmission	6 fwd, 1 reverse	8 fwd., 1 rev.	4 fwd., 1 rev.
Steering	Wilson planetary	Three-wheel KM LG45R	Clutch
Clearance	0.45 meter	0.29 meter	0.35 meter
Front armor	20 mm	30 mm	80 mm
Side armor	13 mm	10 mm	80 mm
Rear armor	13 mm	10 mm	80 mm
Armament	75 mm L/23, 5 KwK (Rheinmetall), or 105 mm KwK (Krupp) + 37 mm L/45 KwK + 3 MG	EW 141 KwK	2 MG 34
Running gear	2 118-link tracks, rear drive, idler, 10 road wheels, 4 return road wheels	2 89-link trks. front front drive, rear idler, 5 no road wheels, no rollers	2 53-link trks. front drive, rear idler, 5 return rollers return rollers
Track width	0.38 meter	0.39 meter	0.54 meter
Fuel capacity	?	?	?
" consumption	?	?	?
Top speed	30 kph	65 kph	25 kph
Ground pres.	0.69 kg/sq. cm	0.84 kg/sq. cm	0.46 kg/sq. cm

Type	VK 901	VK 1601	Panzer II L 38(t) "Luchs"	Scout Car with 20 mm KwK
Made by	MAN	MAN	MAN	BMM
Yrs. built	1941-42	1942	1942-43	1944
Crew	3 men	3 men	4 men	4 men
Weight	10.5 tons	18 tons	11.8 tons	9.75 tons
Length	4.24 meters	?	4.63 meters	4.51 meters
Width	2.38 meters	?	2.48 meters	2.14 meters
Height	2.05 meters	?	2.21 meters	2.17 meters
Engine	in-line 6-cylinder HL 66 p	HL 45 p	Maybach HL 66 p	Praga EPA/2
Cooling	Water	Water	Water	[not listed]
Power	200 HP	150 HP	200 HP	?
Gearbox	5 fwd/1 rev.	5 fwd/1 rev	6 fwd/1 rev.	5 fwd/1 rev.
Steering	?	?	MAN clutch	?
Clearance	?	?	0.40 meter	?
Frt. armor	80 mm	80 mm	30 mm	50 mm
Side armor	15 mm	50 mm	20 mm	15 mm
Rear armor	15 mm	25 mm	20 mm	15 mm
Armament	EW 141	KwK 20 mm KwK 38 L/55	KwK 20 mm 38 L/55	KwK 20 mm 38 L/55
Runn. gear	+ 1 MG 34 2 tracks front drive rear idler 5 overlapp. road wheels no return rollers	+ 1 MG 42 2 tracks front drive rear idler 5 overlapp. road wheels no return rollers	+ 1 MG 34 2 tracks front drive rear idler 5 overlapp. road wheels no return rollers	+ 1 MG 42 2 tracks front drive rear idler 4 road wheels no return rollers
Track width	?	?	0.36 meter	?
Fuel capacity	?	?	235 liters	?
Consumption	?	?	150 l/100 kph	?
Top speed	50 kph	31 kph	60 kph	42 kph
Pressure	?	?	0.98 kg/sq.cm	?
Climbing	?	?	30 degrees	?
Turning	?	?	In place	?
Suspension	?	?	Transverse torsion bars	?
Climbing	?	30 degrees	?	?
Turning circ.	?	In place	In place	?
Suspension	?	?	Transverse torsion ? bars	?



Type	Flammpanzer III	"Kugelblitz"lt. Flakpanzer
Manufacturer	MIAG	Daimler-Benz
Year built	1942	1945
Crew	3 men	5 men
Weight	23 tons	25 tons
Length	6.40 meters	5.92 meters
Width	2.97 meters	2.95 meters
Height	2.50 meters	2.30 meters
Engine	Maybach V-12 HL 120 TRM	Maybach V-12 HL 120 TRM
Cooling	Water	Water
Power	300 HP	300 HP
Gearbox	6 forward speeds, 1 reverse	6 forward speeds, 1 reverse
Steering	Daimler-Bz./Wilson	Krupp/Wilson
Ground clearance	0.38 meter	0.40 meter
Front armor	80 mm	30 mm
Side armor	30 mm	30 mm
Rear armor	50 mm	50 mm
Armament	14 mm flamethrower + 2 MG 34	twin 3 cm Flak MK 103/38 + 1 MG 42
Running gear	2 93-link tracks rear drive, front idler, 6 road whls, 3 return rollers	2 99-link tracks rear drive, front idler, 8 road wheels, 4 return rollers
Track width	0.40 meter	0.40 meter
Fuel capacity	320 liters	470 liters
Fuel consumption	182 liters/100 km	220 liters/100 km
Top speed	40 kph	38 kph
Ground pressure	1.03 kg/sq. cm	0.89 kg/sq. cm
Climbing ability	30 degrees	30 degrees
Turning circle	5.85 meters	5.92 meters
Suspension	Transverse torsion	Transverse torsion

Type	VK 7001 "Löwe"	"Bär" Tank
Manufacturer	Krupp	Krupp
Year built	1942	1943
Crew	5 men	6 men
Weight	90 tons	120 tons
Length	7.74 meters - gun	8.20 meters
Width	3.83 meters	4.10 meters
Height	3.08 meters	?
Engine	Maybach V-12 HL 230 P 30	Maybach V-12 HL 230 P 30
Cooling	Water	Water
Power	800 HP/1000 rpm	700 HP/3000 rpm
Gearbox	12 speeds	6 forward, 1 reverse
Steering	?	?
Ground clearance	0.50 meter	?
Front armor	120 mm	130 mm
Side armor	100 mm	80 mm
Rear armor	?	?
Armament	150 mm L/40 KwK	305 mm L/16 KwK
Running gear	2 ?-link tracks front drive, rear idler, 9 overlap. road wheels, no return rollers	2 ?-link tracks front drive, rear idler, 10 overlap. road wheels, no return rollers
Track width	0.90 meter	1.00 meter
Fuel capacity	?	?
Fuel consumption	?	?
Top speed	23 kph	20 kph
Ground pressure	1 kg/sq. cm	1.13 kg/sq. cm
Climbing ability	?	?
Turning circle	?	?
Suspension	Torsion bars	Leaf springs



Design drawing of the 120-ton "Bär" with 305 mm gun, rigidly installed in a type of self-propelled mount and thus having only a meager traverse field—this drawing also appears for the first time.





The "Luchs"—last development of the Panzerkampfwagen II



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