MESSERSCHMITT Me 262 Described Part 1

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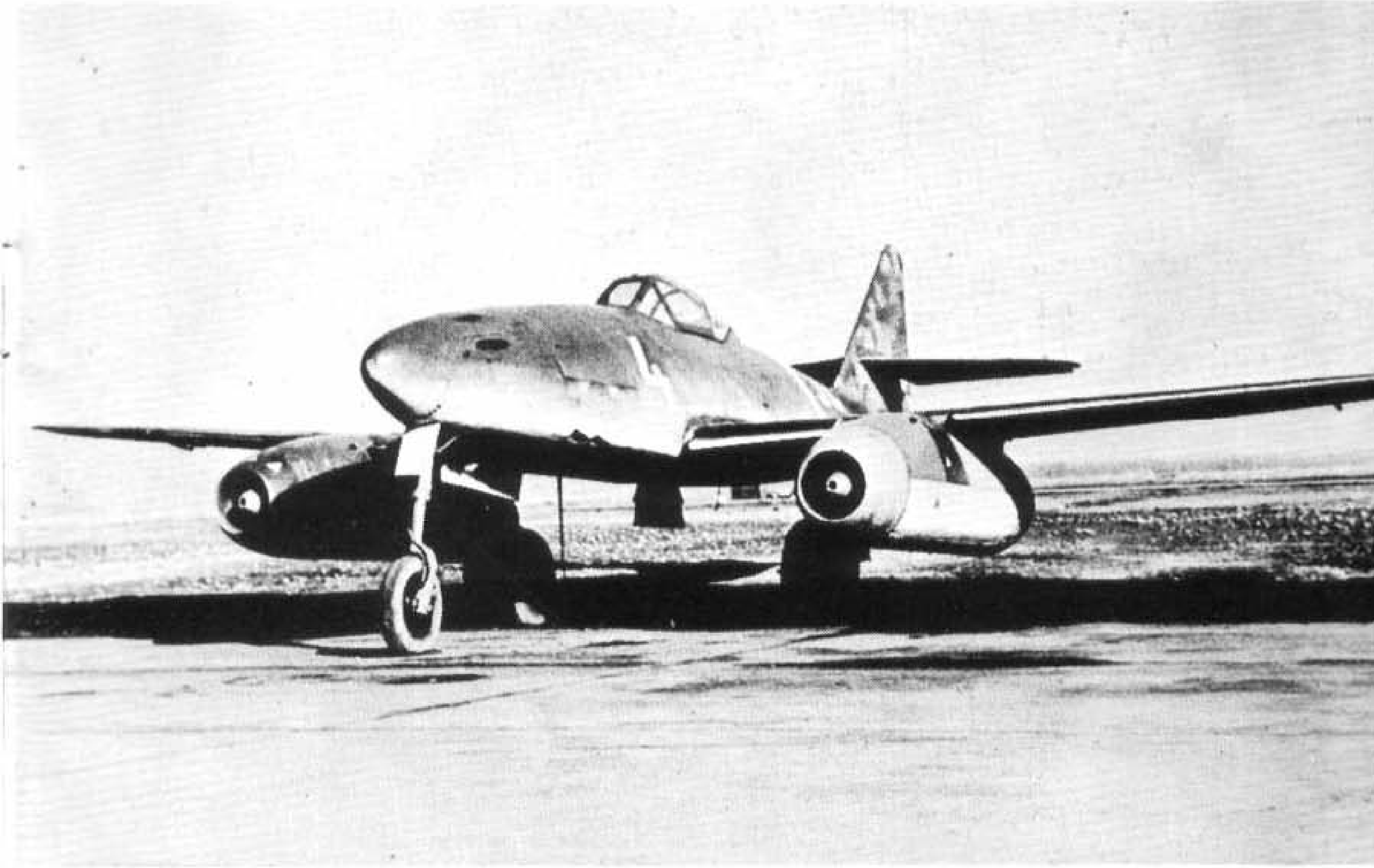
Cover. An Me 262A-1a interceptor of I/KG (J) 54 makes a pass at a USAAF B-26 Marauder during a daylight attack over Germany in April 1945. Painting by Australian artist Norman Clifford.

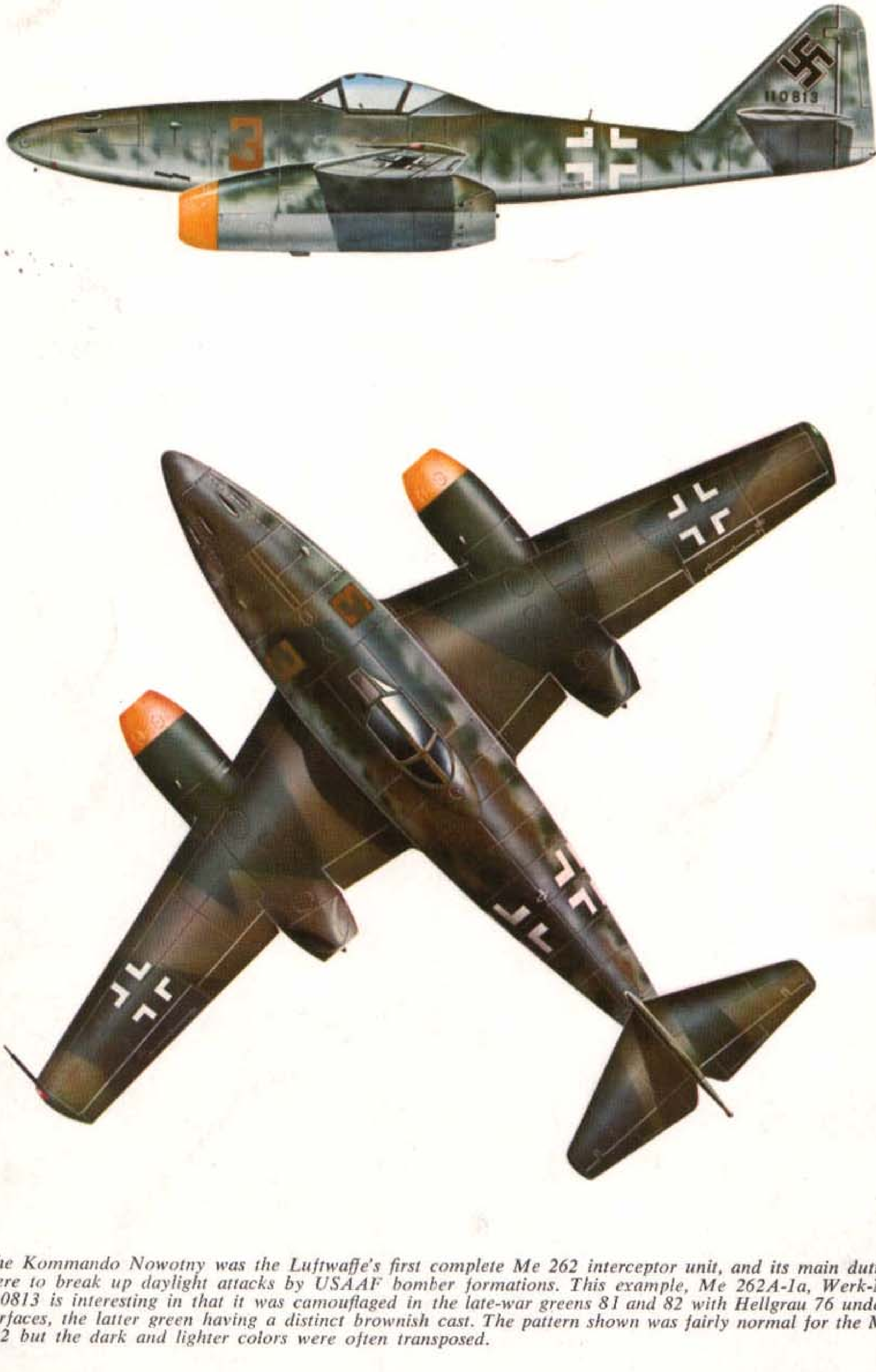
A standard Me 262A-1a. The long aerial beneath the starboard wing is quite distinct.



The full story of the Me 262's operational history both as a fighter and a bomber and its ultimate development into a highly refined two seat night fighter is dealt with in Part II of this work. A comprehensive five page coverage of the multiple camouflage schemes used by this aircraft, with accompanying tone illustrations and a complete breakdown of the various sub-variants and their equipment is also contained in the second volume.

The captured Me 262A-2a currently on display at the Australian War Memorial, Canberra. Colour scheme is dark green and pale blue.

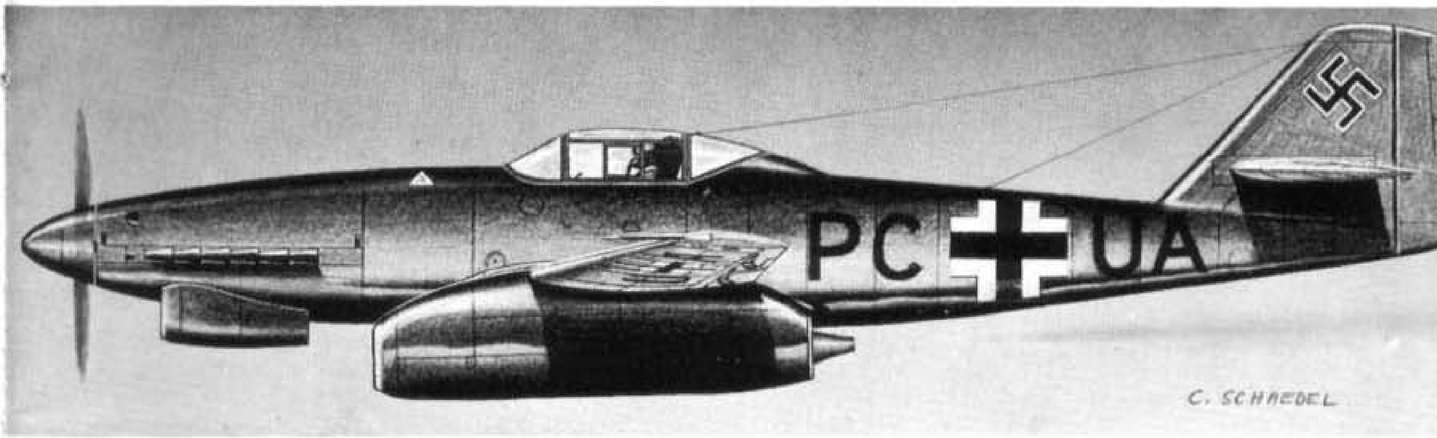
END OF PART I



The Kommando Nowotny was the Luftwaffe's first complete Me 262 interceptor unit, and its main duties were to break up daylight attacks by USAAF bomber formations. This example, Me 262A-1a, Werk-Nr 110813 is interesting in that it was camouflaged in the late-war greens 81 and 82 with Hellgrau 76 undersurfaces, the latter green having a distinct brownish cast. The pattern shown was fairly normal for the Me 262 but the dark and lighter colors were often transposed.

MESSERSCHMITT Me 262 Described PART I

Kenneth A. Merrick



Above and lower: The Me 262V1 (PC+UA) fitted with the Jumo piston engine and the B.M.W. turbojets. Points of interest are the two bladed airscrew, guide rails for the ejector seat and the cropped fin and rudder.

On April 26th, 1945, a formation of Marauder bombers was passing over Neuburg on the Danube when it was intercepted by a formation of Me 262 fighters which came in for an almost head on attack. The Marauders' gunners opened fire immediately, putting up a strong defensive fire. In the leading Me 262 the pilot released the safety catch on the gun and rocket switches and lining up carefully on one of the Marauders he pressed the firing button. The four 30 m.m. cannons in the nose burst into life, but the rockets remained on their racks beneath the wings. He had forgotten to release the second safety catch for the rockets. However, the Marauder hit by the cannon shells burst into flames and exploded. Turning his attention to another bomber further back in the formation, he raked it with a long burst of cannon fire as he swept past, and at the same time felt his own aircraft hit several times by the defensive fire, but this was ineffectual.

The whole action had taken but a few seconds and the German pilot had not had sufficient time to see definitely what had happened to the second Marauder. Pulling up above the rear of the formation he banked steeply to the left—and in that second it happened. The Me 262 shuddered as a hail of .5" machine gun bullets tore into it. The instrument panel disintegrated and the pilot felt a sharp pain in his right knee. At the same time the starboard engine was hit, the cowling broke loose and was partially torn away by the slipstream. Another burst and the port engine was hit; the Me 262 was literally staggering. Diving through the protective layer of cloud beneath, he managed to shake off the tenacious fighter escort Mustang.

Immediately beneath him was an autobahn. Experienced eyes picked out the landmarks, ahead was Munich and to the left Reim. A few careful adjustments and he found that he still had a moderate degree of control over the battered aircraft. Moments later he was over the airfield and banking carefully he began his approach. One of the engines had had the throttle linkage shot away, leaving him no choice but to cut both engines just before the edge of the field. Only when he had cut the engines did he notice the Thunderbolts shooting up the airfield. Now it was too late to do anything about it.

Touching down at 150 m.p.h. he heard the nosewheel rattle violently—the tyre was flat. Braking as hard as possible, the aircraft rumbled on down the small landing strip till finally it ground to a halt and the pilot leapt out and took cover in the nearest bomb crater. Later he learned that his formation had shot down five of the bombers without loss, and the rest of the pilots either being diverted to neighbouring airfields or returning to Reim after the Thunderbolt attack had ceased.

This was to be the last operational sortie for *General* Adolf Galland. It was appropriately fitting that he should be flying an Me 262 fighter for no other senior Luftwaffe officer had risked so much politically or tried so desperately for so long to bring this radically advanced aircraft into full operational service. Finally, in Germany's metaphorical eleventh hour, his efforts had reached partial fruition and the type of results that he had predicted were proven. But his taste of victory was drowned in the bitterness of the impending defeat.

The Me 262V2 (PC+UB) with early model Jumo turbojets, single piece ailerons with external mass balances and elevators fitted with hoop mass balances. Note sharply raked mainwheel fairing doors and lack of mass balances on the rudder and trim tab.

The Me 262 had its genesis seven years before, in the autumn of 1938, when the *Reichsluftfahrtministerium (R.L.M.)* requested the Messerschmitt A.G. to design an airframe suitable for the utilisation of a radically advanced powerplant. This new powerplant was the axial flow turbojet currently under development at both the Junkers Flugzeug and Motorenwerke and the B.M.W. Flugmotorenbau G.M.B.H.

Allotted the title of *'Projekt 1065'*, the preliminary design studies were completed, along with wind tunnel tests of models, and by the following June orders were issued to proceed with the construction of a full scale mock-up of the proposed aircraft. This was inspected by the R.L.M. officials on December 19th and on March 1st, 1940, an order was placed for three Prototype airframes. Power was to be provided by a pair of B.M.W. P.3302 turbojets (later redesigned B.M.W. 109-003A.) which were anticipated to be ready for installation during the coming summer. However, the first of many delays to be suffered was encountered with these engines.

Early experimental work at the Experimental Institute of Aerodynamics at Göttingen had resulted in a model compressor which showed the rather remarkable average efficiency figure of 80%. Using this as a basis the B.M.W. engineers designed a six stage axial flow compressor and although this proved capable of 80% efficiencies over a wide range of loads its capacity was insufficient to meet the demands of the R.L.M. specification. A redesign was undertaken to increase the capacity by 30%, this being achieved by increasing the number of compressor stages to seven whilst the diameter remained unchanged. However, the results were still far from satisfactory despite an improvement in the average air velocity and an increase in the rated r.p.m. from 9,000 to 9,500. The only alternative turbojet engine, the Junkers Jumo 109-004A could not be utilized as it was in an even worse state, having run into serious development troubles following its initial bench tests in November, 1940.

Undeterred by these disappointing results Messerschmitt proceeded with the construction of the three experimental airframes, which had been allotted the type number Me 262, and these were completed by April, 1941. Meanwhile, changing policy at the *R.L.M.* had brought about a review of existing priorities for the aircraft industry and this resulted in the re-allotting of a very low priority to both the airframe and the turbojet development programmes. Despite this official apathy, enthusiasm remained high at Messerschmitt's and work went right ahead. Realizing that there was no chance of obtaining suitable turbojet engines for the next six months at least, the decision was made to begin preliminary flight investigation tests with a piston engine. A Junkers Jumo 210G engine of 700 b.h.p. driving a two-bladed airscrew was installed in the nose and though seriously underpowered (the aircraft had a loaded weight of 9,259 lbs.) the Me 262VI made its first flight on April 4th, 1941. In all seven flights were successfully undertaken with this combination.

The programme received a fillip when a further five prototypes were ordered on July 25th. However, the turbojets were still not available and it was not till mid-November that the first pair arrived for installation, these being B.M.W. 109-003A units, each developing 1,000 lbs. static thrust. These engines were far from satisfactory; vibration failure in the first compressor stage was still a common fault and usually resulted in the complete destruction of the compressor. Because of the unreliability of these early engines, the piston engine was retained when they were installed in the Me 262VI and as events turned out it proved a wise decision.

The first test flight was undertaken by Messerschmitt's chief test pilot *Flugkapitan* Fritz Wendel. Wendel was a little apprehensive of the short runway, there being only 1,100 yards available and this was only grass. However, the aircraft succeeded in getting airborne if only just clearing the boundary fence. Just after completing the first circuit trouble struck. Both turbojets cut and the aircraft sank rapidly on to the airfield only the piston engine preventing a really serious crash. When the engines were dismantled it was found that the turbine blades had been overstrained by the take-off revs. and had succumbed to vibration failure. Despite the accident the Messerschmitt team was satisfied with the main results and eagerly awaited the delivery of the more powerful Jumo 004 engines rated at some 1,850 lbs. static thrust. Meanwhile, Wendel proceeded to familiarize himself with the turbojet at the B.M.W. plant in Berlin and the Junkers works at Desau. There he flew a Bf 110 with a Jumo 004 engine slung underneath the fuselage.

Almost eight months were to pass before the new engines could be delivered and installed in the Me 262V3. This resulted in a redesign of the original nacelles, the Jumo units having a greater overall length and diameter. The rudder and fin areas were also enlarged by the addition of tip pieces to increase the lateral stability. Finally on July 18th, 1942, the aircraft was made ready at Leipheim airfield and Wendel climbed into the Me 262V3 for what was to be the first flight of the aircraft on purely turbojet power. Locking the brakes, he eased both throttles open for thirty seconds and then released the brakes, catapulting forward. At 800 yards the tail still had not lifted and he pushed the control column forward in an attempt to rectify this, but with negative results. The situation was decidely critical; either he got the aircraft off the fast diminishing runway immediately or he would have to brake as hard as possible in an attempt to pull up before hitting the trees that surrounded the boundary. He decided on the latter and braked hard. Much to his surprise and relief the tail came up at last. A split second decision and he had released the brakes again and with full throttle on the aircraft just cleared the tops of the surrounding trees. Once airborne the aircraft behaved well and proved to have good handling qualities.

The *R.L.M*'s interest warmed considerably after the success of this initial flight and the Me 262V3 was transferred to the *Luftwaffe* test centre at Rechlin for further tests. This enthusiasm was to be short lived, for while taking off on his second flight on August 11th, the chief test pilot crashed the Me 262V3. The resulting coolness and lack of response to the programme by the *R.L.M*. shocked the Messerschmitt team, who knew that without official backing and the necessary increase in priority it would be impossible to establish adequate production facilities or even undertake the necessary comprehensive development programme. Despite this apathy and their already extensive commitments, Messerschmitt continued to devote every available means to stepping up the development of the Me 262 programme. Subsequently, the Me 262V2 was fitted with Jumo turbojets and flew for the first time on October 2nd, 1942. The *R.L.M*. once more showed signs of enthusiasm and ordered fifteen pre-production machines, this order later being amended to forty-five machines.

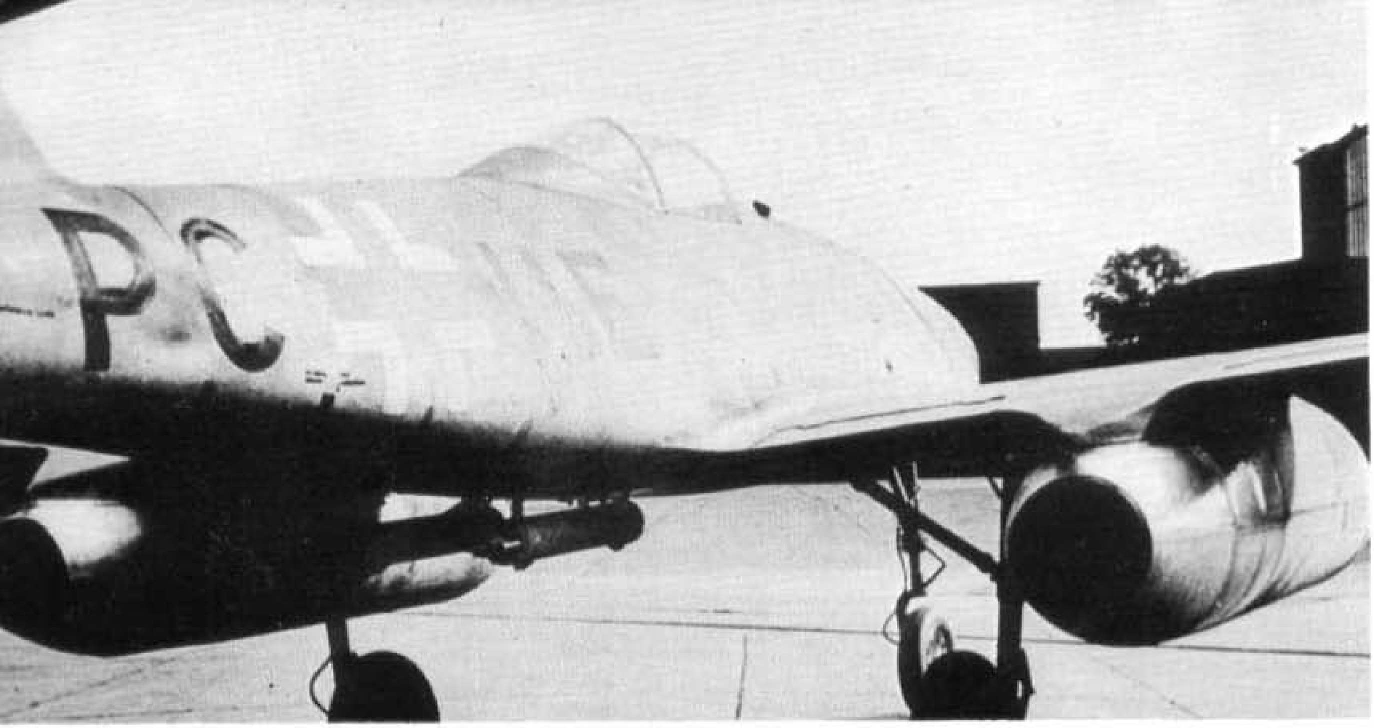
On December 2nd, the *R.L.M*. held a conference in Berlin at which it was decided to establish a production rate of 20 machines a month. Despite the strong protests from the Messerschmitt officials, who pointed out the utter inadequacy of such a programme, the *R.L.M*. remained adamant, pointing out that there was no real need for such an aircraft! The scheduled production rate was considered sufficient for operational trials.

The Me 262V1 rejoined the test programme on March 2nd, 1943, having been repaired after the damage it suffered whilst testing the B.M.W. engines. It was flown to the company test centre at Lechfeld where the Me 262V4 joined it the following month. The future of the Me 262 was further undermined at an *R.L.M*. conference on January 22nd, 1943, at which serious doubts were tabled as to the sense of continuing with development of complex advanced designs. It was felt that the emphasis should be placed on simplification in view of the increasing production difficulties. Messerschmitt was asked to provide a design proposal utilizing the maximum number of existing components from the Bf 109 production coupled with the Jumo 004-BI turbojet engines.

The resulting proposal stipulated the use of either the fuselage of the existing Bf 109 or its derivative the Me 155 along with the complete wing assembly of the latter plus the nosewheel assembly of the Me 309. This limited the design of new components to the fuselage nose section which was to contain two 30 mm. MK 103 cannon with 100 r.p.g. and one MG 151 cannon with 170 r.p.g., the tail assembly, and the main undercarriage members. Estimated performance figures were extremely promising, maximum speed being 522 m.p.h. at sea level, 609 m.p.h. at 29,530 ft. and a service ceiling of 37,415 ft. Overall dimensions included a wingspan of 41 ft. 2 in., length 31 ft. 2 in., height 9 ft. 6½ in. and a wing area of 209.88 sq. ft. Estimated weight was 6,768 lbs. with basic equipment and a loaded weight of 10,472 lbs. which gave a wing loading of 49.8 lbs. per sq. ft. at the latter figure.

These investigations were carried out over a period of two months by which time it was realized that much of the preliminary test work already completed on the Me 262 would have to be duplicated if the project was to come to fruition. In addition, the number of basic common compo-

The Me 262V3 (PC+UC) being prepared for flight trials. Fuselage access panel has been temporarily removed and distinctly shows its lower more forward position when compared to the "A" series production aircraft. Wire frames over the intakes were to prevent ingestion of foreign matter during ground running of the engines.



The Me 262V5 (PC+UE) after modification to the tricycle undercarriage layout. The undercarriage was fixed in the down position, the main wheel centre doors were locked shut and the oleo fairings removed to reduce the drag as much as possible. Two Borsig rockets are visible beneath the fuselage. The original shape of the trailing edge-engine fillet fairings is clearly shown.

nents that could be utilized were still of such insufficient numbers as to make the composite aircraft project of dubious value. Work had already begun on the initial pre-production batch of Me 262s and it was quite apparent that nothing was to be gained by the abandonment of the Me 262 programme in favour of the Bf 109 TL project which thus remained a very interesting proposal on paper.

In May, Prof. Messerschmitt informed *General* Galland that the testing programme had progressed satisfactorily and urged him to test fly one of the aircraft and judge its worth for himself. Galland, who was *General* in charge of the fighters at the time was a popular and energetic leader with an open mind where technical advancement was concerned. He was also in a position to bring political pressure to bear in favour of the Me 262 programme if he considered it worthwhile.

Early on the morning of May 22nd, Galland drove out to the company test airfield, Lechfeld, where he met Prof. Messerschmitt and a party of officials and engineers. Among these were the commander of the *Luftwaffe* testing section at Rechlin, his chief test pilot Behrens, and the Junkers jet engine experts. Galland was introduced to the assembly and a short conference was held during which each of the consulting experts elucidated on his own pertinent point. Behind them on the runway stood two Me 262s. Finally, Wendel climbed into one of the machines and took off giving a preliminary demonstration for Galland. After landing, the aircraft was refuelled and Galland took his place in the cockpit. The mechanics engaged the starter for the first engine and it started quite easily. The starter for the second engine was engaged but this time the engine caught fire, the blaze spreading rapidly over the entire engine. Galland vacated the cockpit with considerable alacrity! Undeterred he climbed into the second aicraft, the V4, and a few minutes later the procedure was repeated, only this time both engines functioned correctly. Moments later he was streaking down the runway and at a little over 120 m.p.h. he was airborne. Then followed a brief but thorough examination of the aircraft's flying and handling qualities.

By the time he landed Galland was convinced beyond all doubt that the Me 262 was a success. Its enormous tactical potential was abundantly clear. Here at last was part of the answer to the decline in the quality of the German aircraft industry. During the first three years of the war the Allies had gradually caught up in the field of technical development and finally surpassed Germany. Thus by early 1943 Germany found herself in an unenviable position. Clearly it was not sufficient to just re-establish a par with the Allies; she must make a rapid and decisive advancement in the shortest possible time. In the Me 262 the technical advancement had been achieved; all that remained was to institute mass production of it. Accordingly, Galland sent a telegram to *Feldmarschall* Milch immediately after his flight in the Me 262, expressing the utmost praise for the aircraft and the tremendous tactical potential it held.

A conference was held by the group who had been present at the demonstration flight and a concentrated effort was made to reach a workable solution which would bring the Me 262 into front line service with the least possible delay. Due to the seriousness of the war situation, it was decided to short circuit the usual test procedures, and it was accordingly suggested that an immediate start should be made on a batch of one hundred aircraft.[*] These would then be put through their tactical and technical trials simultaneously. While these were being built and tested preparations could be made for the final mass production, and any changes found necessary could then be applied directly to the first production series.

A copy of this proposal, complete with Galland's report on his flight was sent to Milch while Galland took the original direct to Goering the same day. Goering read the document with open enthusiasm and immediately telephoned Milch who was in full agreement with the proposals. All that remained was to get Hitler's personal sanction. Goering went to see Hitler the next morning, while Galland and the Messerschmitt team waited for the fatal decision. When it came it drove one more nail into the coffin of Germany's impending defeat.

Hitler's increasing distrust of Goering and the *Luftwaffe's* long list of technical disappointments had taken their toll. Nothing was to be done until Hitler had assured himself personally of all the facts. The extent of his distrust was amply demonstrated at the ensuing conference of experts at which not a single member of the *Luftwaffe* was allowed to participate. Hitler dominated the conference and demanded impossible guarantees which were beyond the means of those present to give. As a result of this one sided argument, Hitler expressly forbade any kind of preparation for mass production. Technical tests would be allowed to continue with a few prototypes. Undeterred, Messerschmitts on July 23rd, demonstrated the Me 262V4 to Goering who was highly enthusiastic about its performance. He reported his findings direct to Hitler, but the latter still refused to alter his former decision; the priority would remain the same.

Meanwhile, Messerschmitts continued to push the testing programme ahead as rapidly as possible. It had been obvious from the outset that the tailwheel layout was not very satisfactory, providing at it did very restricted visibility during the critical stages of the take-off as well as causing damage to the runways with the jet efflux. On top of this, as has already been recorded, it required the use of full brake to bring the tail up for take-off. The obvious solution was to fit a nosewheel layout which, paradoxically, had been avoided originally as it was feared that this would provide too many complications. An order was also received from the *R.L.M.* stating that production aircraft and all subsequent prototypes were to be fitted with this type of undercarriage layout.

The Me 262V5 was chosen for the initial installation of the nosewheel layout, trials having already been carried out with a standard Bf 109F-1 (Werk.Nr.5603) fitted with a fixed nosewheel. In addition two Borsig rocket units, each delivering 1,100 lbs. static thrust, were fitted to the aircraft to shorten the take-off run. The flight tests were begun on June 26th and proved highly successful, and in consequence, the Me 262V6 was fitted with a nosewheel undercarriage, this being the first fully retractable installation. In addition to receiving the first Jumo 109-004B turbojets scheduled for installation in the production series aircraft, the prototype four cannon installation was also fitted, flight trials beginning in October.

Several other external changes were also apparent. The new engines were enclosed in revised cowlings of improved aerodynamic shape, the fairing panel from the trailing edge of the wing being carried down to enclose the rear of the engine cowling in order to improve the airflow characteristics. Some cooling problems had been encountered during earlier tests and it had been found necessary to increase the flow of air over the rear section of the engine. This was achieved by introducing a series of slots radially in the external section of the double skinning, the metal in front of each slot being slightly depressed to form a shallow scoop.

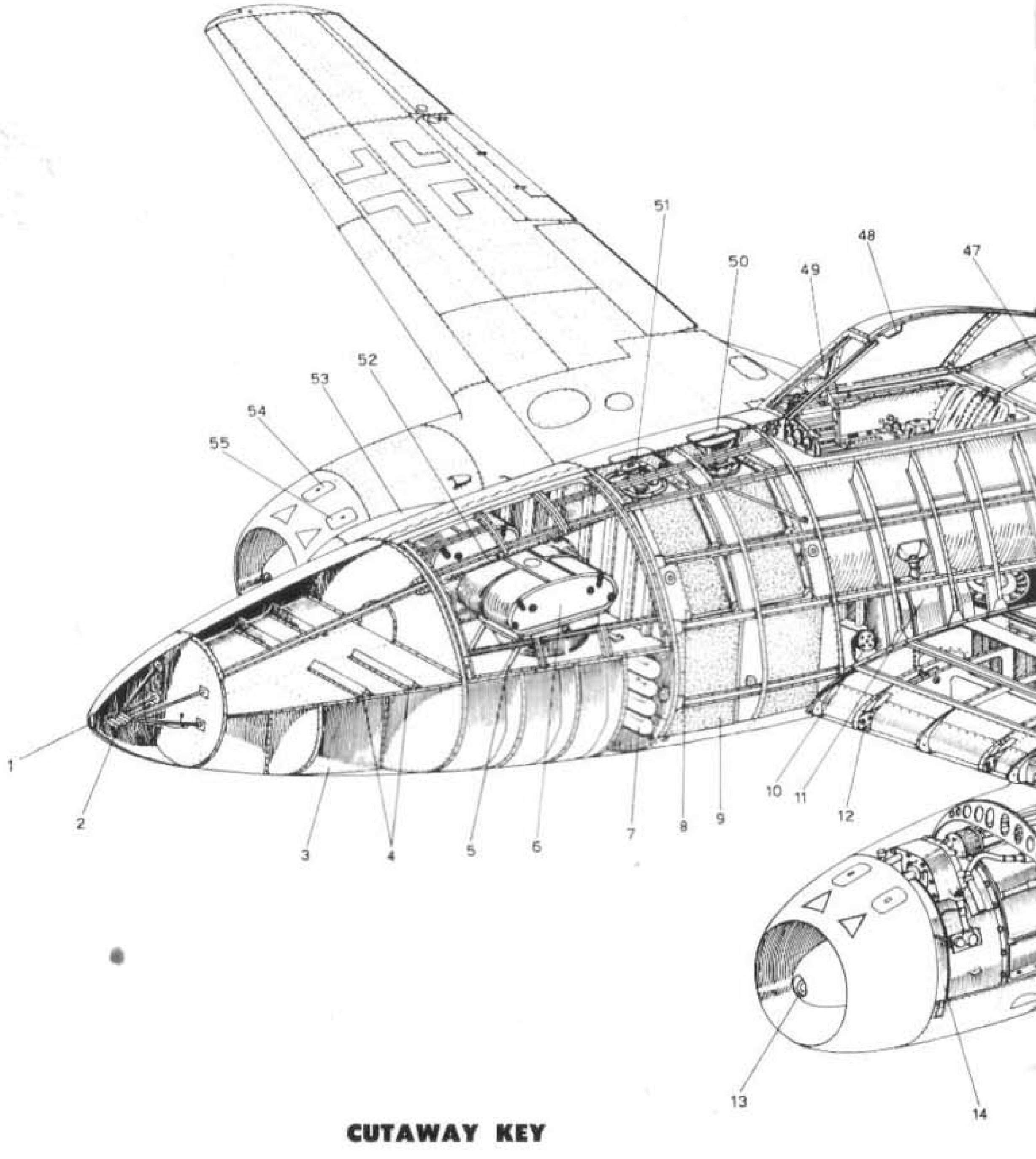
The control surfaces had also undergone a series of refinements. The original mass balanced ailerons with conventional internal linkage had proved to be inefficient at high speeds, becoming excessively heavy, a fault common to the earlier Bf 109. In order to alleviate this problem the ailerons had been redesigned with a central external linkage to provide sufficient mechanical advantage to overcome the loads imposed at high speeds. Although a fully blown canopy had already been tested on the Me 262V5, this being a rubber sealed unit fitted for cabin pressure tests, the original braced type of canopy was retained on this aircraft. The programme had, however, suffered a serious setback due to the first American daylight raid on the Regensburg plant on August 17th, which caused the destruction of a major portion of the assembly fixtures. This prompted the transfer of the development programme from Augsburg to Oberammergau which seriously disrupted production.

On November 2nd Goering visited the Messerschmitt works to see how the programme was progressing. During the course of the conversation with Prof. Messerschmitt he asked if the aircraft was capable of carrying one or two bombs in the role of fighter bomber, adding that this was the general trend of Hitler's thoughts. Messerschmitt was evasive at first, but finally replied that it was possible to adapt the aircraft for this role, though the performance would certainly suffer accordingly.

Early in December a demonstration of the latest *Luftwaffe* technical developments was held at the aviation centre at Insterburg in east Prussia. Hitler, Goering, Galland and Prof. Messerschmitt were all present on this occasion.

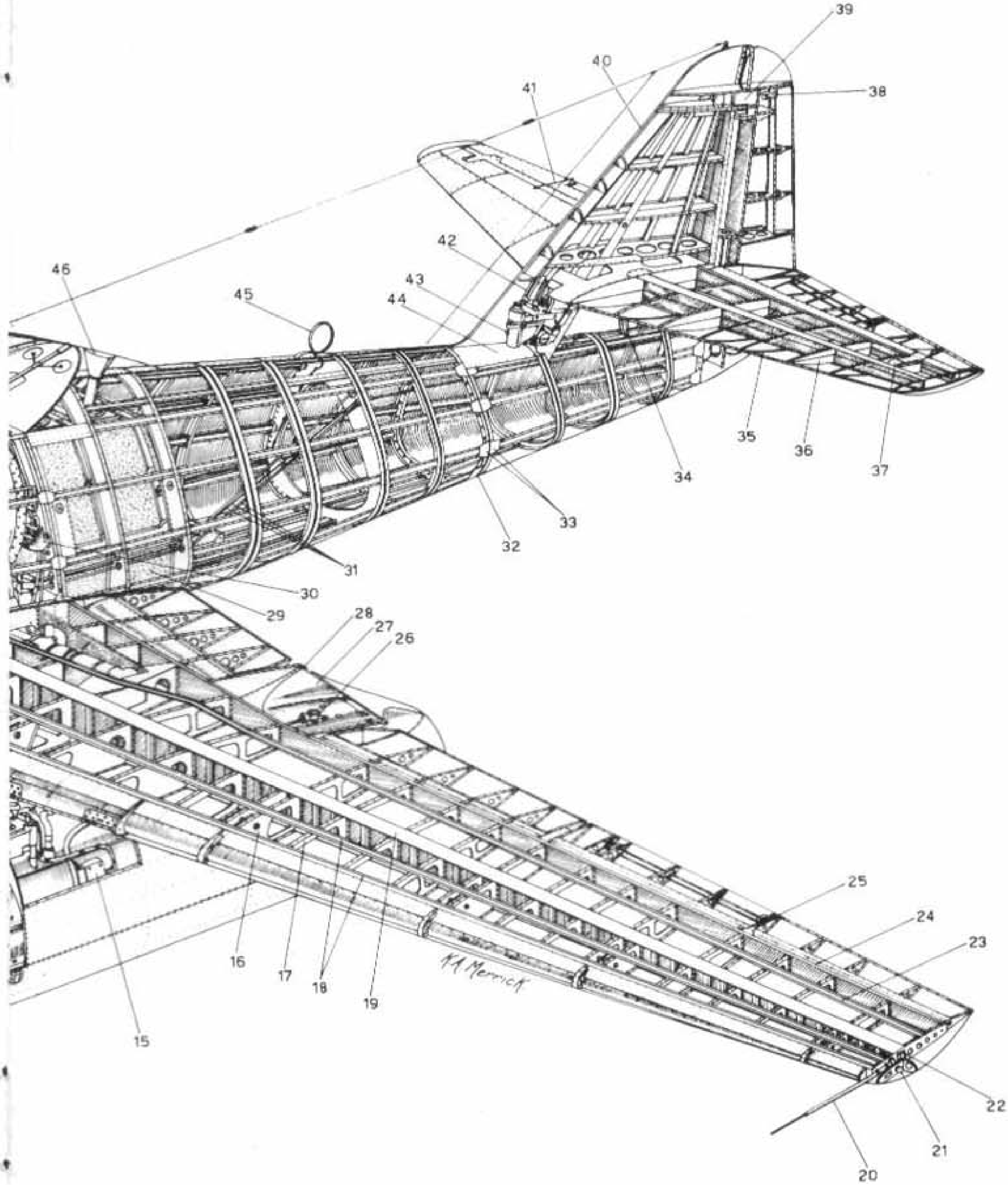
Another view of the Me 262V5 showing the prototype nosewheel installation.

MESSERSCHMITT Me 262A—1a/U3



CUTAWAY KEY

1 Camera gun window
2 Camera gun cradle (camera gun not normally fitted to this version).
3 Wall of nosewheel well
4 Reinforcing strips
5 Camera cradle
6 Port RB50/30 camera.
7 Port rack of compressed air bottles.
8 Reinforcing strip for fuel tank pick-up point.
9 Forward main fuel tank
10 External power socket
11 Hydraulic reservoir
12 Slot operating arm.
13 Pull ring for manual start of Riedel motor.
14 Annular oil tank
15 Ignition box
16 Half-rib construction containing guides and rollers for slot operation
17 False rib
18 "U" Stringers
19 Main spar
20 Pitot tube
21 Port navigation light
22 Bracket for single bolt wing tip attachment
23 "U" stringer
24 Rear spar
25 Aileron mid-section joint
26 Worm gear drive for variable area "bullet"
27 Engine fairing panel
28 Lower wing surface
29 Aft main fuel tank
30 Fuel transfer pump
31 Control rods for elevators, rudder and rudder trim
32 Rear fuselage joint line
33 Fish plates
34 Elevator bell crank
35 Skeleton rib
36 Sheet rib
37 Elevator mass balance
38 Rudder trim tab mass balance
39 Rudder mass balance
40 Plywood leading edge shell
41 Elevator trim tab linkage
42 Tailplane incidence change guide slots
43 Tailplane incidence actuating motor
44 Double skinning
45 D.F. loop
46 Fuel tank filler
47 Canopy stanchion rod
48 Canopy handle
49 Optically flat windscreen with armoured glass panel immediately behind it
50 Fuel tank filler
51 Fuel booster pump
52 Steel tube pick-up attachment with built-in turnbuckle
53 Starboard camera blister
54 Filler point for two-stroke mixture for Riedel motor
55 Filler point for high-octane fuel for initial engine start



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The Me 262V6 (VI+AA) with the late model Jumo turbojets of the production series aircraft showing the revised cowling panels. Both rudder and trim tab have mass balances. Note cannon ports and the repositioned hydraulic filler point.

The Me 262V6 was demonstrated and made a definite impression on Hitler. Turning to Goering he asked if the aircraft could carry bombs. Goering replied that it could, adding that it might even be possible to carry up to a 500 k.g. bomb load. Hitler immediately delivered a short but devastating speech to his companions. Here at last was what he had been demanding from the *Luftwaffe* for years, a high speed Blitz-bomber! With it he would destroy the coming Allied invasion in its first and weakest phase; on the beaches. Hitler had spoken—the Me 262 was to be a bomber!

Those present were stunned; the whole idea was ludicrous. The aircraft was capable of carrying bombs but it had no means of delivering them accurately. Level bombing attacks would be extremely difficult since there was no provision for fitting a suitable bomb sight to the aircraft, and at the best the pilots would be lucky to hit a moderate-sized town from high altitudes under these conditions. Low level attacks were also out of the question since fuel consumption was excessively high at low altitudes and the effective range would be critically reduced. Diving or steep gliding attacks were equally impractical due to the excess speeds built up, the aircraft's controls becoming "solid" at speeds over 600 m.p.h. Despite this the long awaited order for mass production was at last gained, but the backing of the *R.L.M.* remained uninspired, for no effort was made to terminate production of any of the other existing types to provide the necessary resources for the Me 262 production. However, Programme 223 was instituted which called for an initial production rate of sixty aircraft per month from May, 1944, increasing to mass production as soon as tooling, raw materials and labour became available.

In the meantime several other prototypes had been completed, the Me 262V7, fitted with two streamlined bomb racks and two Borsig units, first flying in November, 1943. The Me 262V8 was used for further armament tests while the Me 262V9 which first flew in January, 1944, was used to test radio and navigation aids including FuG 25A (I.F.F.) and FuG 24 (R/T), the latter being replaced by FuG 16 on the production aircraft. The Me 262V10, first flown on May 1st, 1944, was initially used to test methods of reducing stick forces at high speeds but was eventually fitted with two streamlined racks beneath the forward fuselage and used to test the aircraft's suitability for the ground attack role. Additional experiments with cabin pressurisation and the development of a suitable ejection seat were also carried out with the Me 309 during 1944.

The first thirteen pre-production Me 262A-O fighters for service were completed and test flown during the period from March to April, 1944. The close grouping of the armament in the nose was ballistically ideal but initially some firing difficulties were experienced during high speed turns due to the large centrifugal forces present. This was rectified by an alteration to the feed system. These aircraft exhibited several external differences from the prototypes. The cockpit canopy was of a revised aerodynamic shape. (It is believed that the Me 262V7 was first used to test this improved canopy.) Despite the use of ground adjustable internal mass balances on the control bellcranks for the elevators and rudder, additional mass balances were found to be necessary due to the loads imposed at high speeds. The elevators were already equipped with a small external mass balance in the form of a weight suspended between two metal arms but this was replaced by a more refined type of mass balance. A similar type was also fitted to the rudder, being inset into the fin, whilst the one fitted to the rudder trim tab was re-positioned at the top of the trim tab. The Leipheim factory also prepared a specially cleaned up high speed version, the Me 262V12 (Werk.Nr. 130 007) which was first flown on July 6th, 1944. This aircraft attained a level speed of 624 m.p.h., the highest speed ever recorded for an Me 262.

Despite Hitler's bombing order, the existing programme for production and testing of the aircraft in the fighter configuration continued unchanged except for the bomb trials with the Me

262V10. Galland in the meantime had formed a special flight from experienced fighter pilots to test the Me 262 in action.

The initial deliveries of Me 262s had been made to two test units, one at Lechfeld and the other at Rechlin Experimental Station *(E-Stelle Rechlin)* north of Berlin. Each detachment had approximately fifteen aircraft on its charge but as far as is known the one at Rechlin did not undertake any operational sorties, being engaged purely in technical testing. However, the Lechfeld detachment, designated *Erprobungskommando 262*, under *Hauptmann* Thierfelder was used primarily against the high flying Mosquito daylight reconnaissance aircraft which had hitherto proved to be almost invulnerable due to their speed. Before long the first kills were achieved by the Me 262 flight, and Thierfelder progressed to attacking bomber formations single handed. After some initial success he was eventually shot down. The tactical and technical trials continued to progress most satisfactorily during this period, and the collaboration between the military and industrial departments developed quickly and favourably.

However the presence of German jet and rocket propelled aircraft had naturally not gone unnoticed by the Allies, and in February, 1944, their bomber forces were directed against the entire German aircraft industry. This caused serious damage to the Me 262 production programme, Messerschmitt's plants being so badly damaged that the initial order of 100 aircraft could not be delivered. Increasing difficulties with material and personnel further retarded the final production phase until the end of March, 1944. When the initial batch was finally ready to leave the assembly works at Leipheim four weeks later, they were caught by an American daylight raid of April 24th, and in the event only eighteen reached the *Luftwaffe*. A further seven aircraft were taken on charge in May.

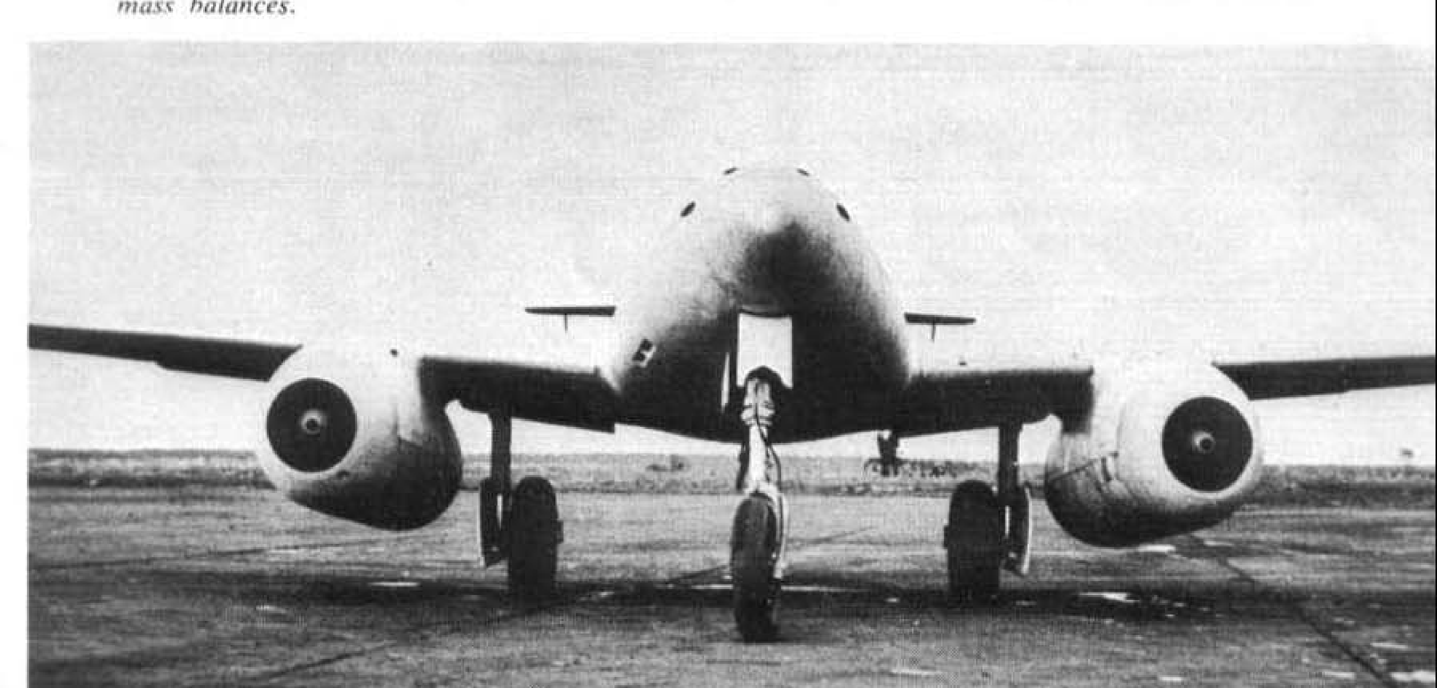
During the same month Galland attended an armament conference at which he emphasised the fact that the Luftwaffe's increasing losses could only be stemmed by the rapid service introduction of the technically superior jet and rocket propelled aircraft. He finished off his resumé with the statement that he would sooner have one Me 262 than five Bf 109s. The armament department accepted his views and steps were taken to increase the Me 262 production tempo. It was decided that within three months of the inauguration of the proposed speed up programme production would exceed 1,000 aircraft per month. But once more Hitler intervened and rejected the programme. He still could not rationalise the necessity for increasing the air defences of Germany.

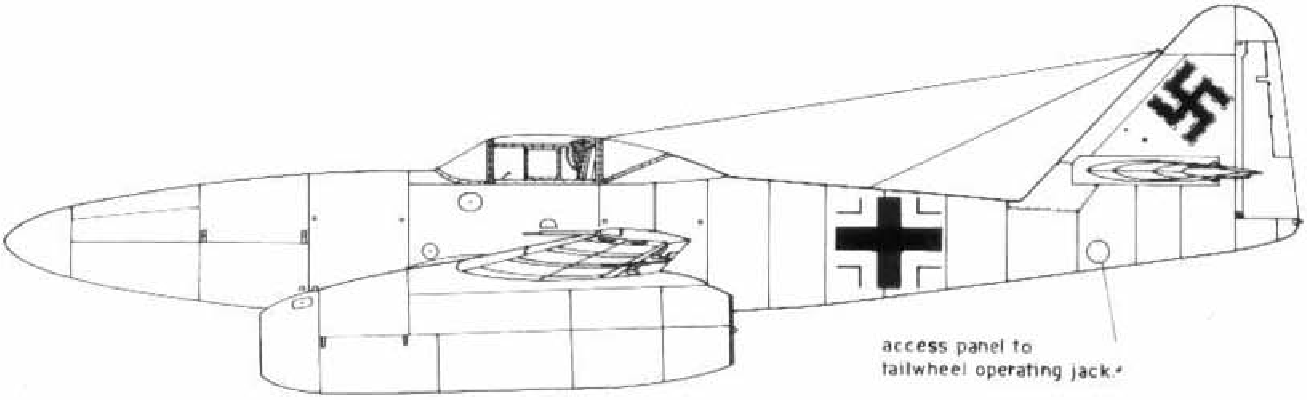
The initial production version was the Me 262A-1a *Schwalbe* which carried a fixed armament of four 30 m.m. MK 108 cannon in the nose. The two upper cannon were each provided with 100 rounds per gun, while the lower two had 80 rounds per gun. Radio equipment included FuG 16ZY with ZVG and FuG 25a. Several sub-variants stemmed from this basic design. The Me 262A-1a/U1 varied only in the type of armament fitted, six cannon being installed, two 20 m.m. MG 151 with 146 rounds per gun, two 30 m.m. MK 108 with 66 rounds per gun and two 30 m.m. MK 103 with 72 rounds per gun.

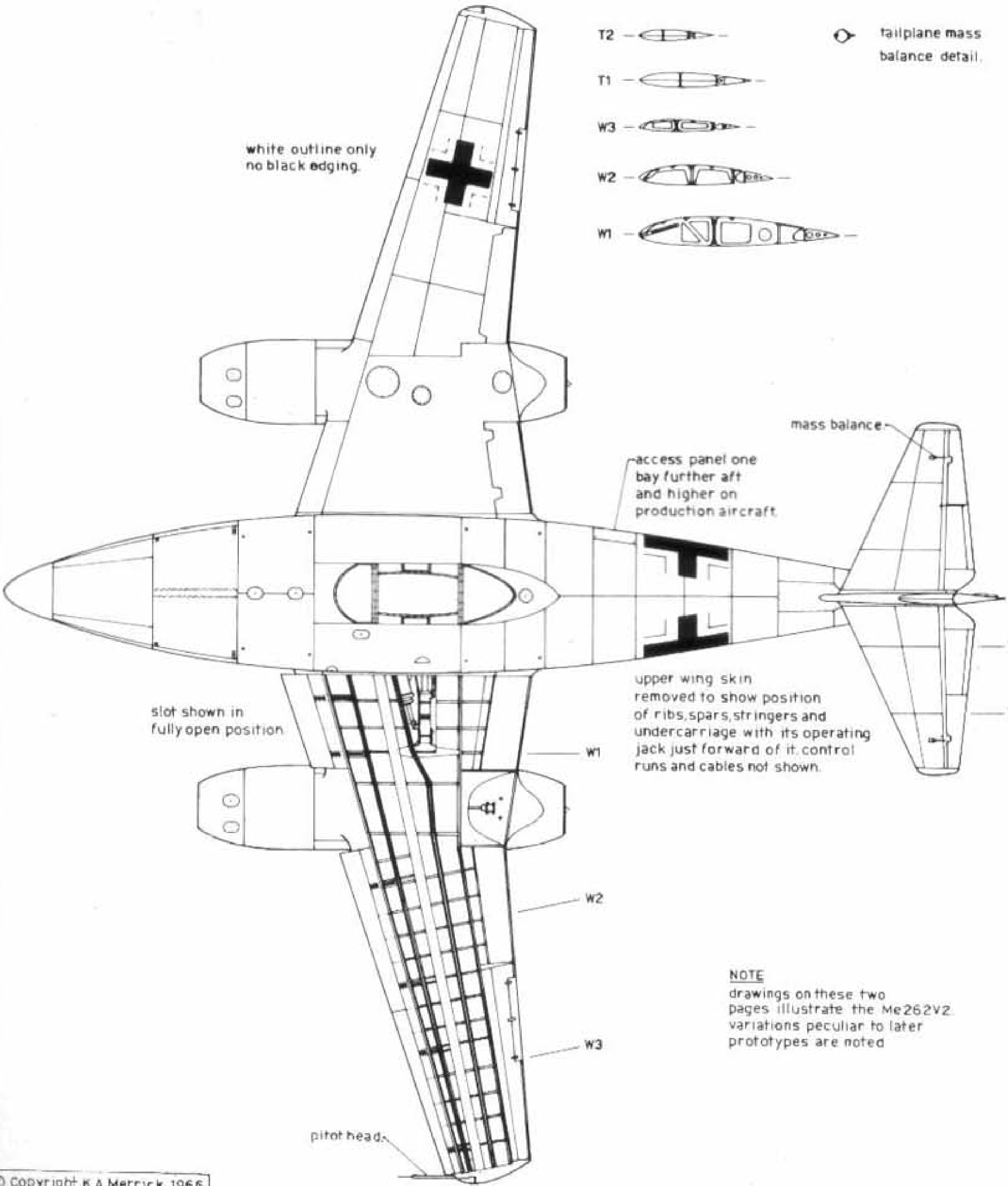
To meet the pressing need for a bad weather interceptor a specialized version with additional radio navigational aids was built under the designation Me 262A-1a/U2. A photographic reconnaissance version materialized under the designation Me 262A-1a/U3. This mark was unarmed, carrying two RB 50/30 cameras installed in the position normally occupied by the four cannon, the size and angular positioning of these units requiring the addition of a bulged fairing on each side of the fuselage. Despite this specialization the standard nose panelling was still retained, the cannon ports being covered with doped fabric patches.

The final blow came at a discussion of an emergency programme when Hitler suddenly asked how many of the finished Me 262s had been converted to carry bombs. Milch, who had not been present at Insterburg and thus had not heard Hitler's bomber order, replied that none had been converted as the aircraft was being produced exclusively as a fighter. Hitler flew into a rage, the severity of which had not been witnessed before. A few hours later orders were issued detailing the refitting of the entire Me 262 production output as bomber aircraft. As a final touch, the aircraft was in future only to be referred to as a bomber. Both Galland and

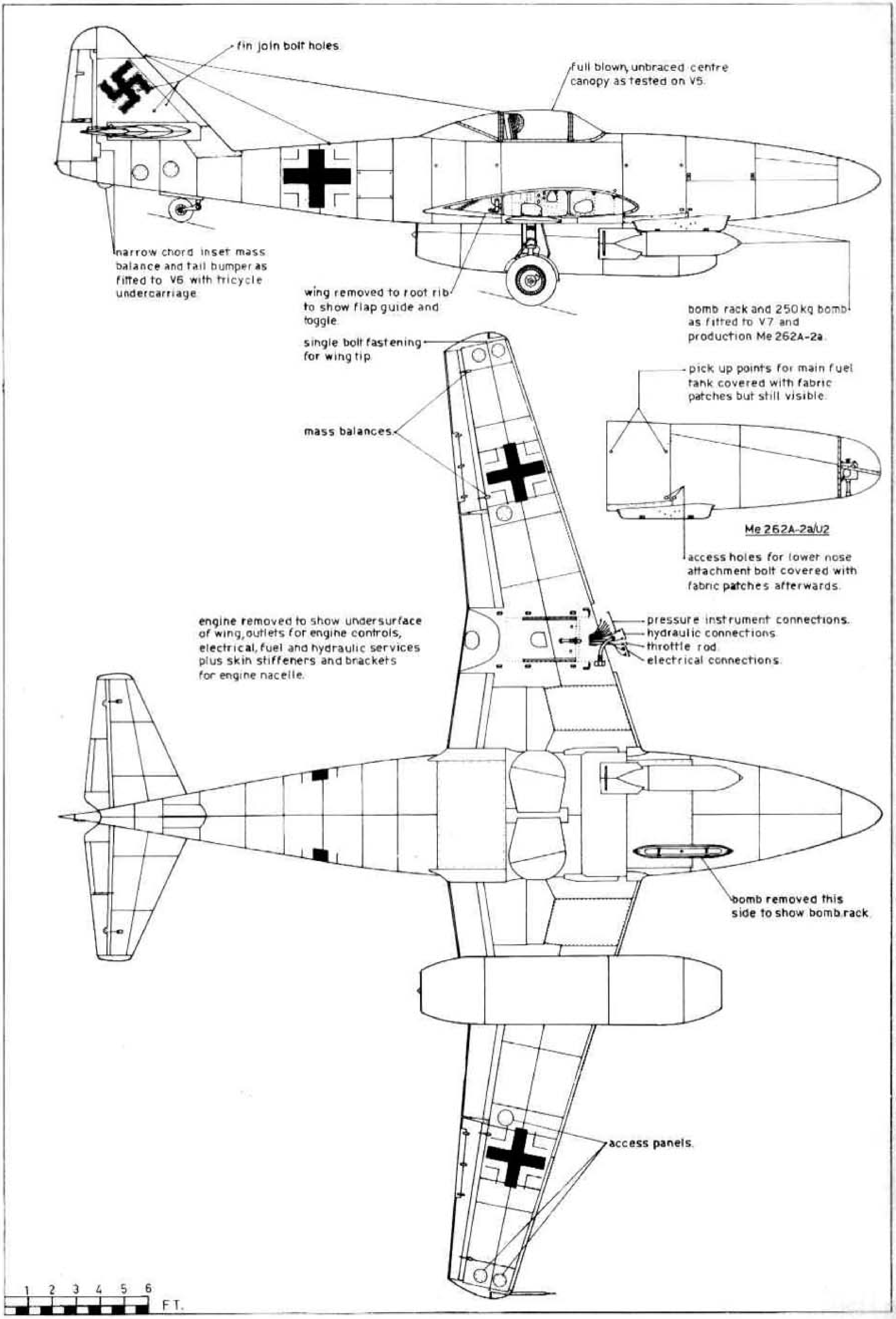
This nose on view of the Me 262V6 shows the shell ejector chutes in their original form. The lines projecting downwards from the underside of the tailplane are the hoop frames of the elevator mass balances.

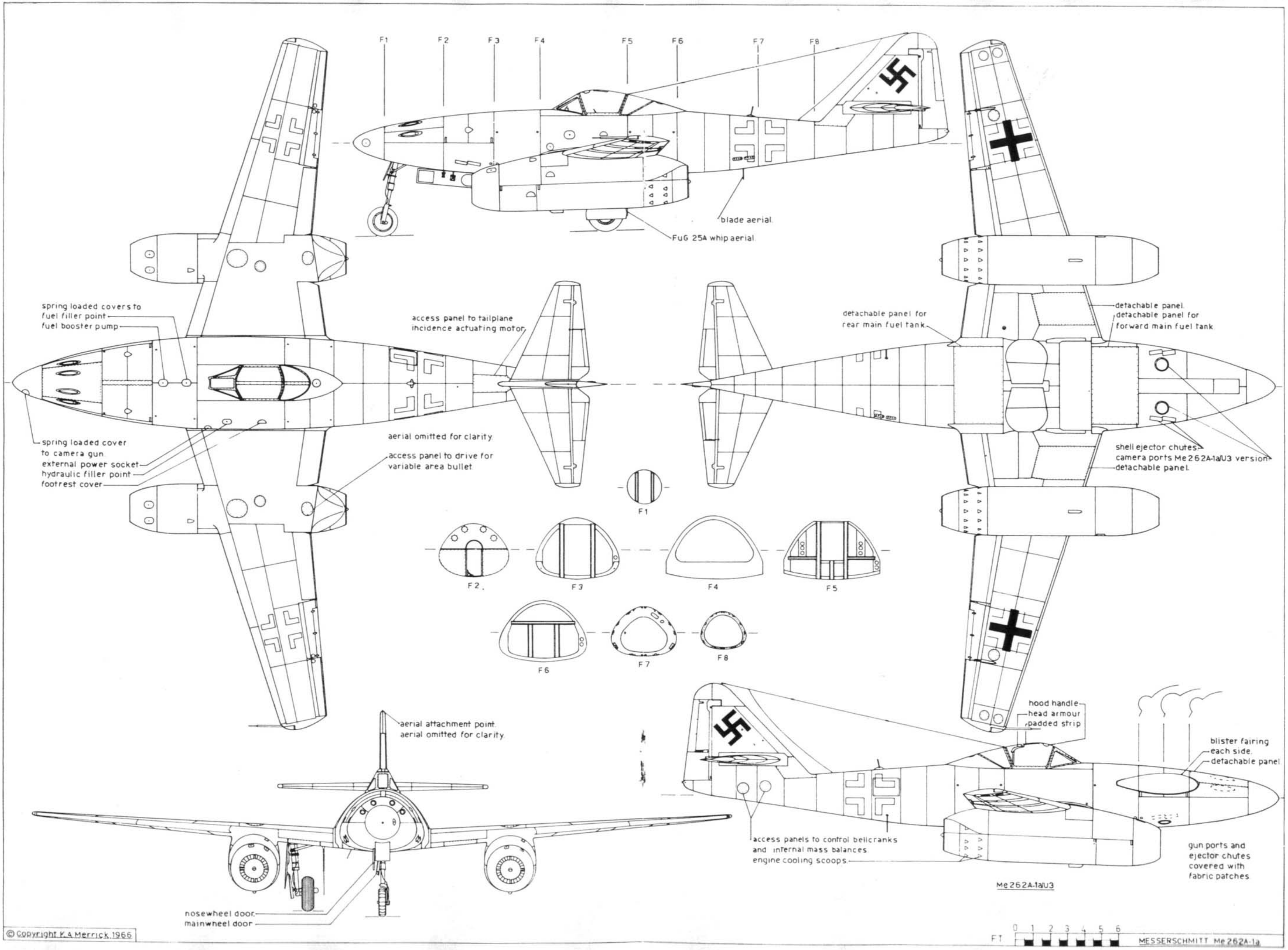






NOTE
drawings on these two
pages illustrate the Me262V2.
variations peculiar to later
prototypes are noted


fin join bolt holes.
full blown, unbraced centre canopy as tested on V5.
narrow chord inset mass balance and tail bumper as fitted to V6 with tricycle undercarriage.
wing removed to root rib to show flap guide and toggle.
bomb rack and 250 kg bomb as fitted to V7 and production Me 262A-2a.
single bolt fastening for wing tip.
pick up points for main fuel tank covered with fabric patches but still visible.
mass balances.
Me 262A-2a/U2
access holes for lower nose attachment bolt covered with fabric patches afterwards.
engine removed to show undersurface of wing, outlets for engine controls, electrical, fuel and hydraulic services plus skin stiffeners and brackets for engine nacelle.
pressure instrument connections.
hydraulic connections.
throttle rod.
electrical connections.
bomb removed this side to show bomb rack.
access panels.
1 2 3 4 5 6
FT.


F1
F2
F3
F4
F5
F6
F7
F8
blade aerial.
FuG 25A whip aerial.
spring loaded covers to
fuel filler point
fuel booster pump
access panel to tailplane
incidence actuating motor.
detachable panel for
rear main fuel tank.
detachable panel.
detachable panel for
forward main fuel tank.
spring loaded cover
to camera gun.
external power socket
hydraulic filler point
footrest cover
aerial omitted for clarity.
access panel to drive for
variable area bullet.
shell ejector chutes
camera ports Me 262A-1a/U3 version
detachable panel.
aerial attachment point.
aerial omitted for clarity.
hood handle
head armour
padded strip
blister fairing
each side.
detachable panel
access panels to control bellcranks
and internal mass balances
engine cooling scoops.
gun ports and
ejector chutes
covered with
fabric patches
Me 262A-1a/U3
nosewheel door.
mainwheel door
© Copyright K.A.Merrick.1966
FT 0 1 2 3 4 5 6
MESSERSCHMITT Me 262A-1a

An Me 262A-2a Werk.Nr.111711 in natural metal finish. Despite the lack of bomb racks this WAS a bomber variant and details of its capture will be found in Part II of this work.

Messerschmitt tried desperately to get the order revoked but it was useless. The entire programme of testing, training of personnel and preparation for action was transferred from Galland to Pelz, *General* of the bombers. This conversion, which resulted in further delays resulted in the Me 262A-2a *Sturmvogel*, two bomb racks in streamlined fairings being mounted beneath the nose on either side of the wheel well. These were usually ETC 504s or the type known as *Wikingschiff*. A multitude of stores including a guided torpedo were projected for use with this variant but in practice only four types were used. These were the SC 500 500 kg. light case bomb, the SD 500 500 kg. semi-armour piercing bomb, the SC 250 250 kg. light case bomb or the SD 250 250 kg. semi-armour piercing bomb. The resulting speed penalty was as much as 120 m.p.h. which made the aircraft vulnerable to interception by standard piston engined fighters. The usual four cannon installation was retained although a few aircraft had the upper pair of cannons removed. Initial deliveries of this version began in June 1944, twenty-eight being taken on charge by the *Luftwaffe*.

The next variant to appear was the Me 262A-2a/U1 in which the lower pair of cannon were removed to provide space for a T.S.A. bomb aiming device. The Me 262A-2a/U2 was a further attempt to improve the bomb aiming facilities by fitting a bulged semi-glazed wooden nose section, housing a second crew member in prone position similar to the P-38J Lightning (see Series 1, No. 3) and which resulted in an increase of approximately 8¼ in. in the overall length of the fuselage. A standard *Lofte 7H* bomb sight was fitted. Only one prototype of this version was completed.

A specialized ground support and interceptor model materialized in the Me 262A-3a which featured additional armour for the fuel tanks and cockpit but was otherwise externally indistinguishable from the standard Me 262A-1a. The characteristic German propensity for multiplicity of operational role produced a compromise between the pure photographic reconnaissance version and the fighter interceptor: the Me 262A-5a. While still retaining the two RB 50/30 cameras in their original position the relatively small size of the MK 108 cannon made it possible to fit two of these in the next forward fuselage bay, one each side of the nosewheel well, with the barrel protruding through to the nose cone. External pylons beneath the nose permitted the fitting of either two 65.9 Imp. gal. or 131.8 Imp. gal. auxiliary fuel tanks for increased operational range.

During the following weeks, while German towns and industry succumbed to the softening up attacks of the Allied bomber forces, Pelz continued to attempt to retrain his bomber pilots to fly the Me 262. Problem after problem arose, and while they were still in the process of being solved the long anticipated Allied invasion began. Not a single one of the blitz bombers was ready for operations and even during the following critical weeks of the bridgehead, few if any went into action. Their greatest opportunity had been lost.

CONSTRUCTION DETAILS

Fuselage: The fuselage was a semi-monocoque construction employing a mixture of triangular hoop frames and formers. No longerons were used, only hat section stringers, one along the top centre line aft of the cockpit, six along the sides with one terminating at former 14, and five along the bottom, the two outermost terminating at former 15. Except where specifically noted, stressed aluminium alloy skinning was used to cover the airframe.

Immediately aft of the nose cone was a solid web bulkhead which served as a jacking point. This was followed by a section 14½ in. long terminating in a flush riveted, channel shaped former, the whole being screwed to the next section which contained the armament bay. Steel sheet .080 in. thick was used to cover this section. The entire nose section was joined to the mid-fuselage by two high tension steel bolts, one in each of the lower corners, fastening it to a solid web bulkhead. At the top two 1½ in. steel tubes, attached to the mid-section bulkhead by forged fittings, extended forward to the bulkhead at the front end of the gun access bay. Both tubes incorporate turnbuckles for alignment adjustments. Immediately behind the gun access bay was the forward fuel tank bay. The bottom panel of this section was of a waffle grid, double stressed skin construction and formed a detachable access panel. Attachment was by flush screws and captive nuts.

The horizontal semi-cylindrical cockpit liner was supported between two solid web aluminium alloy bulkheads interspaced with three hoop frames and one channel shaped former. The rear bulkhead began the aft fuselage section and also formed the front panel of the rear fuel tank bay. The bulkhead forming the aft end of this fuel tank bay was also of solid web construction but utilised sheet steel .080 in. thick.

The skinning of the rear fuselage was of unusual construction, the sheets being preformed to the fuselage contour and then the aft ½ in. joggled to the thickness of the metal and bent inward to form a "J" channel section. The next skin was then lap-jointed and flush riveted.

The tail cone was attached to the rear fuselage by a ring of bolts which were afterwards covered with filler and doped fabric strip in order to preserve the flush finish. The former immediately aft of this joint comprised a built up ring riveted to a steel "I" beam section which slanted aft at 47 deg. from the vertical and extended upwards for approximately 2 ft. above the fuselage to form the lower portion of the front fin spar. At the end of the tail cone was a stamped flanged aluminium channel member which acted as the bottom half of the rear fin spar and the rudder post. A horizontal stamped flanged channel member connected the tops of these two spars and formed the attachment for the tail-plane.

Tailplane: The adjustable, all metal, cantilever tailplane was built up in two sections split horizontally and bolted together through access holes which were afterwards fabric covered. A built up "I" beam spar carrying stamped flanged ribs was attached to the fuselage by bolts to two forged fittings set in ball bearings at the axis of the angle of adjustment. The one piece, pressed aluminium alloy tailplane fillets were held in place by a leading edge pin which moved vertically between greased strips just above the adjusting jack. The rear attachment was by two screws, one above and one below, aft of the spar.

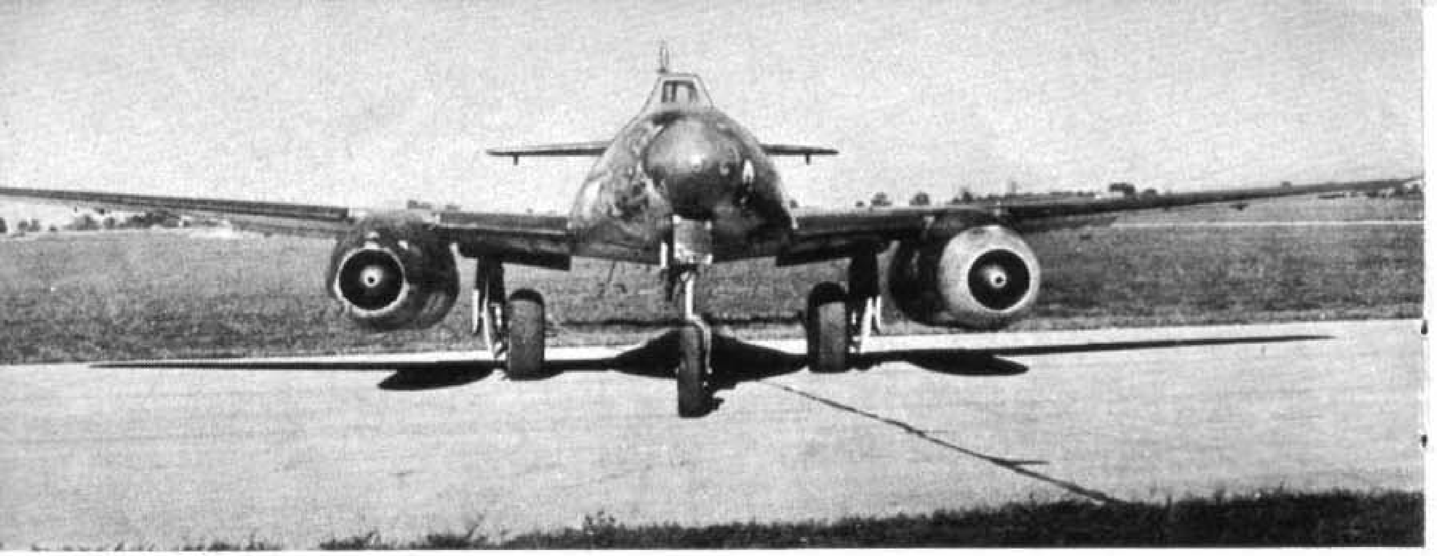
Elevators: The mass balanced elevators were of conventional construction utilising a stamped flange spar, rounded metal leading edge shrouded into the tailplane trailing edge, and stamped flanged ribs. The trailing edge was formed by crimping the aluminium alloy skin sheeting together and riveting it with plain rivets. Hinges were of the self-aligning ball-bearing type. Both elevators had inset Flettner-type trim tabs. Although originally intended to be interchangeable with each other and servo operated, in practice they were generally ground adjustable only. The trailing edges of these tabs were flush riveted.

Adjustment of the tailplane incidence was facilitated by means of an electric motor driven screw jack bolted to the front face of the slanting fin spar. Two guide rails, immediately above the jack, were provided with slots to take the retaining pins in the leading edge of the tailplane. A single piece drawn aluminium fairing attached by screws enclosed this unit and faired the leading edge of the fin into the top of the fuselage. The tailplane had to be installed before the fin was bolted in place.

Fin: The fin was built up in two sections split vertically along the centre line and bolted together through access holes which were covered with fabric patches afterwards. The assembly consisted of four main ribs built up on two flanged spars which were bolted at their lower end to the steel "I" beam section in the rear fuselage and the flanged channel stern post member. Between these two spars was a channel shaped stringer. The front of the fin was finished off with a flat sheet to which were attached a series of small false nose ribs. A single piece, pre-formed plywood nose skin was attached to these. Two small metal plates were riveted to the top rib and supported a small false rib to which the fin tip was attached.

Rudder: The mass balanced rudder was built up from seven stamped flanged aluminium ribs attached to the leading edge "D" shaped spar, the curved portion of which fitted closely inside the trailing edge of the fin. The trailing edge was formed by crimping the aluminium alloy skin together and riveting with ⅜ in. round headed rivets. The front portion of the lower rudder was built up from two pre-formed aluminium sheets flush riveted to the spar and the lowest rib. Two small pre-formed sheets containing the formation light were attached to the lower aft portion of the fin by flat screws.

This rear view shows well the exceptionally clean lines of the Me 262.



The broad triangular shape of the fuselage is well shown in this view. The port engine is a replacement, hence the difference in colouring.

The top of the rudder was completed by a small tip screwed into place just above the mass balance. A mass balanced combined servo-trim tab, attached by four hinges, was set into the trailing edge of the rudder. The trailing edge was formed by crimping together the aluminium alloy skin around which an aluminium strip was folded and flush riveted.

Mainplanes: The mainplanes were built up on two spars, the mainspar being a composite "I" beam with steel booms and built up dural webs, tapering in depth from 14½ in. at the aircraft centre line to 3 in. at the tip attachment fitting. The spar boom caps were ¾ in. thick at the centre line, 4½ in. wide at the top and 4¾ in. at the bottom.

The spar was built up in two sections and spliced at the aircraft centre line where the webs were flanged and bolted. ¾ in. thick by 8 in. long steel splice plates were attached to both the top and bottom of the boom caps by six through bolts on each side of the web. Small steel wedges were used as packing between the lower spar caps and the splice plates as the taper on that surface began at the centre line. Six heavy steel hat shaped stiffeners were riveted to the front face of the spar, three each side between the centre line and the fuselage skin at which point the spar sweepback began. Hat shaped aluminium stiffeners replaced the steel ones along the rest of the spar.

Since the mainspar occurred at approximately 35% of the Mean Aerodynamic Chord, the nose ribs were longer than normal and were consequently of mixed construction. The compression ribs had hat shaped vertical stiffeners, while the remainder were of the stamped flanged type with riveted stiffeners. Three large "U" section spanwise stringers were fitted, two in front of the mainspar and one between it and the auxiliary spar. The auxiliary spar was aluminium, being channel shaped with hat shaped stiffeners. Set 38½ in. behind the mainspar at the aircraft centre line, it extended out to the wingtip attachment point and carried the flaps and ailerons.

The wingtip stressed skin covering was flush riveted except at the base of the leading edge where it was flanged out and riveted to the bottom surface skin. It varied in thickness from .083 in. at the leading edge to .080 in. at the trailing edge. A rolled .010 in. thick sheet steel section was riveted in place at the lower surface to preserve the true aerofoil shape behind the slots.

The slots were constructed from a .040 in. thick steel sheet and extended from the fuselage to the wingtips being divided into two sections by the power plants. The outboard section was further divided into two sections and connected by a ½ in. steel pin. Each section was bolted to two curved steel guide tracks which in turn slid over ball bearing rollers bolted to the wing ribs.

The wingtip, with integral formation light, was built in two halves, flush riveted to an inboard rib and spar and welded together around the outer edge. The tip was attached by means of an ingenious three way fitting using a single bolt.

The all metal Frise-type ailerons were constructed from a channel section aluminium leading edge and stamped flanged ribs. The two skin surfaces were crimped together at the trailing edge and riveted to a flat ¾ in. strip with normal round headed rivets. The ailerons were built in two sections and connected via a control bracket. A self aligning ball bearing hinge also acted as a connecting point for the two sections and similar bearings were bolted to the ribs aft of the auxiliary spar at each end. The inset metal trim tabs were originally intended as servo tabs but were eventually built as ground adjustable units only, the control arm being attached by a turnbuckle and rod to the aileron operating bracket. The trailing edges of the skins were crimped together and flush riveted to a metal strip.

The all metal flaps were of similar constructions to the ailerons and were divided into two sections by the rear of the engine nacelle. Both sections were connected to the wings by roller bearing struts which fitted into angled tracks. Operation was via toggle arms which moved the flaps backwards for approximately 5½ in. while the angled tracks transferred the movement downwards. In the fully extended position the flaps were shrouded by 1¾ in. of the top wing surface. A set screw in the toggle arm could be adjusted for the "up stop" position. A single hydraulic jack located in the starboard wing operated the entire flap system via a series of bellcranks and rods. The port inboard flap was usually marked with a series of red lines denoting the degree of extension, i.e., 10 deg, 20 deg, etc., to the maximum of 50 deg.

The wing attachment to the fuselage was as simple as it was unorthodox. 9 in. aft of the leading edge, near the base of the root rib, a 1 in. bolt passed through a two sided forged

Another Me 262A-2a minus bomb racks and showing the upper guns deleted, the recesses being covered by doped fabric.

"bathtub" fitting which was in turn bolted to the aft face of the bulkhead immediately behind the forward fuel tank bay. A similar bolt and fitting was used on the root rib aft of the auxiliary spar. Finally, riveted to the top wing surface at the fuselage line was a $1\frac{3}{16}$ in. x $1\frac{3}{16}$ in. steel angle member which was attached directly by 17 bolts and self locking nuts to the fuselage skin. The wing fillet was held in place by a cable anchored to an angle bracket at the trailing edge and passing under seven hooks riveted to the attaching angle members with a turnbuckle at the front. The leading edge fillet was a drawn light aluminium alloy section attached by eight flush screws.

Undercarriage: The main wheel units consisted of two forged oleo-pneumatic shock absorber struts which retracted inwards into the bottom of the fuselage to meet on the aircraft centre line. The right strut operated an actuating valve at the end of its arc which closed the fairing doors. These doors also served as the landing gear up-lock. Fairing plates for these wheels were built in two sections, both of which were of double skinned, grid type structure. The top section was hinged to the torque box and the lower one bolted to a bracket welded to the oleo piston just below the axle.

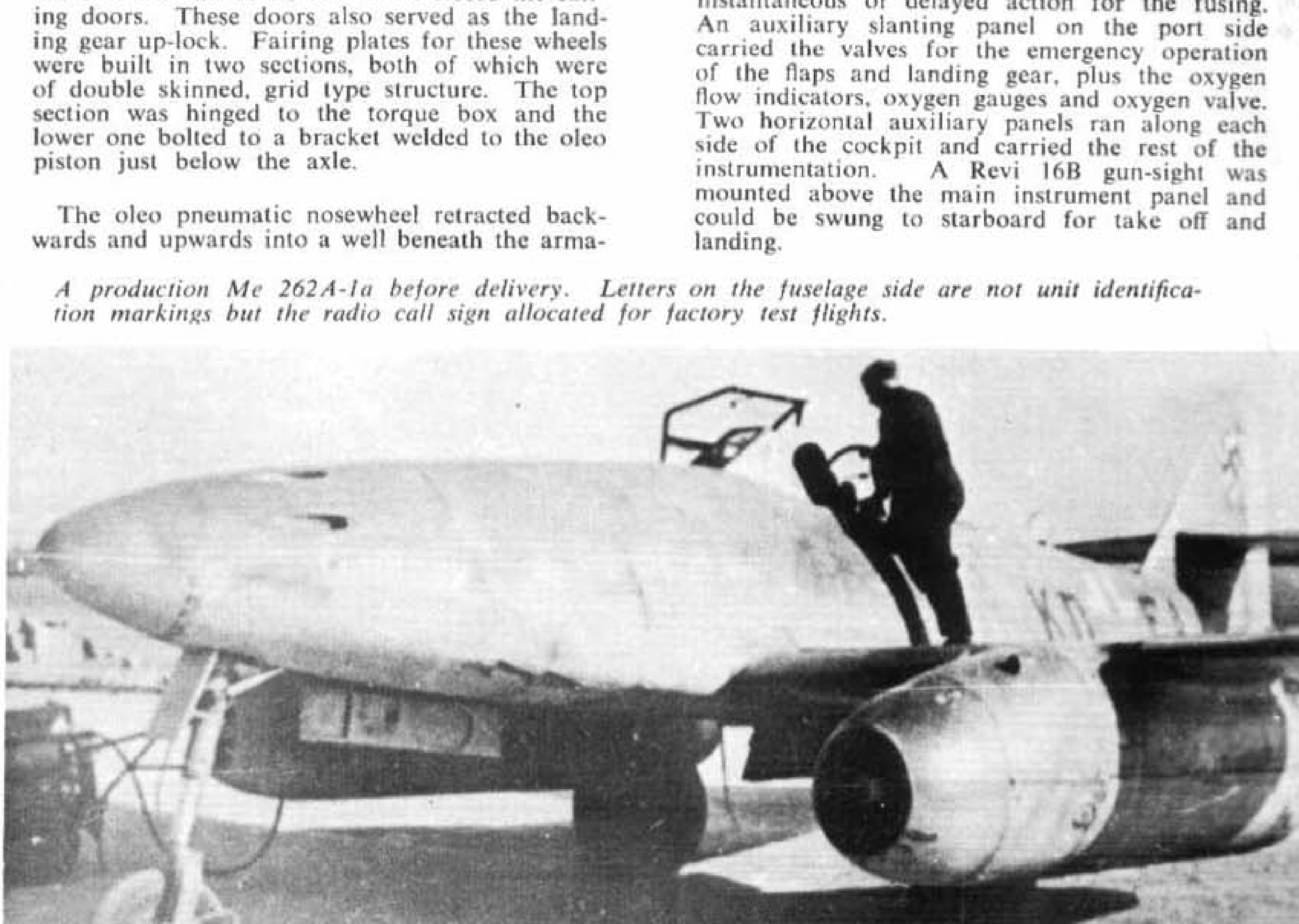
The oleo pneumatic nosewheel retracted backwards and upwards into a well beneath the armament bay. A transverse tube, which was operated by the wheel striking it at the top of its arc, pulled the double skin fairing door closed. Spring loaded pins moving into the piston served as up and down locks. Originally fitted with conventional torque scissors, late production aircraft had built in shimmy dampers. Down locks for the three undercarriage members were incorporated in the hydraulic actuating cylinder, pressure on the cylinder holding the undercarriage locked.

Note.

The nose wheel could be unlocked to permit ground steering by means of a "Y" shaped yoke during towing operations.

Cockpit Controls: The main instrument panel was divided into two sections with the flight instruments to port and the engine instruments to starboard. Immediately below this panel was a central bomb switch panel, on the bomber version, marked for level or dive bombing, plus instantaneous or delayed action for the fusing. An auxiliary slanting panel on the port side carried the valves for the emergency operation of the flaps and landing gear, plus the oxygen flow indicators, oxygen gauges and oxygen valve. Two horizontal auxiliary panels ran along each side of the cockpit and carried the rest of the instrumentation. A Revi 16B gun-sight was mounted above the main instrument panel and could be swung to starboard for take off and landing.

A production Me 262A-1a before delivery. Letters on the fuselage side are not unit identification markings but the radio call sign allocated for factory test flights.



An operational Me 262A-1a of JG 7 taxies out preparatory to intercepting a bomber stream over Germany in 1945.

The pilot's seat was adjustable only for height via a parallelogram frame, being locked into position by a lever underneath the front of the seat. The upholstered back of the seat was held in place by two spring clips and could be removed to give access to the battery behind the seat frame.

The control column was mounted in a ball and socket joint in the bottom of the cockpit liner, providing elevator and aileron control via a system of 1 in. push-pull tubes. Universal joints were used on the aileron controls at the fuselage side to compensate for the wing sweepback. The rudder pedals were similar to those of the Focke Wulf Fw 190 (see Series 1, No. 5) and incorporated the main wheel brake pedals as integral units, toe pressure being used to activate the system. A single torque tube extending from the starboard pedal connected with the push-pull tube to the rudder via a series of bell-cranks. All the control push-pull tubes ran along the port side of the fuselage.

Armour plating was attached to the front and aft bulkheads and a single piece of 16 m.m. head and shoulder silhouette armour was attached directly to the canopy. However, most aircraft did not use this last item.

Powerplants: Two Junkers Jumo 109-004B-1, -2 or -3 eight stage axial flow turbojets with six straight through combustion chambers and a single stage turbine leading to a variable area efflux orifice. Each was rated at 1,980 lbs. static thrust at 8,700 r.p.m. at sea level. A Riedel four cylinder, two stroke, starter motor was housed in the streamlined centre fairing of the intake of each engine.

The variable area efflux orifice was obtained by the use of a longitudinally movable "bullet" operated via a rack and pinion by a servo motor controlled, initially, from the throttle lever. During starting the "bullet" was in the full forward position being gradually moved aft with increase in speed. In flight the control of the "bullet" was automatic, the unit being linked to a pressure sensitive capsule exposed to the ram pressure due to the aircraft's forward speed.

Cooling air was bled off between the fourth and fifth compressor stages via a double skin surrounding the combustion chamber assembly. A small portion of this air was allowed to pass into the space between the combustion chambers and the inner wall. The remainder passed into the "bullet" fairing through a tubular strut and discharged through small holes to cool the rear face of the turbine disc. Some of the air then passed into the double skin surrounding the rear portion of the jet efflux nozzle.

Similarly, air was bled internally from the last compressor stage and transferred through tunnels into two of the casing ribs, to cool the front face of the turbine disc. Additional air was taken through three passages in the central casting and fed into the space between the two plate diaphragms in front of the turbine. Most of this air then passed into the hollow turbine nozzle guide vanes, to be discharged through slits in the trailing edges of the vanes.

Fuel System: All internal fuel tanks were installed in the fuselage, the two main tanks, each with a capacity of 197.8 Imp. gal., were installed immediately ahead of and behind the cockpit. A reserve 37.4 Imp. gal. tank was situated just in front of the mainspar beneath the cockpit. An additional auxiliary tank of 131.8 Imp. gal. capacity was installed on some aircraft, being situated immediately aft of the rear main fuel tank. This installation necessitated moving the radio further aft. In most cases all these tanks were of the self sealing variety although a few machines were fitted with non-sealing type reserve tanks.

The main fuel tanks were fitted with two booster pumps and the reserve with one, the system being so arranged that the fuel could be pumped from any tank to either engine or transferred from the rear tank to the forward one.

Additional external fuel tankage was available in the form of either two 65.9 Imp. gal. or one 131.8 Imp. gal. fuel tanks which were attached to the under nose pylons. These tanks contained J-2 diesel oil which was produced from brown coal. Petrol carried in the lower portion of the annular tank set in the nose of the engine cowling was used for starting, being delivered to the main engine by an electrically driven fuel pump working at 28 p.s.i. which cut off automatically at 3,000 r.p.m. Two stroke mixture for the Riedel starter motor was housed in the top portion of this annular tank. Diesel fuel from the main tanks was delivered by a single stage electrically driven gear type pump operating at 1,000 p.s.i.

Oil System: An annular shaped oil tank of 2.49 Imp. gal. capacity was attached by a flange to the aluminium alloy intake casting of the engine. Two gear pumps circulated the oil to the front

An Me 262A-2a minus bomb racks and with the upper cannon deleted.

compressor bearing assembly, the accessory drive gears and the accessory gears. Another pump supplied oil to the rear compressor and both turbine bearings.

Pneumatic System: Gun firing and cocking mechanisms were pneumatically operated. Compressed air for charging the guns was carried in eight bottles, four each side beneath the armament bay.

Hydraulic System: Raising and lowering of the undercarriage and flaps was effected hydraulically, pressure being supplied by a pump mounted in the port engine. The hydraulic reservoir was located between the cockpit liner and the port wing root. During retraction and lowering of the undercarriage, the nose wheel retracted and extended after the main wheels had been locked in position. A safety device was incorporated in the system so that the flaps could not be lowered until the undercarriage was locked down. Both the undercarriage and the flaps were interconnected with compressed air bottles for emergency operation of the two systems. Hydraulic expanding band type brakes were fitted to all three wheels, those on the main wheels being actuated from the rudder pedals whilst the nose wheel was applied by means of a hand brake lever on the port side of the cockpit.

Gun Controls: The cannons were fired electro-pneumatically by depressing a switch on the control column.

Rocket Projectile Controls: The projectiles were fired electro-pneumatically in a single salvo.

Bomb Controls: Selection and fusing switches were provided on a central panel beneath the main instrument panel. The bombs were released by pulling back a curved lever on the starboard side of the cockpit. Pulling this lever back beyond the bomb release stop jettisoned the bomb racks.

Cine Camera Gun: The camera was mounted in the nose cone and automatically synchronised to the cannons or rocket projectiles. Access to it was gained via a quickly detachable plate on the port side of the nose cone.

An Me 262A-2a with full war load of two 250 kg. bombs and carrying the full complement of four cannon.

PILOT'S HANDLING NOTES

All figures left in the original metric form for accuracy.

Operating Instructions

Switch on main battery, port and starboard generators, instruments and stabilizer trim motor. Ensure throttles and fuel selectors are in the closed position and press starter handle to down position for three to five seconds to prime starter engine. Pull starter handle up and at same time press down on tachometer button to engage low stage side. When 700 r.p.m. is indicated on the tachometer press ignition button on the right hand side of the throttle lever and hold it till a deep roar is heard. This is the high octane aviation fuel being injected and igniting. Keep starter handle, tachometer and ignition on until 2,000 r.p.m. is indicated and then release the starter handle and tachometer button. Switch fuel selector to the desired tank, usually the front tank for the port engine and the rear tank for the starboard engine, then engage the fuel pump. Open the throttle slowly to the idle position, approximately 3,000 r.p.m., being careful to ensure that the engine temperature does not reach 700 deg. Centigrade for more than 30 seconds. If temperature exceeds 700 deg. throttle back immediately and release the ignition button. Open throttles slowly to maximum r.p.m. holding the aircraft on the main wheel brakes and check that the variable area bullet is fully extended for each engine. (These can easily be observed from the cockpit.) Check fuel pump pressure gauges to see that the pressure remains between 50 and 80 kg./cm.^{2}

Set tail trim indicator at plus 1 deg., the rudder trim to 0 deg., select 20 deg. of flap and check instruments. Hold the aircraft on the main wheel brakes, open the throttles slowly until 7,000 r.p.m. is indicated and then release the brakes and open the throttles fully. (The throttles can be quite safely advanced above 7,000 r.p.m.) After covering a distance of approximately 200 metres ease back on the control column to gently raise the nosewheel and hold in this attitude until the airspeed builds up to 200-230 km.p.h., then lift the aircraft off.

Shutting Down

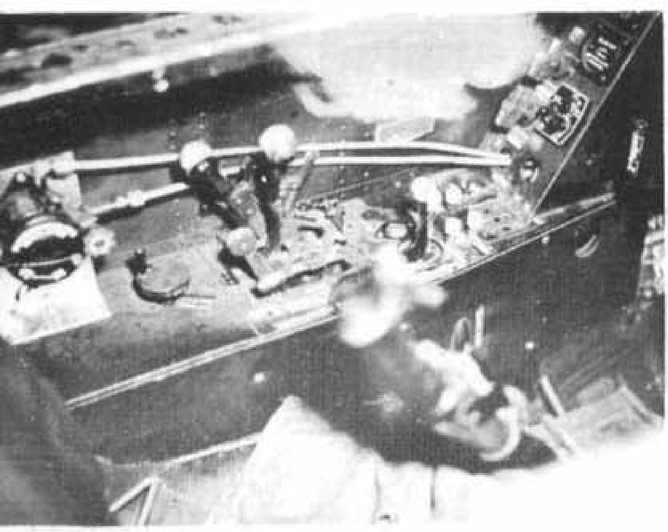
The engine shut down technique is critical and should be carefully adhered to. Retard the throttles to the idle position and wait for the engines to idle at a constant r.p.m. Shut down only one engine at a time. Switch the fuel pump off and close the fuel selector. Release the safety catch on the throttle and close the throttle completely, pressing the ignition button and holding it in the on position for five seconds as the r.p.m. drops below 2,000. This burns out any remaining fuel and fills the fuel lines with high octane fuel for restarting. If after stopping, an engine smokes, or flames are emitted, re-engage the starter motor and restart engine again before repeating the shut down procedure. Zero the tailplane trim indicator and close all switches.

In Flight Checks

Apply brakes to stop wheel spin and retract undercarriage, raise flaps, close throttles to desired climb setting and retrim aircraft. Check lateral trim as ailerons should not be more than 10 mm. out when control column is in the neutral position. Check fuel pump pressures to ensure that they are equal for both engines. On climb leading edge slots will open if speed drops below 450 km.p.h. (279 m.p.h.).

Landing Checks

Reduce speed to 400 km.p.h., and trim aircraft into straight and level attitude then lower undercarriage (maximum permissible speed 500 km.p.h.). As the nosewheel is lowered there is a distinct trim change and it is necessary to hold forward stick to counteract the sharp nose up trim. Once the nosewheel is fully extended the aircraft will resume its original level trim attitude. Lower the flaps 20 degrees and retrim aircraft. It is advisable to keep engine r.p.m. at 7,000 during landing pattern to allow the throttles to be opened rapidly in the event of an emergency. Full flap of 50 deg. should be selected as the aircraft is turned on to final approach. The recommended speeds during the landing pattern are 350 km.p.h. on the base leg reducing to 300 km.p.h. on the turn on to final and further reducing to 250 km.p.h. on the final approach. The touchdown should be made between 180 and 200 km.p.h. on the main wheels letting the nosewheel down gently, but care should be taken to ensure that all three wheels are on the ground before applying the brakes.



DIMENSIONS, WEIGHTS & PERFORMANCE DATA

Figures in brackets refer to the Me 262A-2a.

Fuselage

Overall length .... 34 ft. 9¼ in.
Maximum width .... 5 ft. 6 in.

Wings

Span .... 40 ft. 11½ in.
Chord at root .... 8 ft. 4 in.
Chord at tip .... 2 ft. 9¼ in.
Aspect ratio 7:5
Maximum thickness .... 35% M.A.C.
Maximum permissible C. of G. .... 30% M.A.C.
Dihedral .... 6 deg.

Height overall

Static, oleos free .... 12 ft. 4 in.
Static, oleos compressed .... 11 ft. 4 in.

Tailplane

Span .... 12 ft. 3⅛ in.
Dihedral .... 0 deg.

Undercarriage

Main wheel track .... 7 ft. 9 in.
Tyre size, mainwheel .... 840 mm. x 300 mm.
Tyre size, nosewheel .... 660 mm. x 160 mm.

Areas

Mainplanes (gross) .... 234 sq. ft.
Ailerons (gross) .... 12.9 sq. ft.
Tabs (gross) .... 1.6 sq. ft.
Flaps (gross) .... 22.4 sq. ft.
Tailplane with elevators and tabs .... 34.9 sq. ft.
Elevators (gross) .... 9.3 sq. ft.
Tabs (gross) .... 1 sq. ft.
Rudder with tab .... 6.4 sq. ft.
Tab .... 1.3 sq. ft.

Wing loading

At maximum all up weight .... 60.3 lbs./sq. ft. (65.4 lbs./sq. ft.)

Weights

Tare .... 9,741 lbs. (9,900 lbs.)
Fuel and oil .... 3,350 lbs.
Gross .... 13,091 lbs. (13,250 lbs.)
Maximum .... 14,101 lbs. (15,620 lbs.)

Tyre pressures

12,000 lbs. and below .... 58.8 p.s.i.
12,000 lbs. to 14,000 lbs. .... 66 p.s.i.
14,000 lbs. and above .... 70 p.s.i.

Range of movements of controls

Ailerons .... 20 deg. (±2 deg.)
Elevators .... 35 deg. (±2 deg.)
Elevator trim .... 35 deg. (±2 deg.)
Rudder .... 30 deg. (±2 deg.)
Rudder trim at 30 deg. deflection of rudder .... 18 deg. (±2 deg.)
Rudder trim at 0 deg. deflection of rudder .... 20 deg. (±2 deg.)
Flaps, maximum .... 50 deg.

Power plant

Weight .... 1,669 lbs.
With cowl .... 1,775 lbs.
Static thrust .... 1,970-1,980 lbs.
Pressure ratio 3:1
Fuel consumption .... 2,720-2,745 lbs./hr.
Maximum r.p.m. 8,700
Idling r.p.m. 3,080
Idling speed fuel consumption .... 614 lbs./hr.
Frontal cowl area .... 6.4 sq. ft.
Overall length .... 12 ft. 8 in.
Maximum external diameter .... 2 ft. 10 in.

Performance

Maximum speed .... 538 m.p.h. at 29,560 ft.
(466 m.p.h. at 23,000 ft.)
500 m.p.h. at sea level

Rate of climb
Initial .... 3,937 ft./min.
2,165 ft./min. at 19,684 ft.
1,082 ft./min. at 29,560 ft.

Service ceiling .... 37,565 ft. (32,800 ft.)
Stall .... 108 m.p.h.
Range .... 298 mls. at sea level
526 mls. at 19,684 ft.
652 mls. at 29,560 ft.

Take off to clear a 50 ft. obstacle .... 1,093 yds. (1,600 yds.)

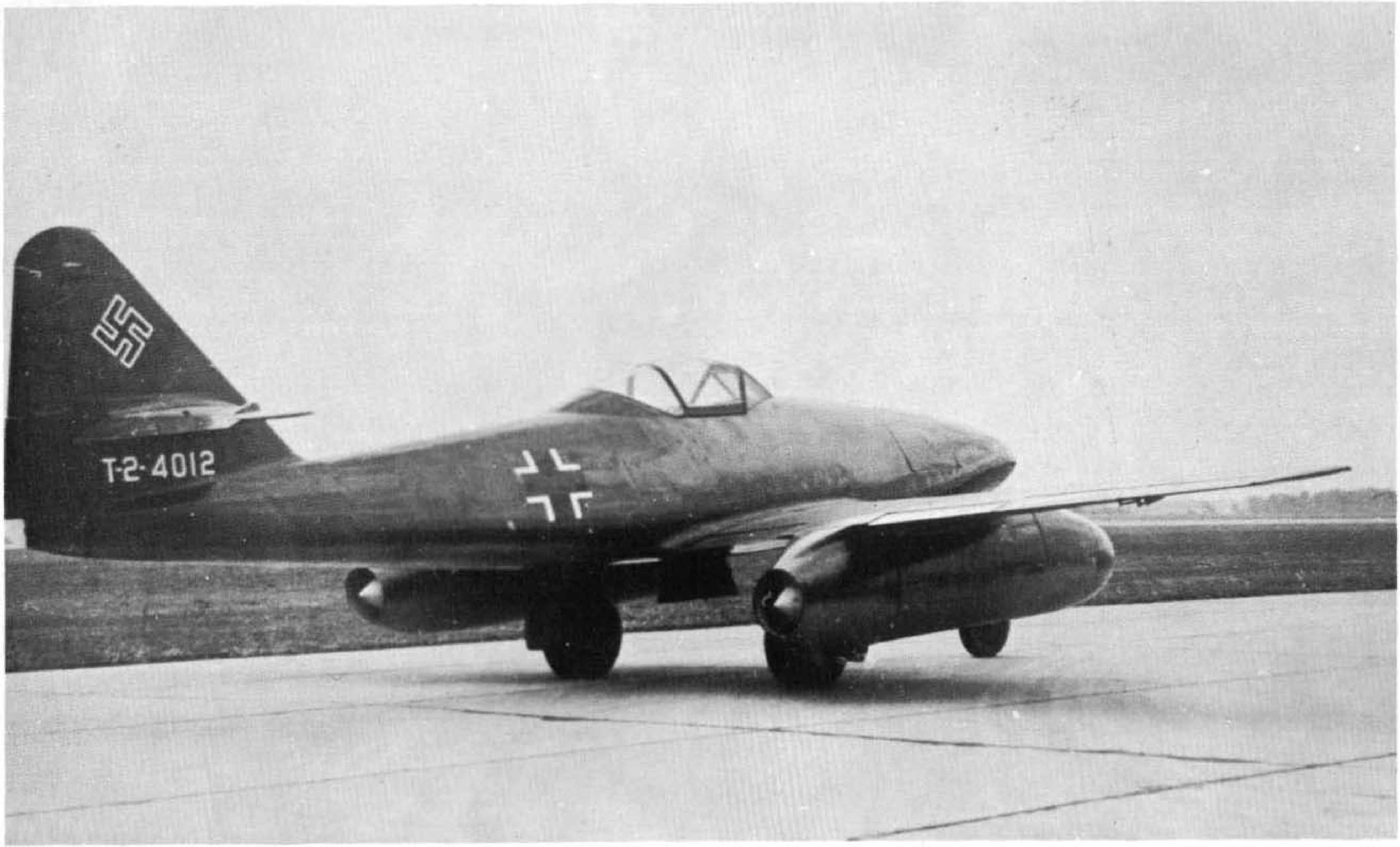
NOTE:

Performance figures and even weights varied from individual aircraft to individual aircraft and the above information refers in general to all aircraft of that particular type but only specifically to the machine tested to obtain these figures.

Left: Port side of cockpit showing throttles with starting buttons and immediately behind them the tailplane trim wheel.

Centre: Main instrument panels with the blind flying instruments grouped together at top left and engine instruments at lower right.

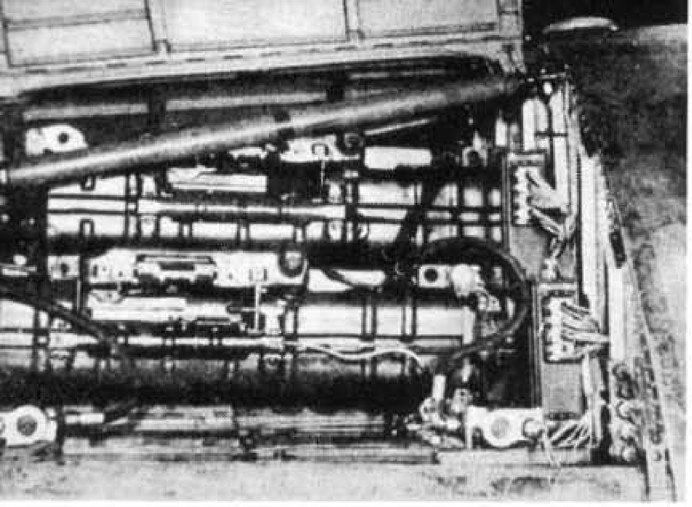
Right: Starboard side of cockpit. The curved handle behind the non-standard microphone is the bomb release. Pulling it back beyond the stop jettisoned the bomb racks themselves.



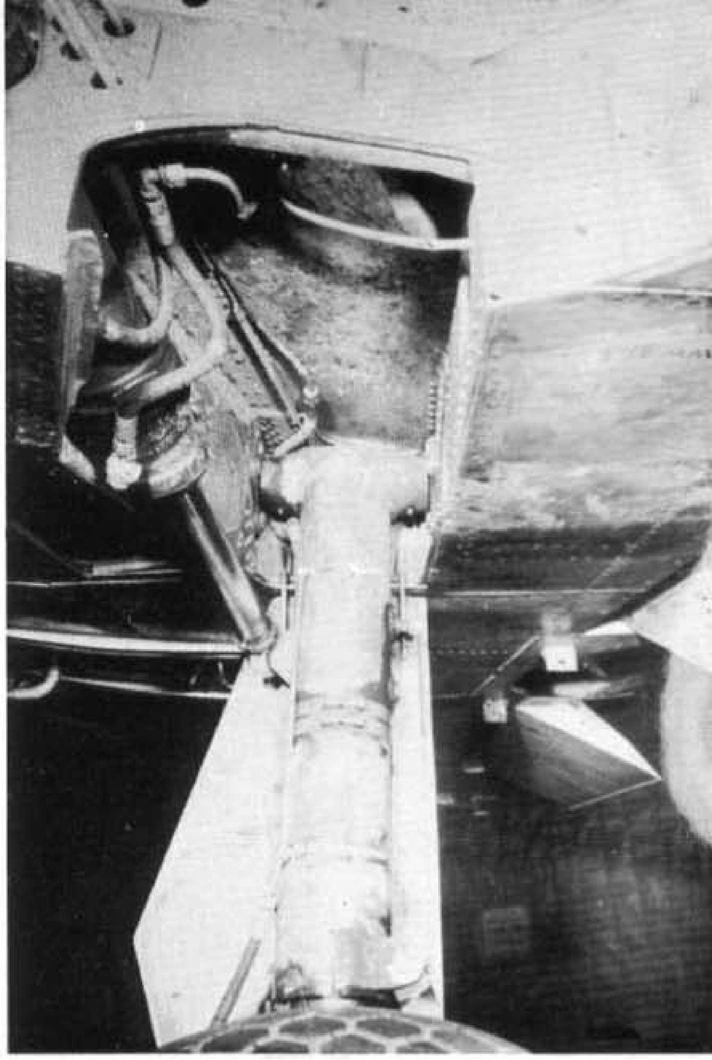
The extremely pleasing lines of the Me 262 are shown to advantage despite the incorrect camouflage and markings.

Mark	Radio/Radar	Armament/P.R. Equip.	Internal Fuel Capacity	Duty
A-1a	FuG 16Z or FuG 16ZY with ZVG (V.H.F., R/T., D/F. and retransmission facilities for G.C. stations) and FuG 25a (I.F.F.).	4 x 30 mm. MK108 cannon. Upper pair 100 r.p.g. Lower pair 80 r.p.g.	564.9 Imp. gal.	Fighter.
A-1a/U1	As for A-1a.	2 x 20 mm. MG151/20 with 146 r.p.g. 2 x 30 mm. MK213 with 66 r.p.g. 2 x 30 mm. MK103 with 72 r.p.g.	As for A-1a.	Fighter.
A-1a/U2	As for A-1a plus FuG 125.	As for A-1a.	As for A-1a.	Bad weather fighter.
A-1a/U3	As for A-1a.	2 x RB 50/30 cameras.	As for A-1a.	Photo-recce.
A-1b	As for A-1a.	As for A-1a plus 24 R_4M 50 mm. rockets.	As for A-1a.	Fighter.
A-2a	As for A-1a.	As for A-1a plus either 1 x 500 Kg. bomb, or 2 x 250 Kg. bomb.	As for A-1a.	Fighter bomber.
A-2a/U1	As for A-1a.	2 x 30 mm. MK108 with 80 r.p.g. Bomb load as for A-2a.	As for A-1a.	Fighter bomber.
A-2a/U2	As for A-1a.	1 x 500 Kg. bomb, or 2 x 250 Kg. bomb.	As for A-1a.	Bomber.
A-3a	As for A-1a.	As for A-1a.	As for A-1a.	Ground attack fighter.
A-5a	As for A-1a.	2 x 30 mm. MK108 with 66 r.p.g. plus 2 x RB 50/30 cameras.	As for A-1a*.	Fighter-recce.
B-1a	As for A-1a.	As for A-1a.	380.2 Imp. gal.*	Two-seat trainer.
B-1a/U1	FuG 16ZY with AFN 2 (Benito ranging) EVI 7 intercom, FuG 25a, FuG 125 (auxiliary to FuG 16 for beam approach), FuG 120a (automatic bearings), FuG 218 AI (D/F indication and range measurements up to five miles), FuG 350Zc (H_2S homing) and EBL-3 (blind approach).	2 x 20 mm. MG151/20 with 146 r.p.g. or 2 x 30 mm. MK108.	As for B-1a.*	Two-seat night fighter.
B-2a	As for B-1a/U1.	As for A-1a plus 2 x 30 mm. MK108 in a *Schräge Musik* installation.	637.4 Imp. gal.*	Two-seat night fighter.
C-1a	As for A-1a.	As for A-1a.	235.2 Imp. gal. of J-2 diesel oil. 197.8 Imp. gal. of T-Stoff. 131.8 Imp. gal. of C-Stoff.	Rocket boosted fighter.
C-2b	As for A-1a.	As for A-1a.	As for C-1a.	Rocket boosted fighter.
—	As for A-1a.	1 x 50 mm. BK-5 cannon.	As for A-1a.	Bomber destroyer.

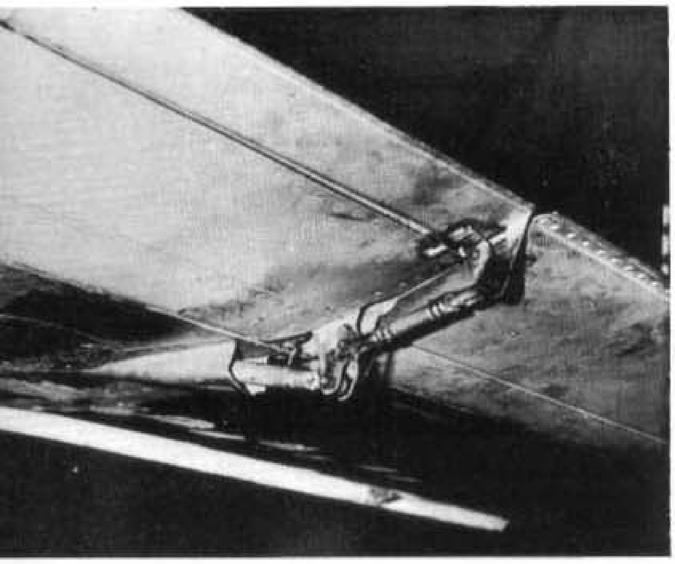
*Additional external tankage available by using either 2 x 65.9 Imp. gal. or 1 x 131.8 Imp. gal. auxiliary fuel tanks.



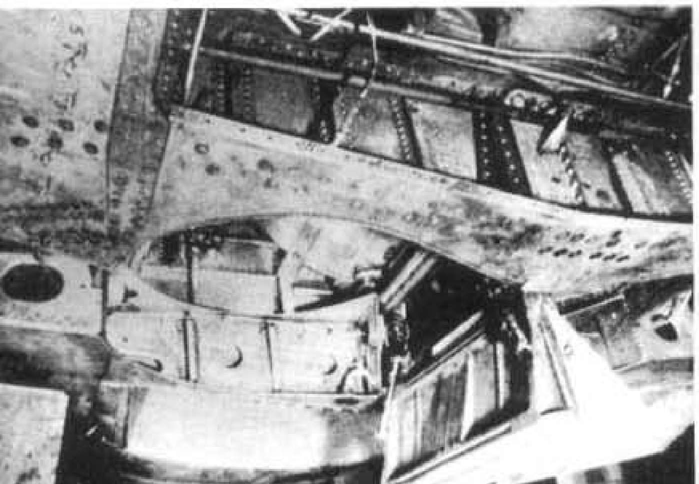
The armament bay showing the port pair of MK 108 cannon.

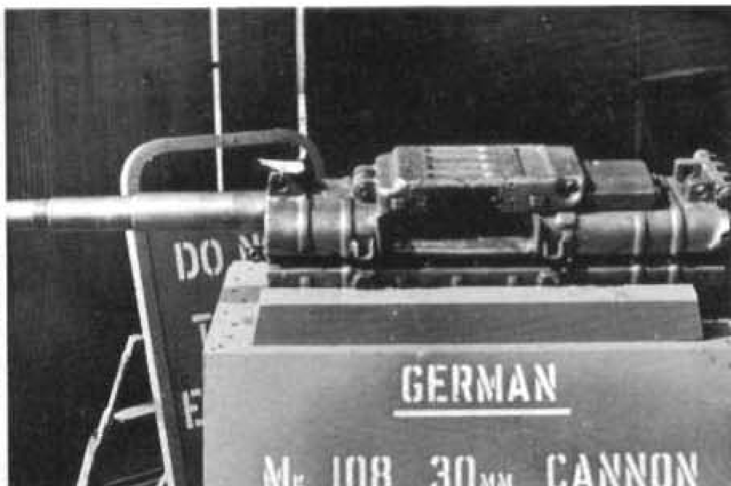


The starboard main undercarriage member showing the operating ram to the left of the photograph.



Left:
The starboard aileron linkage with auxiliary linkage to the trim tab.





Left: Access panel removed showing the front face of the mainspar. Cockpit liner is visible through the wheel well. Right: The compact size of the MK 108 30 mm. cannon is readily apparent from this photograph.

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1. Camera gun window.
2. Camera gun cradle (camera gun not normally fitted to this version).
3. Wall of nosewheel well.
4. Reinforcing strips.
5. Camera cradle.
6. Port RB50/30 camera.
7. Port rack of compressed air bottles.
8. Reinforcing strip for fuel tank pick-up point.
9. Forward main fuel tank.
10. External power socket.
11. Hydraulic reservoir.
12. Slot operating arm.
13. Pull ring for manual start of Riedel motor.
14. Annular oil tank.
15. Ignition box.
16. Half-rib construction containing guides and rollers for slot operation.
17. False rib.
18. "U" Stringers.
19. Main spar.
20. Pitot tube.
21. Port navigation light.
22. Bracket for single bolt wing tip attachment.
23. "U" stringer.
24. Rear spar.
25. Aileron mid-section joint.
26. Worm gear drive for variable area "bullet."
27. Engine fairing panel.
28. Lower wing surface.
29. Aft main fuel tank.
30. Fuel transfer pump.
31. Control rods for elevators, rudder and rudder trim.
32. Rear fuselage joint line.
33. Fish plates.
34. Elevator bell crank.
35. Skeleton rib.
36. Sheet rib.
37. Elevator mass balance.
38. Rudder trim tab mass balance.
39. Rudder mass balance.
40. Plywood leading edge shell.
41. Elevator trim tab linkage.
42. Tailplane incidence change guide slots.
43. Tailplane incidence actuating motor.
44. Double skinning.
45. D.F. loop.
46. Fuel tank filler.
47. Canopy ejection rod.
48. Canopy handle.
49. Optically flat windscreen with armoured glass panel immediately behind it.
50. Fuel tank filler.
51. Fuel booster pump.
52. Steel tube pick-up attachment with built-in turnbuckle.
53. Starboard camera blister.
54. Filler point for two-stroke mixture for Riedel motor.
55. Filler point for high-octane fuel for initial engine start.

CUTAWAY KEY

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