LOCK ON N°24
AIRCRAFT PHOTO FILE

Boeing
B-17G FLYING FORTRESS

Willy PEETERS

VP
the world in scale

897

B-17G FLYING FORTRESS

Imperial War Museum Collection

Duxford, England

VP

the world in scale

Cover & title page: Finished in the colors of Captain Robert K. Morgan's famous B-17F "Memphis Belle" of the 91st GB, 324th BS, 8th AF, this beautifully and airworthy B-17G touches Belgian soil after a ferry flight from its home base Duxford in Cambridgeshire, England. The B-17G is still considered one of the most elegant and most important allied bombers of World War II.
(Both photos by Marck DEBOECK)

Centerfold : The very same aircraft framed while displaying a low altitude flypast with its bomb bay doors open. One can almost hear the roar of the four turbo-supercharged engines.

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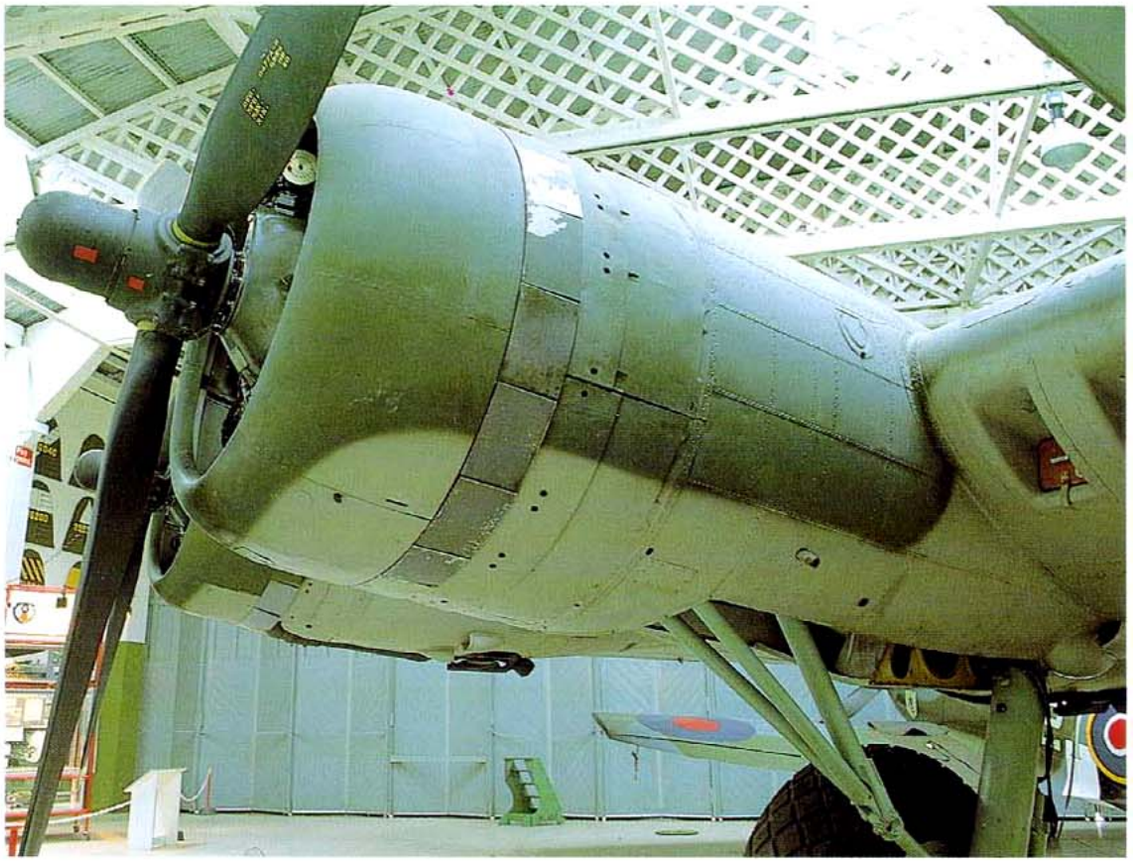
"Action shots" were taken at the Flying Display in Oostmalle, Belgium thanks to Mr Ronny VAN SANT, who deserves a word of thanks.
Finally, I would like to express my gratitude to Capt. Marck DEBOECK for sharing his slides to be printed in this book. To those, unintentionally forgotten, my sincere apologies.

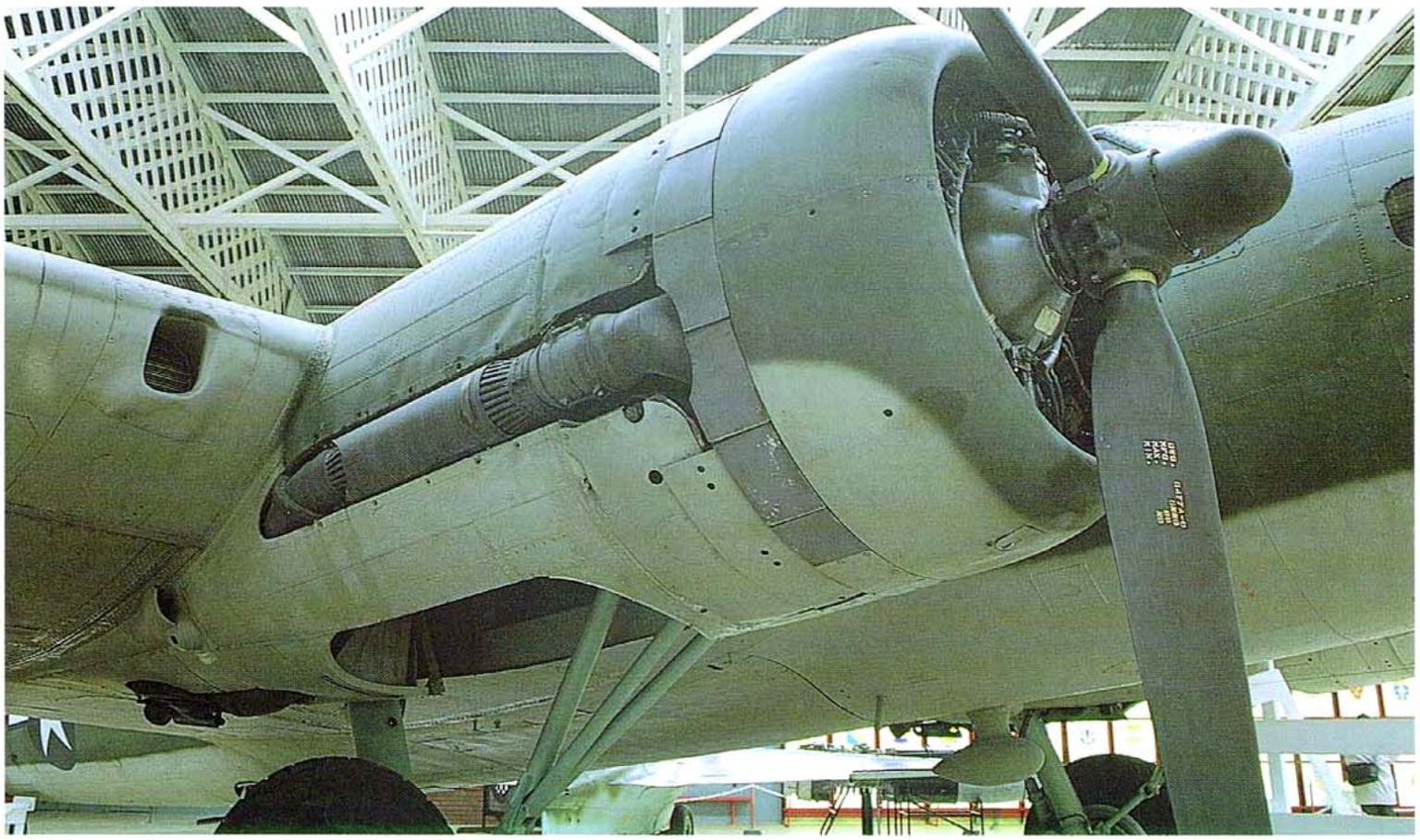
Willy PEETERS

Readers are invited to send in slides and/or clear color photographs on military subjects which may be used in future LOCK ON publications. Additional information on military aircraft of any kind is also welcomed. Material used will be paid for upon publication and unused material will be returned upon request. Original slides and photographs will be handled with extreme care.
Clearly state name and address when sending in your material.

INTRODUCTION

Several B-17's are still flying today and even more have been preserved in museums, most in prestine condition like the one covered in this Lock On.
What eventually emerged in the late 30's as the Y1B-17 project from Boeing, a longe range bomber no one actually needed at that time, soon became one of the backbones of the air war over Europe and Nazi Germany.
Like most of the new aircraft, the B-17 went through a number of development stages, each time changing the prefix of its official designation. It was only after a journalist published an article on the aircraft which "looked more like a flying fortress than a long range bomber" that its surname became official.
The B-17G was certainly the most proliferate type produced with 8,680 examples, of which 4,035 alone were assembled by Boeing. Because their facilities could not cope with the demand for more aircraft, some 2,395 B-17G's were license-built by Douglas and 2,250 by Lockheed Vega.
Early B-17 G's were simply modified B-17 F's with a chin turret added. The additional modifications will be covered on the following pages.

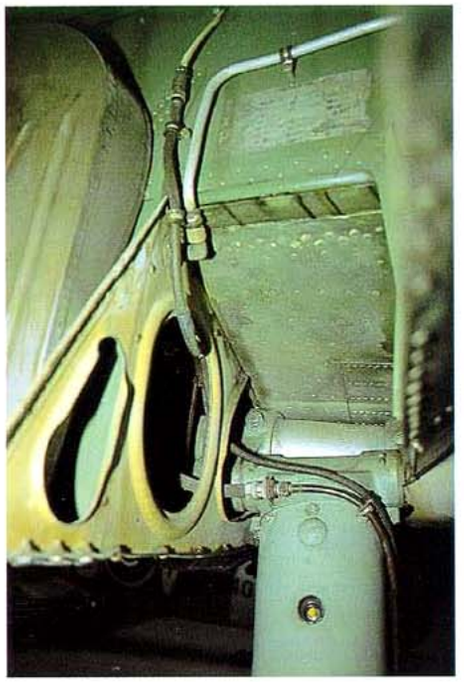


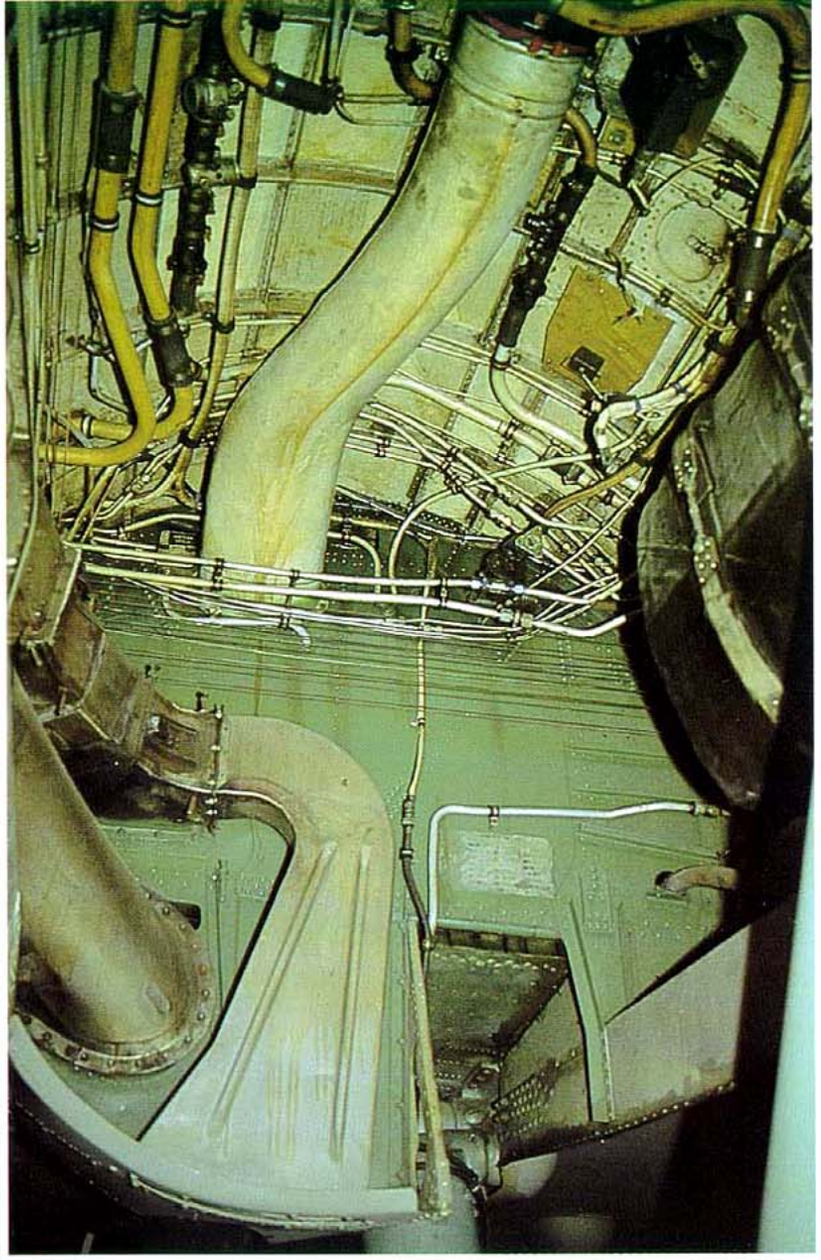


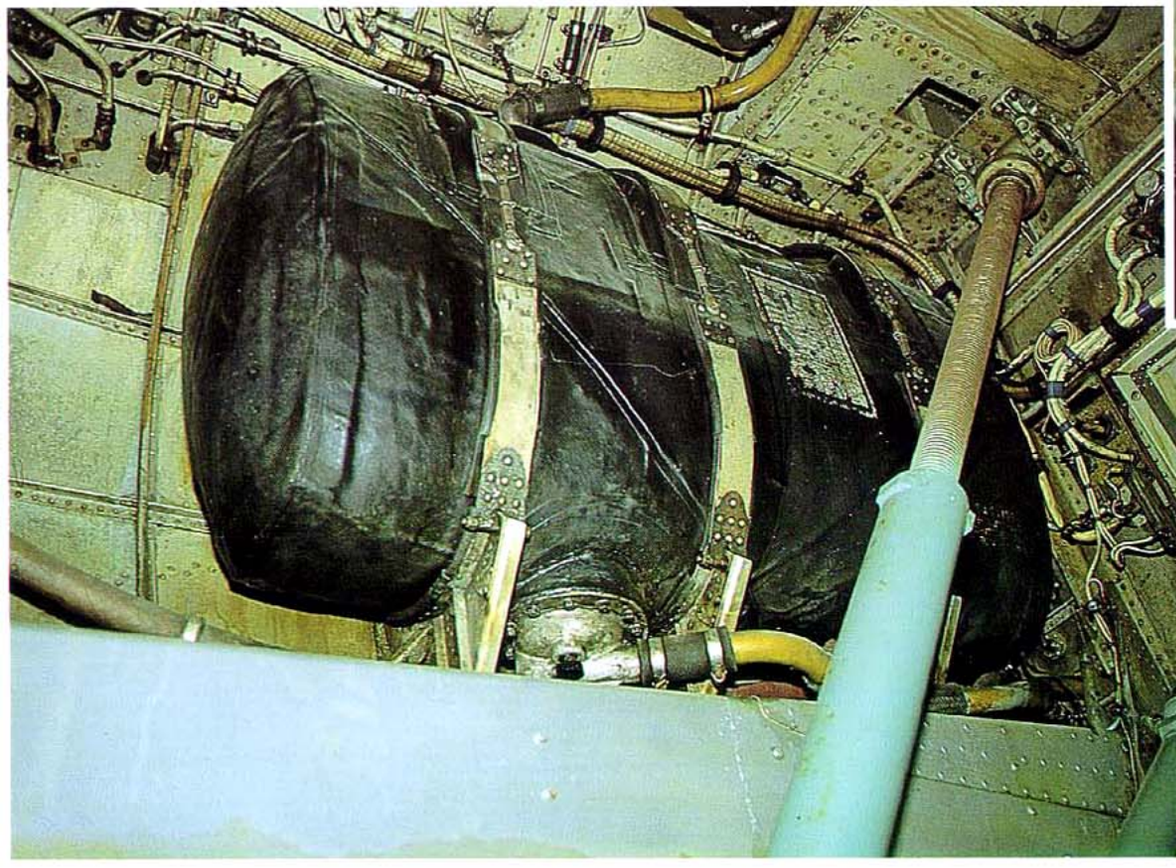
(Top) Fuselage side detail of the N°3 engine nacelle and part of the inner wing section. Noteworthy is the forward extended position of the engine in relation to the wing. Also note how the cowl flaps almost completely encircle the engine nacelle.

(Right) Outboard detail of the N°3 engine has the same set of cowling flaps but also an exhaust manifold collector and exhaust duct. Note the demarcation line of the green upper surface color and the light gray bottom color.

Close up of the loop antenna under the B-17 belly just in front of the bomb bay doors.
Below can be seen the main gear strut wing attachment.

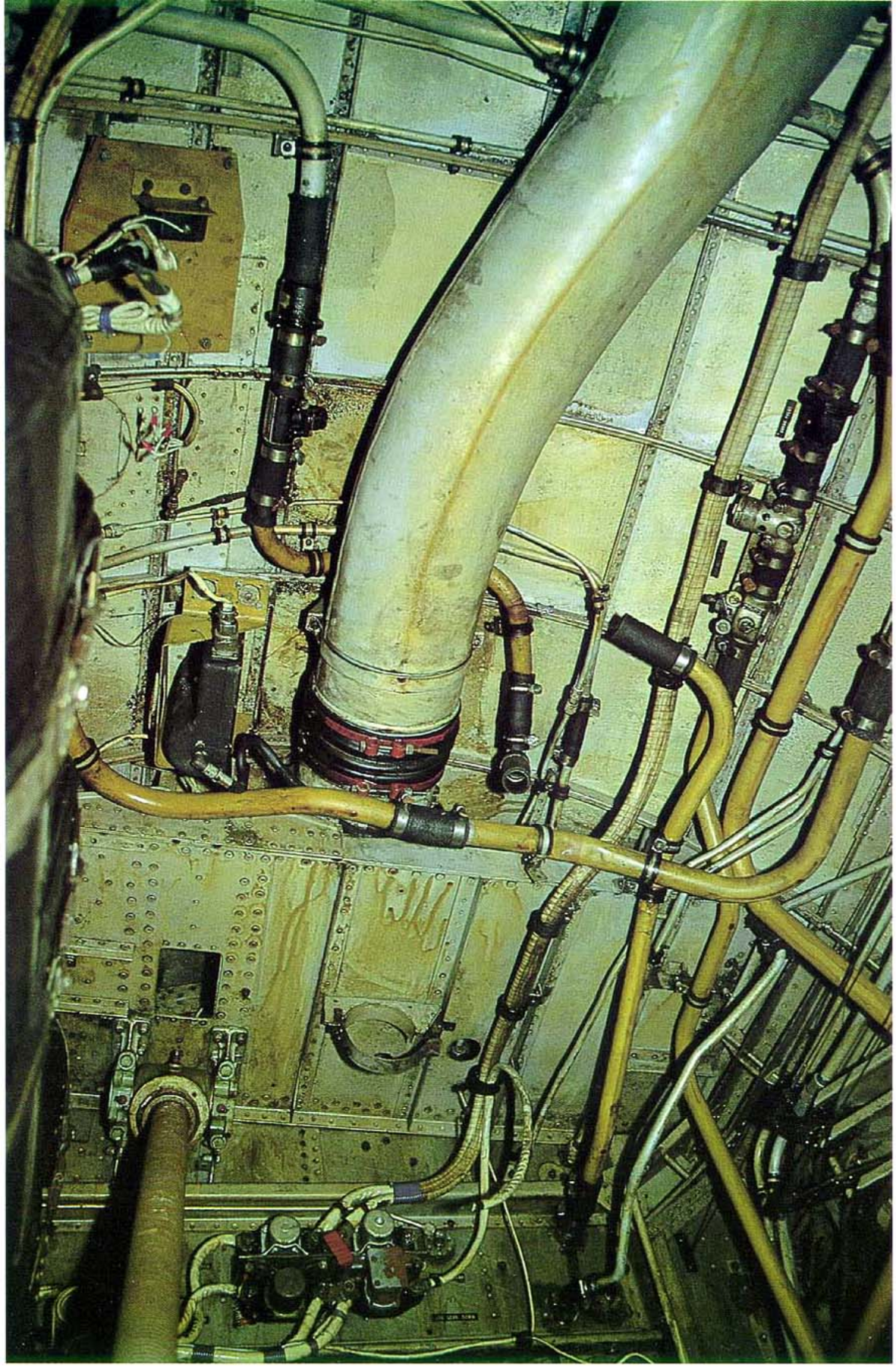


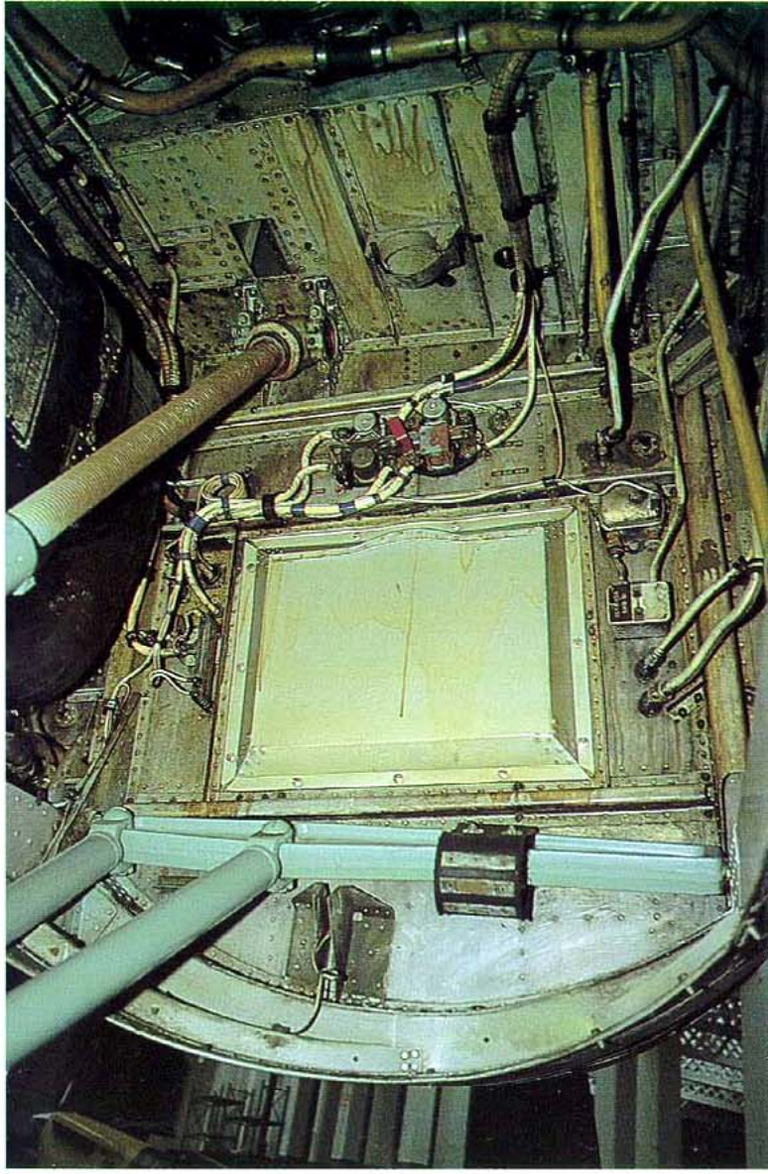




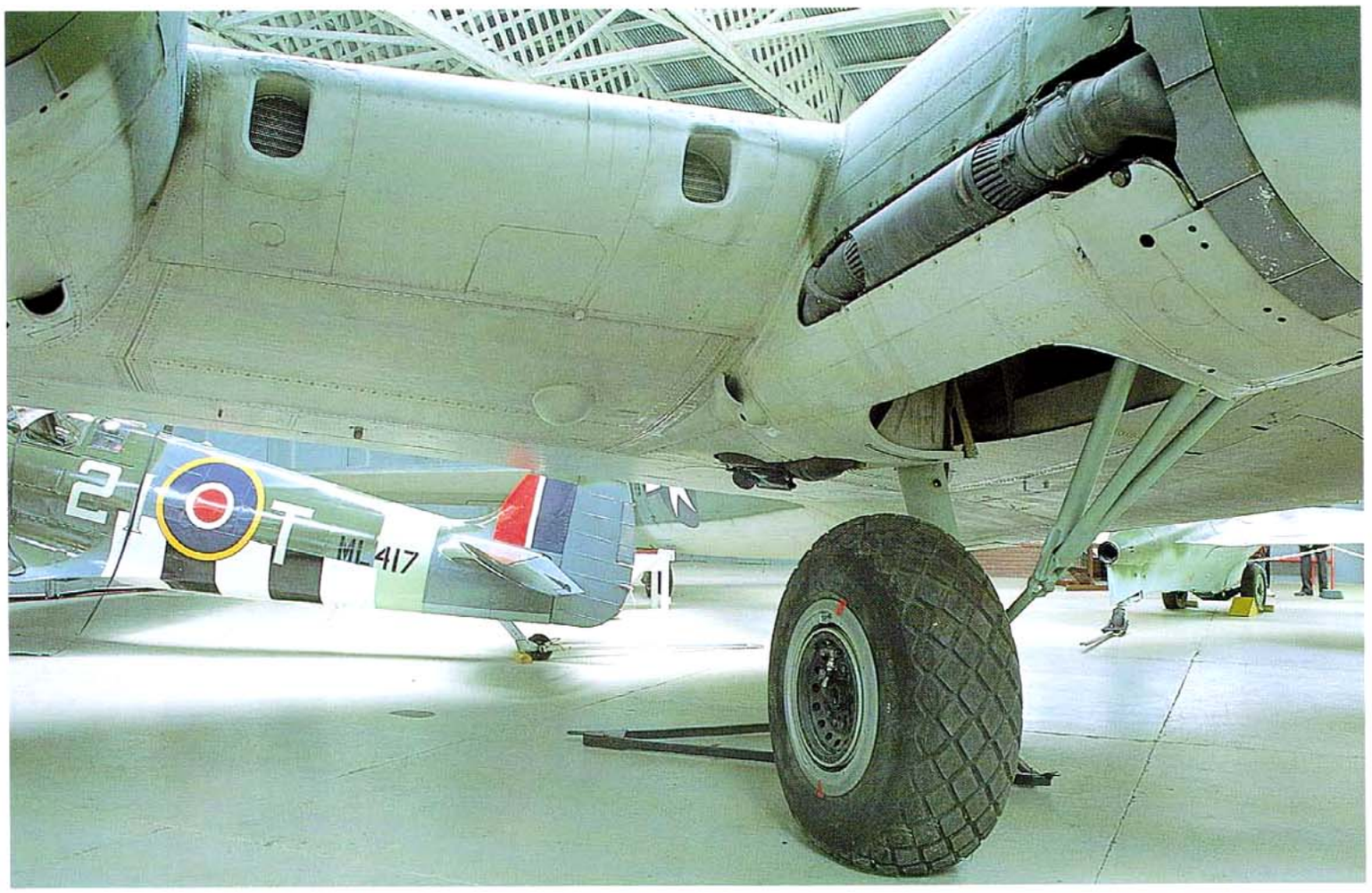
The main gear wheel well on starboard side looking up and aft. The hole at bottom right houses the main gear strut. The pressure duct to the roof connects to the intercooler behind the rear wall. The duct at bottom left connects to the supercharger.
Tightly strapped against the nacelle wall can be seen the 37 US gal oil tank (30.7 Imp. Gal/140Liter). Note the forward retracting rod attached to the roof.

(Next page) More wheel well detail and close up of the main gear hub and brake fluid container at the rear.



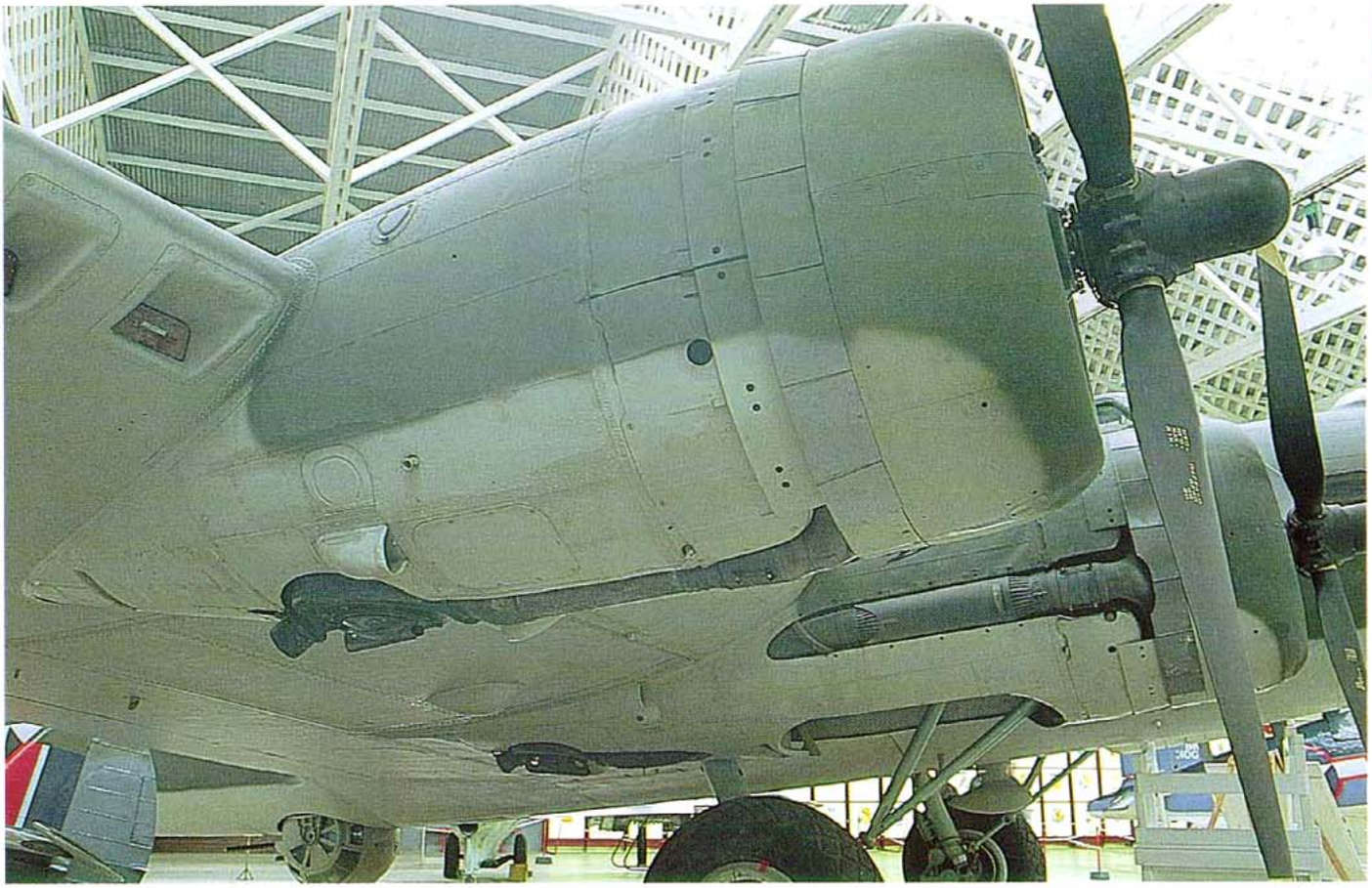


The below-nacelle supercharger with cooling intakes. The outlet at the rear of the supercharger is a waste gate.



A firewall seperates engine compartment and wheel well. Small bulkheads hold the exhaust pipe in position against the sidewall.
Note the concentration of tubing in this area and also the control cables at the top.

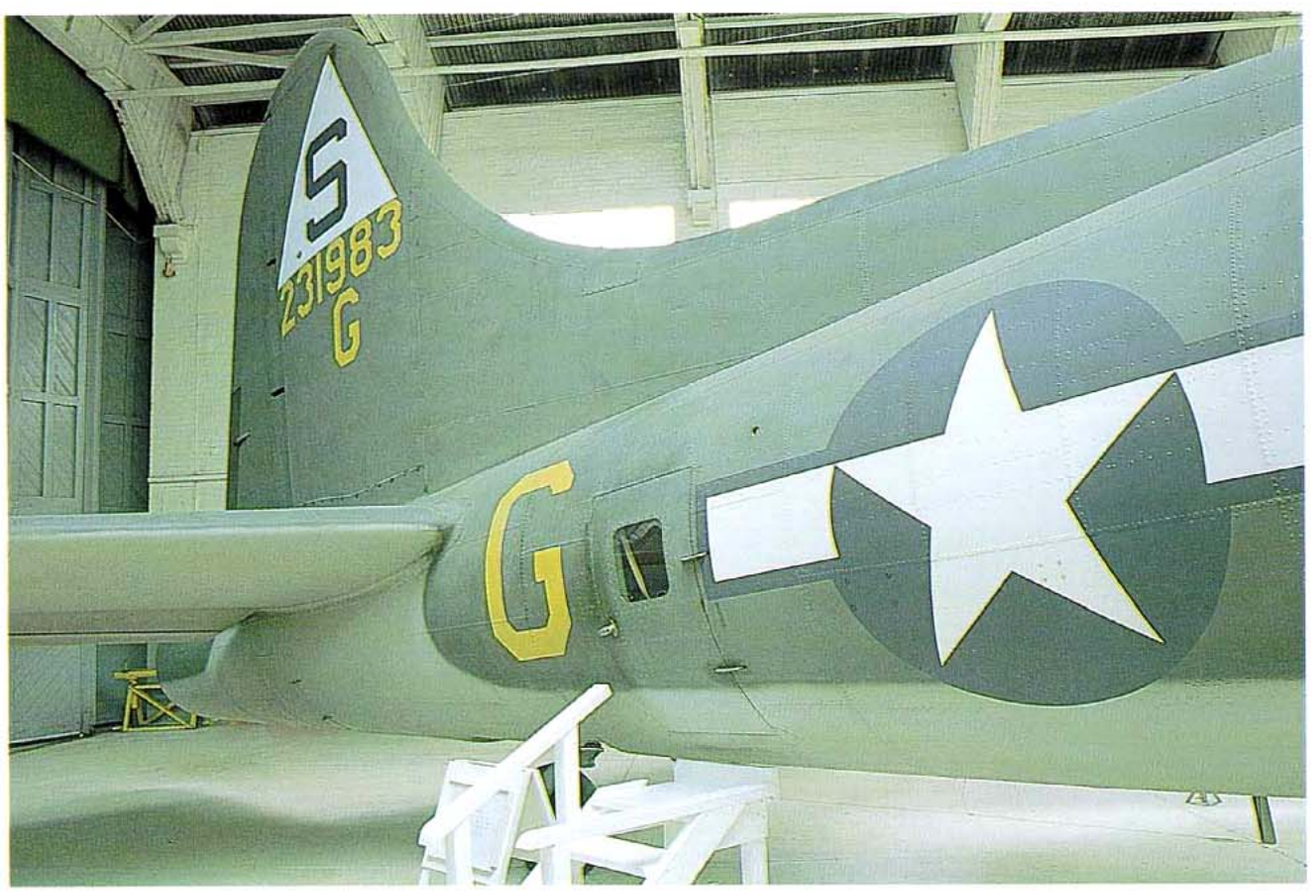
Two carburator intakes are located in the wing root next to the engine nacelles. Note outer wheel hub detail and tire tread pattern.

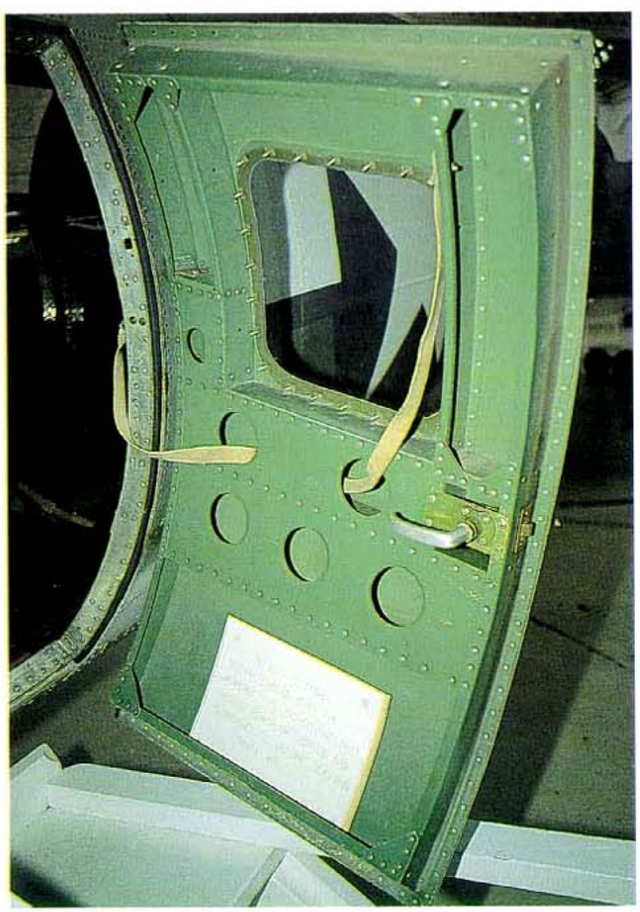


(Top left) The starboard wing's most outboard powerpack or the N°4 engine. The engine cowl flaps seen on this model was a design update first incorporated in the B-17D, first introduced in February 1941. Note the air intakes next to the supercharger and the various inspection panels in the same area.
Bottom detail of the supercharger can be studied in the top right picture where the position of both cooling intakes is much clearer. Note the waste gate of the supercharger at the rear.

Outboard view of the same engine with two more intakes (with covers) in the wing leading edge. Note the small drain pipe on top of the cooling intake and the rectangular slot in the rear of the engine fairing.

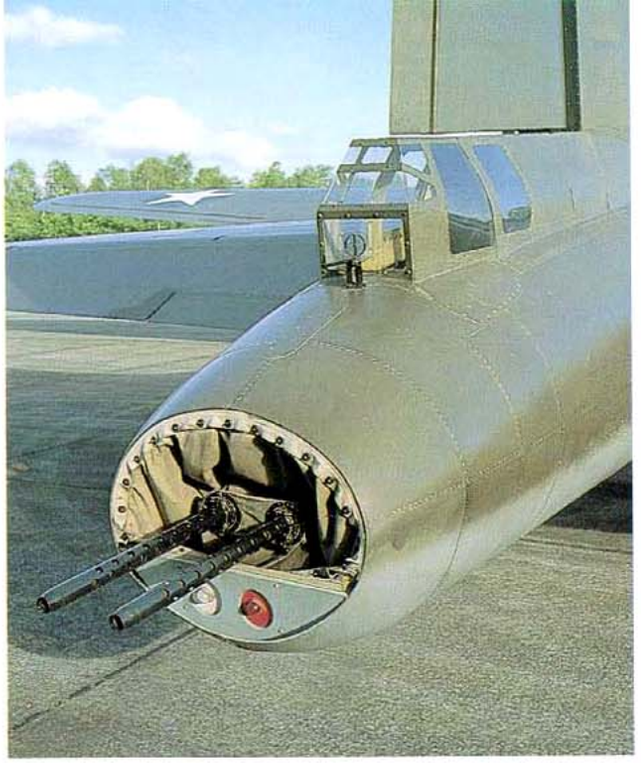
The starboard waist gun position was formerly further aft on the early G model but the side by side configuration proved unsatisfactory with both waist gunners constantly blocking each other's movements in the heat of the battle. Moving forward one of the gun positions was a simple but effective solution.
Several cover designs were tried out to protect the waist gunners from the cold at high altitudes, like sliding plexiglas windows which could be kept closed during the en-route flight (but which needed to be opened to install the .50 cal guns). The enclosed plexiglas covering was introduced from early 1944.
Below can be seen the inside detail of the waist entrance door introduced on the B-17E.





Late production B-17 G's can be recognized by the much larger cover over the tail gun position, better known as the "Cheyenne" turret featured here on the Duxford model.
The origin of the name "Cheyenne Turret" is related to the United Airlines Bomber Modification Unit stationed at Cheyenne, Wyoming who was credited the development of this large plexiglas enclosure. It enabled a much wider field of fire and was fitted with a reflector gunsight instead of the early ring and bead design.
The picture at left shows to good advantage the shape of tail and rudder and the slightly rearward tilted rudder chord.

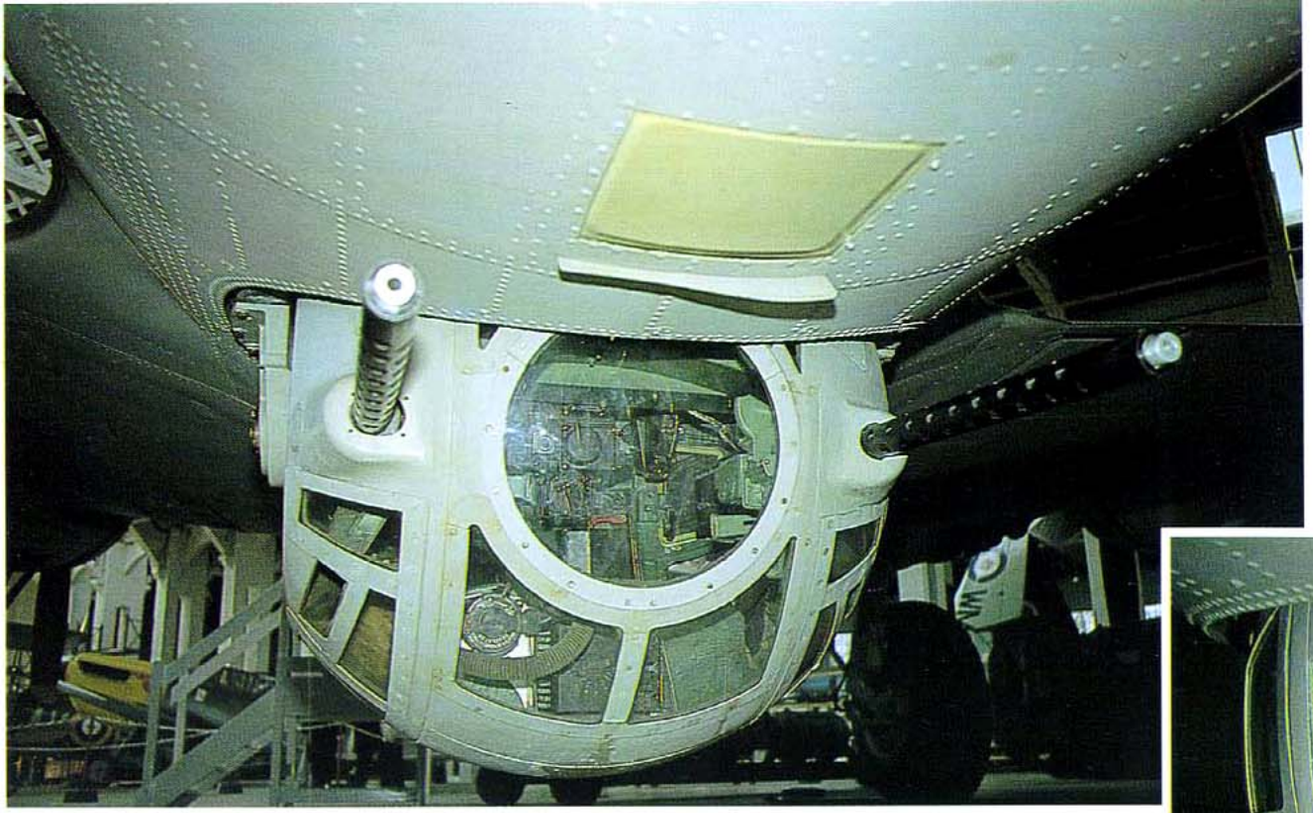
Both pictures at right allow comparison of both the early tail gun position (far right, note the ring and bead aiming sight just outside the gunner's enclosure and the position lights) and the later Cheyenne design with gunsight.

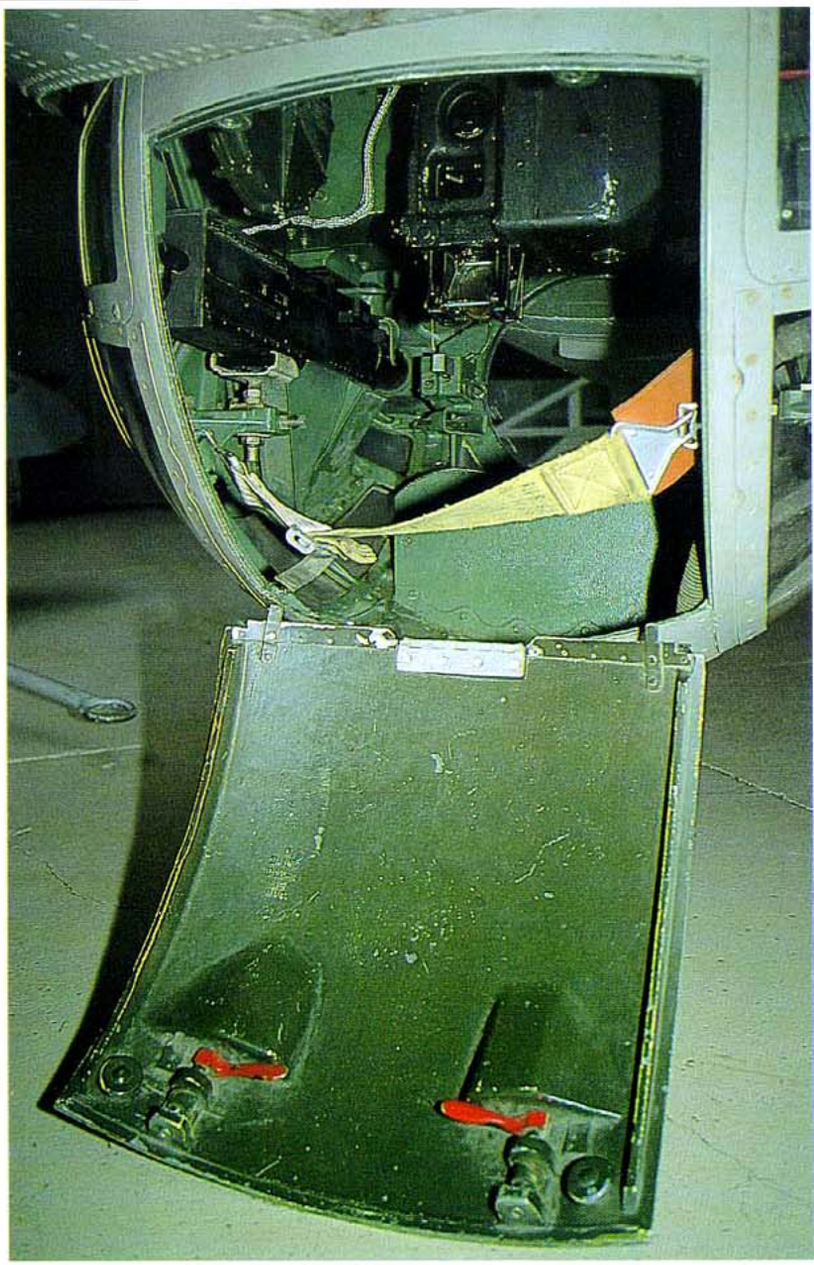


Bottom left photo reveals the aft position of the port waist gunner and the immense size of the national "Star 'n Bar". Note the trailing antenna below the insignia.
Bottom right photo reveals the inside tailwheel well, seldom seen before. The canvas cover protects the actuating mechanism inside the fuselage (see also page 31).

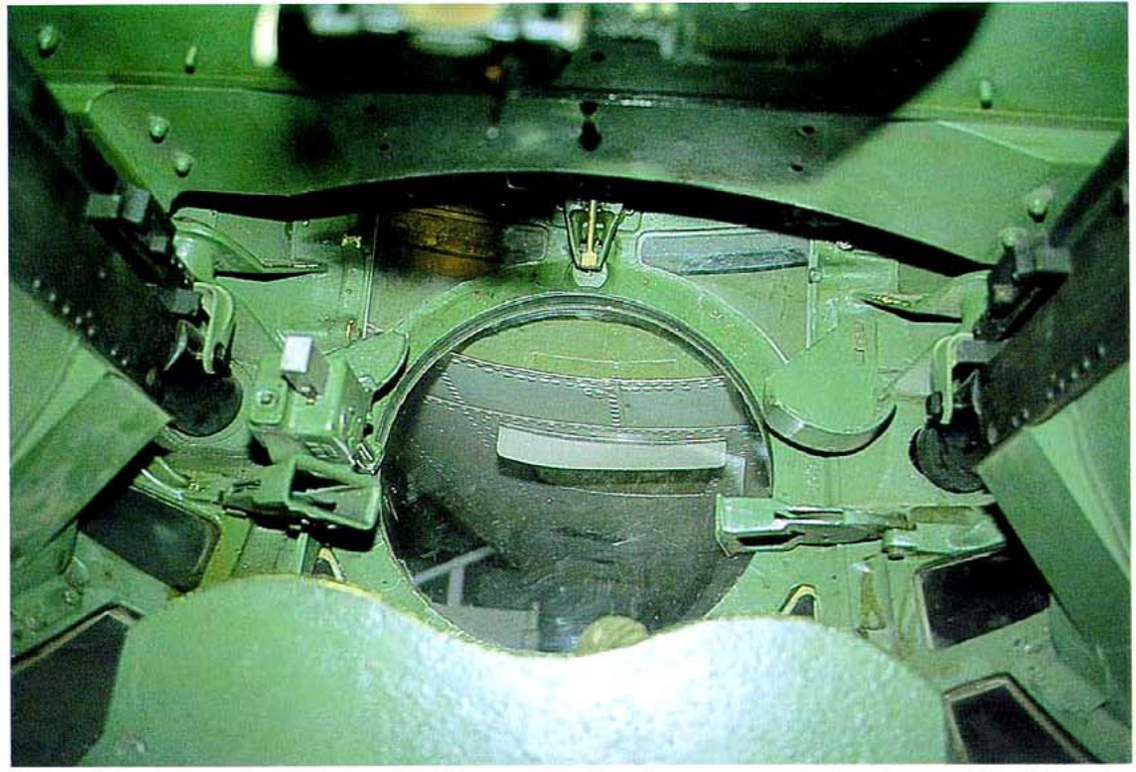
A good view on the wing/fuselage joint and upper wing detail with various exhaust louvers. On top of the fuselage can be seen part of the Sperry upper turret with twin .50 cal Browning machine guns.

The fully retractable tail wheel (contrary to the partially retracted main wheels) features a single side yoke and big Good Year balloon tires, suitable for rough grass field from which most B-17's operated.



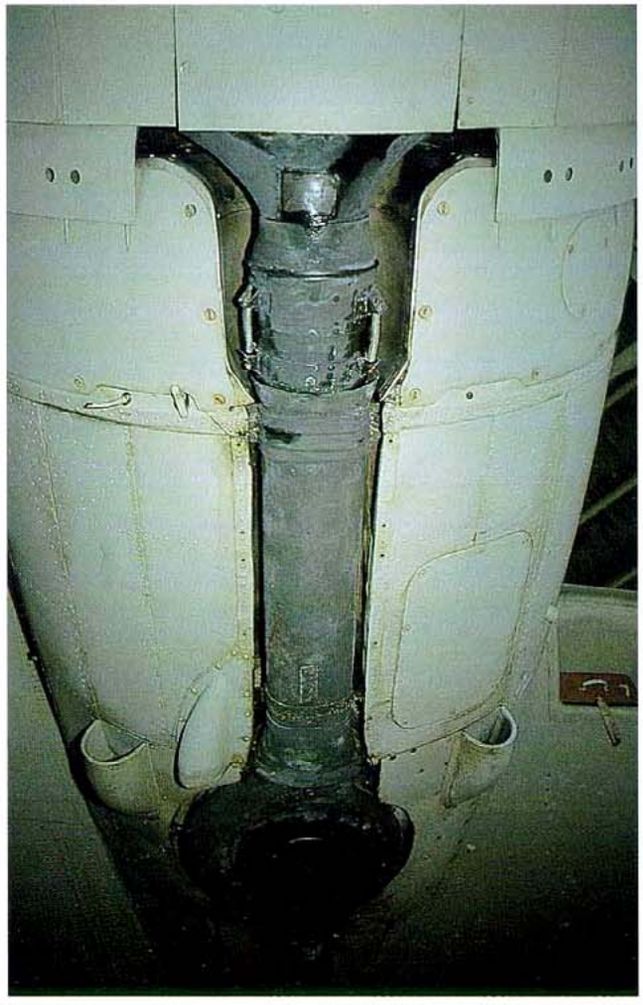


Finally replacing the early gun fairing, belly gun tub and Bendix remote control belly turret (all rather unsatisfactory designs) was the manned Sperry ball turret (actually introduced on the 113th B-17E). The whole electrically operated assembly was supported on a yoke and gimbal which can be seen on page 29. Although it provided a 360° arc of fire and was highly effective against attacks from below, it was not a comfortable place to be. The gunner (the smallest member of the crew) fired his guns in a foetus-like position, leaning against the entrance hatch. On the ground, access could be gained through the hatch but the gunner would not be in position during landing and take-off in case of undercarriage failure. In flight, the gun turret would be revolved, guns pointing down, enabling the hatch to be opened.



Aiming the guns was by means of a reflector sight between the gunner's legs. The ball turret had a few specific drawbacks. One was the unability to wear a parachute in the cramped inner space. The second was equally severe; a blocked turret forced the gunner to remain in position, facing a possible belly landing upon the return home. A third problem which was never completely solved concerned the other B-17's in a formation. The empty shell casings were ejected outside the turret, sometimes causing severe damage to the aircraft below.
Of interest in the photo at right are both foot rests aside of the circular window.

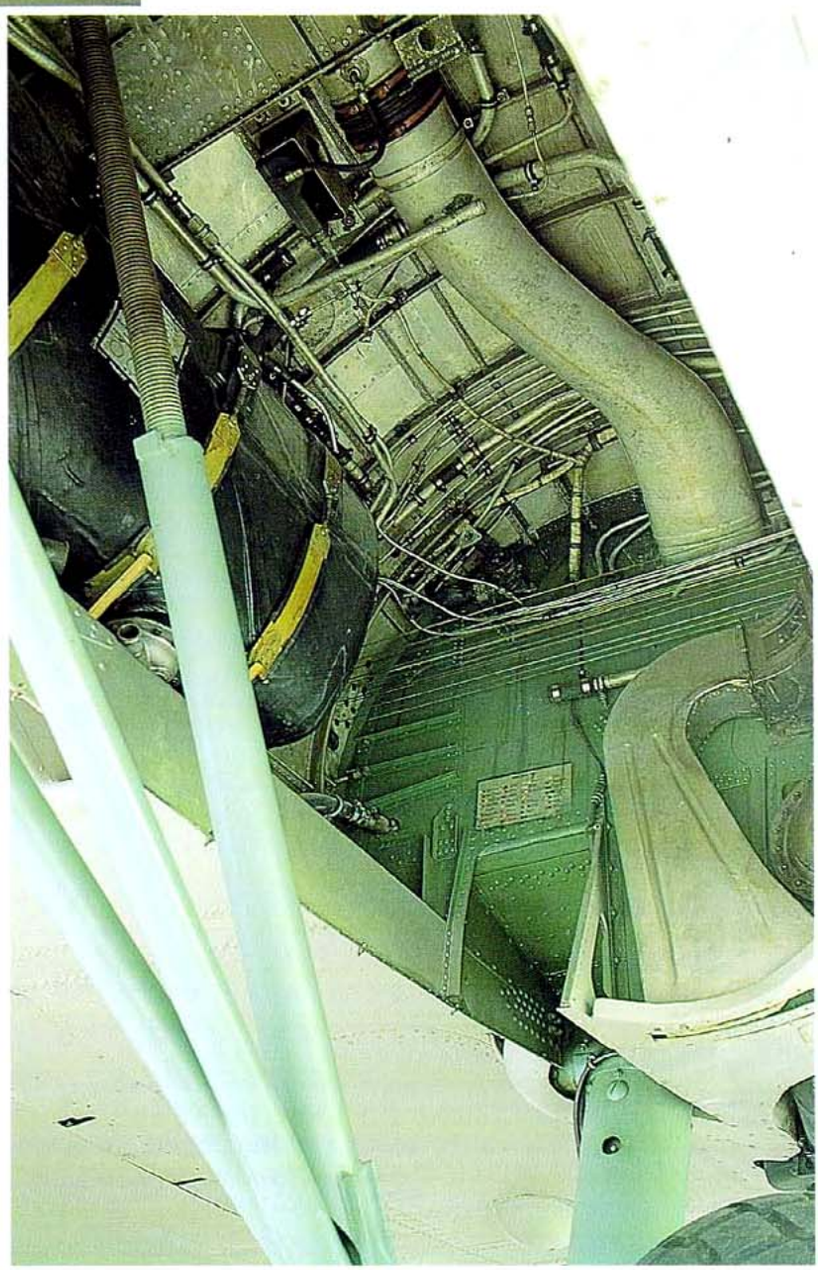
Overall view of the central belly with the bomb bay doors in closed position. The main drawback of the B-17 was its relative small bomb bay (maximum 9,600 lbs) denoting it as a medium bomber, but it was the most heavily armed aircraft of WWII.



More belly and underwing detail is revealed in these photos whereas the bottom left photo focusses on the front of the supercharger where it emerges the engine nacelle.

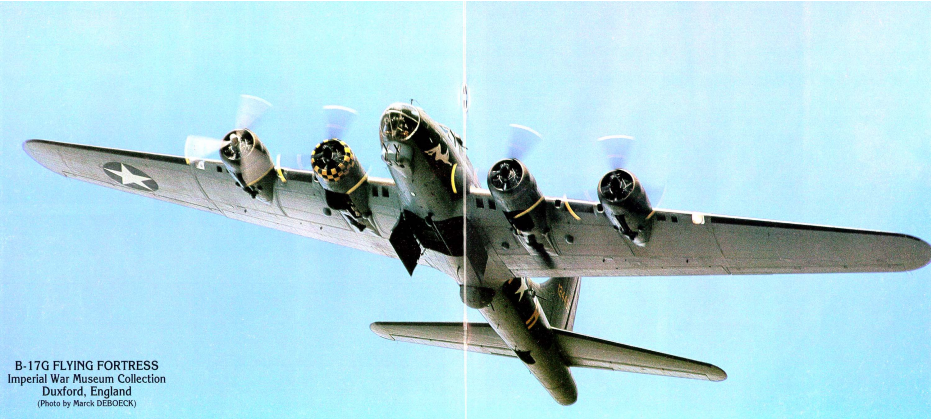
Both number 1 and 2 engine nacelle in one view. The B-17 was powered by four Wright R-1820-97 turbo-supercharged engines. Its nine cylinder in radial position were air-cooled and provided some 1,200 HP each (1,380 HP in war emergency setting).
Already featured on the B-17F were wider propeller blades resulting in the so-called "paddle blade" effect. Slight redesign of the engine cowlings was needed so the wider blades could clear the cowling when in feathered position. The Hamilton Standard propellers were of the variable pitch, constant speed type. The B-17G was able to reach maximum speeds of 287 mph (460 km/h) and 302 mph (485 km/h) in war emergency setting. B-17F's fitted with these wide propeller blades have reached top speeds of 325 mph (520 km/h). Note the Olive Drab upper surface camouflage color follows the contour of the engine cowling leading edge. Bottom surface is finished in Neutral Gray.

The port main wheel housing is a perfect mirror image of the starboard side, so only two pictures are shown for confirmation.

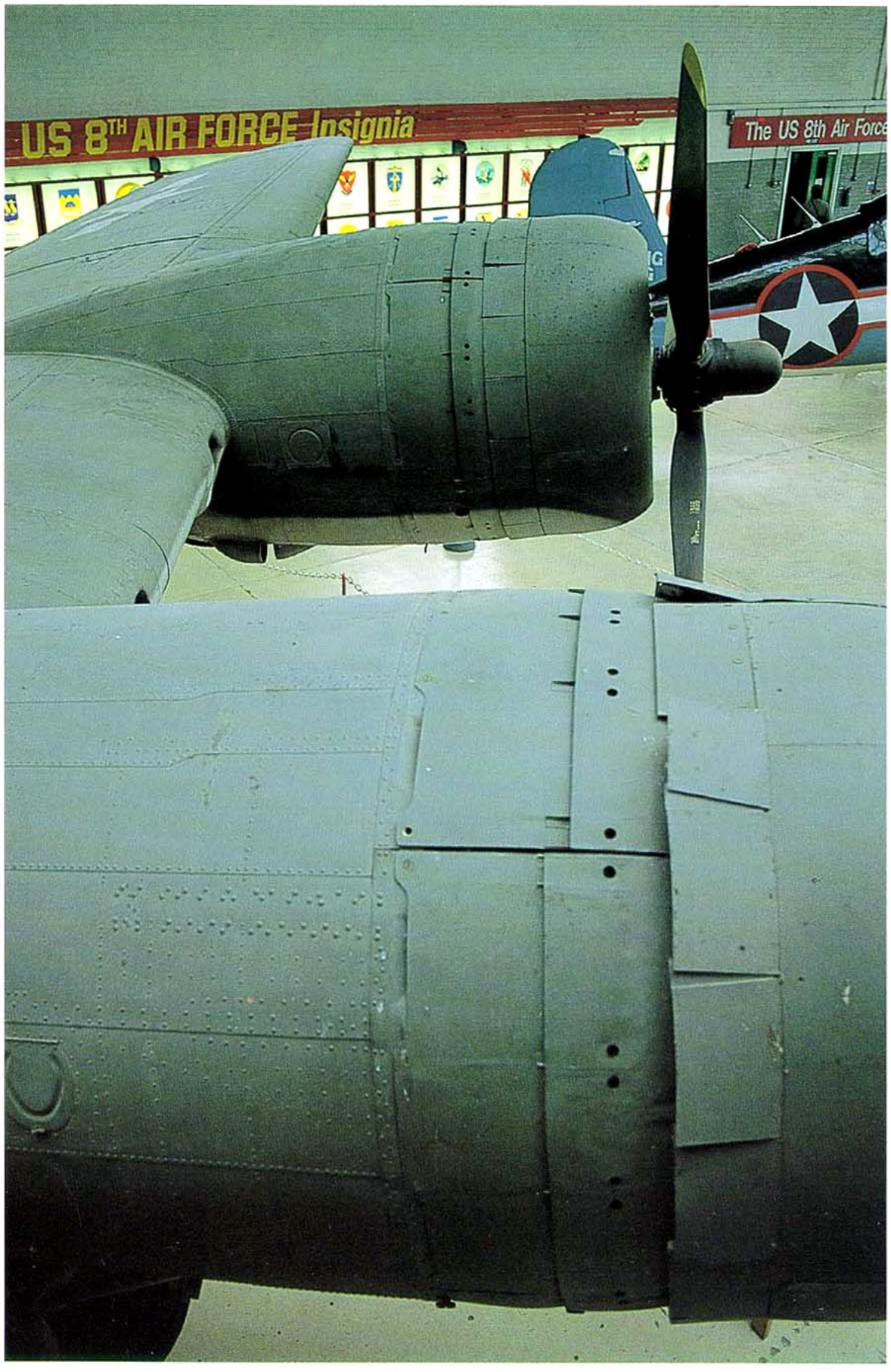


Main wheel tires were also provided by Good Year, one of the main tire manufacturers in WWII. Unlike the tail wheel tire the main wheel rubber has a distinguished pattern. Note the valve protruding the wheel axe. Main wheel legs are finished Interior Green.

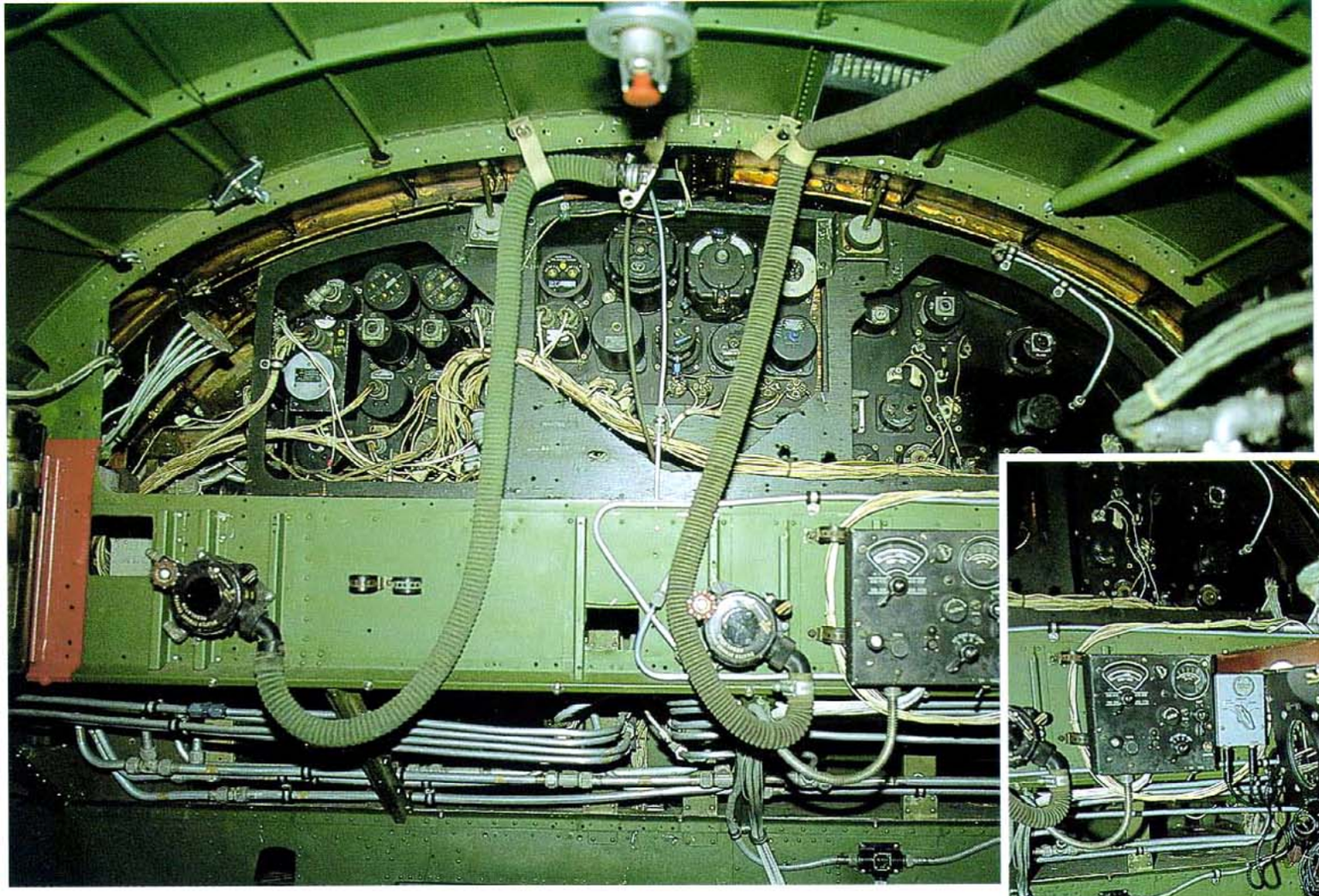
Detail not revealed in the large photo on page 15 is apparent in this view of the propeller hub and cylinder arrangement. Note the red markers on the yellow propeller rings.
At bottom right can be seen the inside of the emergency exit door at front on port side.

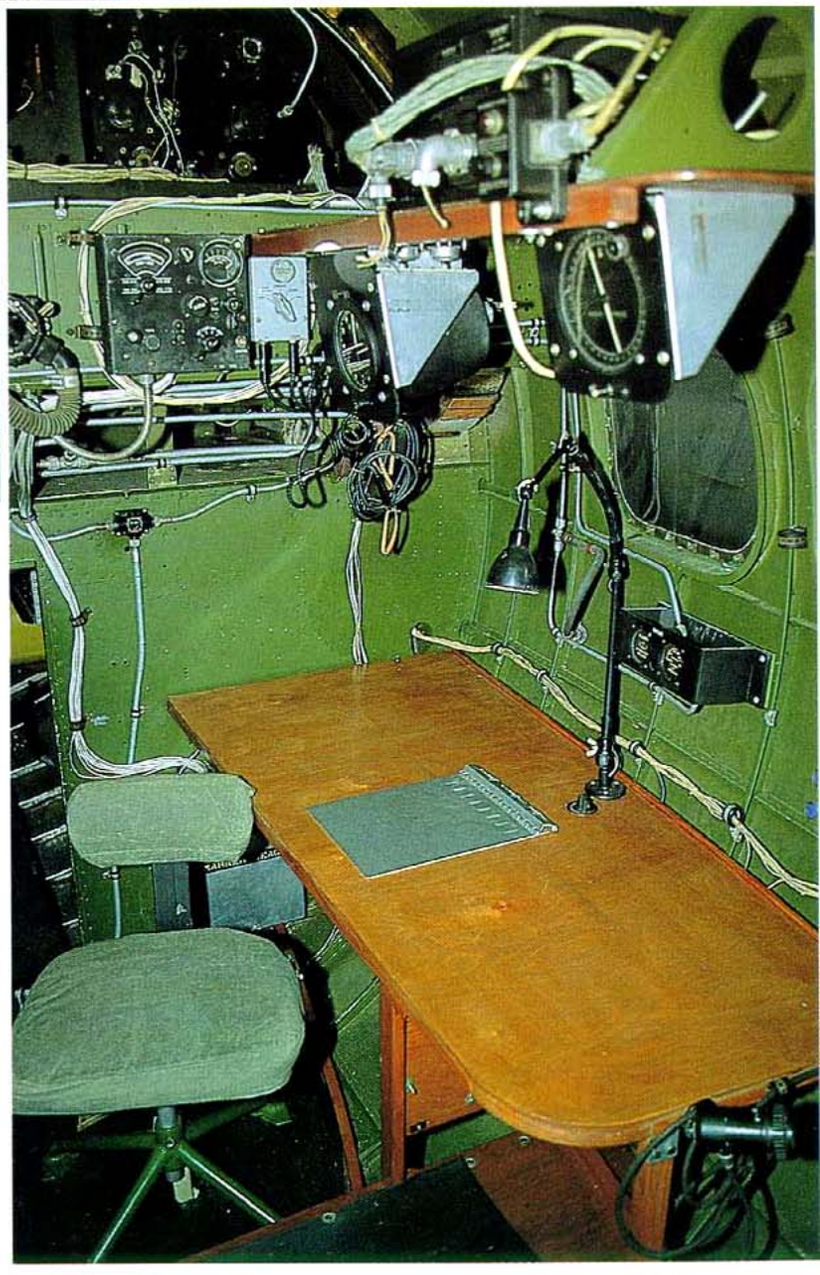


B-17G FLYING FORTRESS
Imperial War Museum Collection
Duxford, England
(Photo by Marck DEBOECK)



Important upper surface detail includes the Astro compass bubble over the bombardier/navigator's compartment and the Sperry upper turret first mentioned on page 11. All photos are taken through the open pilot's window.

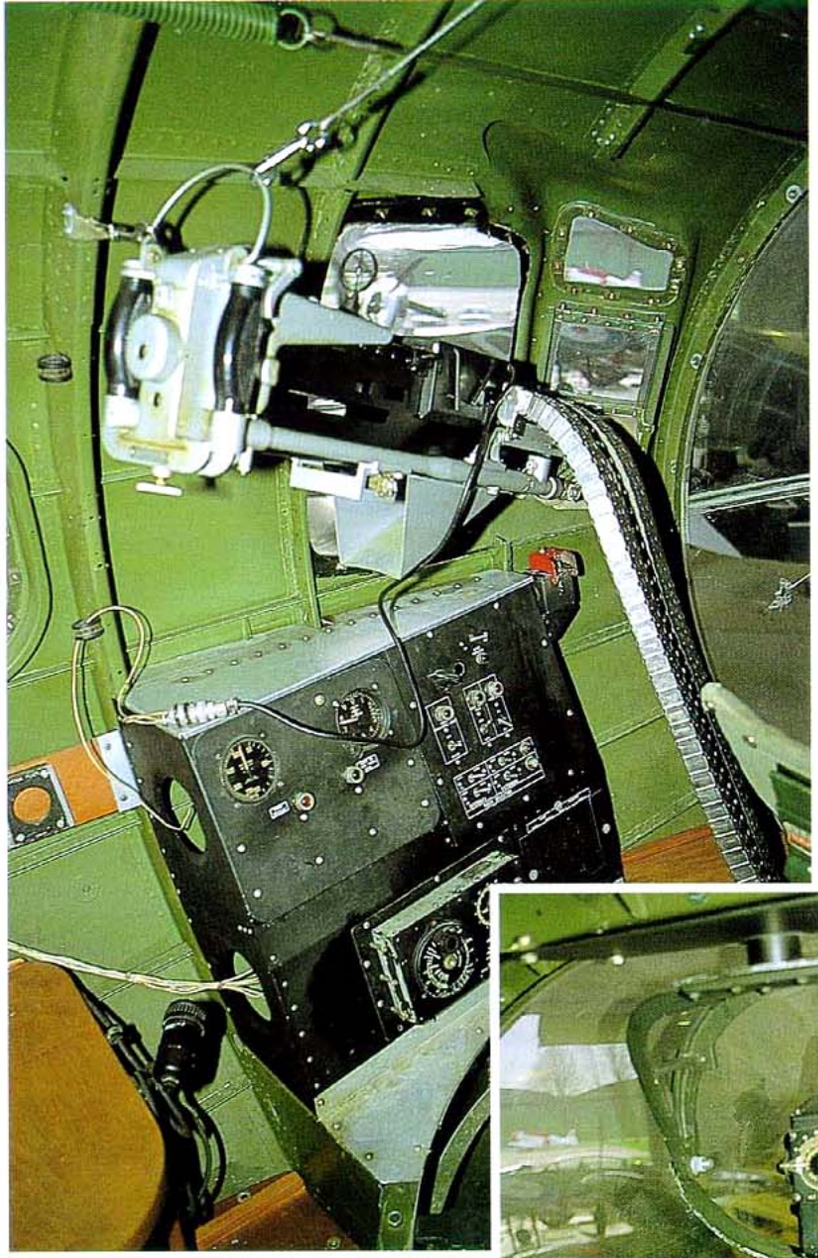




A complete B-17 crew consisted of ten crewmembers, comprising a pilot and co-pilot; a bombardier also acting as chin gunner; a navigator which manned the cheek guns; a flight engineer which operated the top turret over his compartment; a radio operator; a ball turret gunner, two waist gunners and a tail gunner.

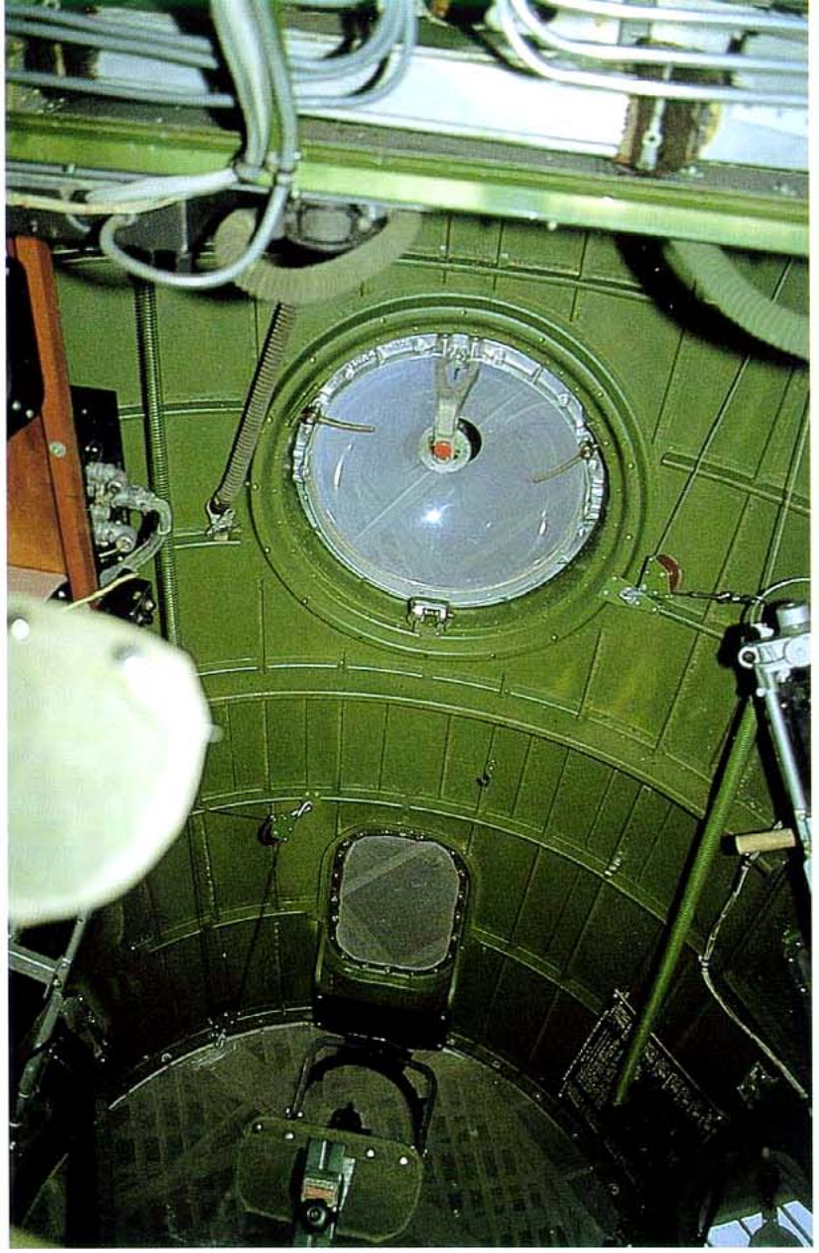
The main picture on this page is an overall view of the rear of the main instrument panel which can easily be reached from the navigator's compartment for repairs or adjustments. No attempts have been made to cover the instrument cabling or tubing below the main spar. Two oxygen hoses and oxygen flow regulators are attached to the same spar.

The navigator's workbench is to the port side and close to the pilot's position. At the upper left hand is a radio compass control box with an interphone jackbox next to it. Note the lamp used at night and in cloudy weather when daylight through the fuselage windows is inadequate.



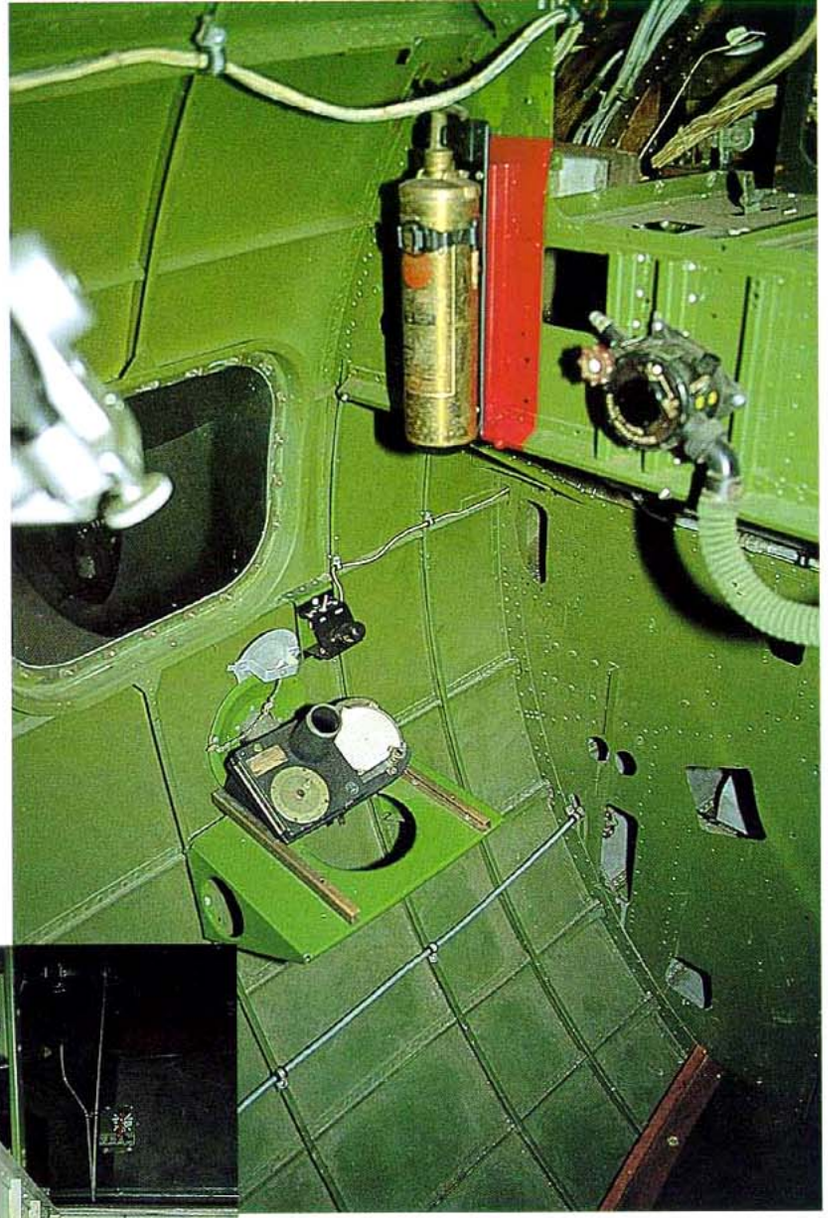
Just forward of the navigator's station and to the fuselage side is a control box operated by the bombardier. Note the red securing cover over the electric bomb release switch to the right of the box. The port cheek gun (operated by the navigator) can be seen hanging from the roof.

Close view of the immaculately preserved Norden bomb sight. On top, attached to the N° 1 bulkhead, is the chin gun turret computing sight. Both devices are operated by the bombardier.

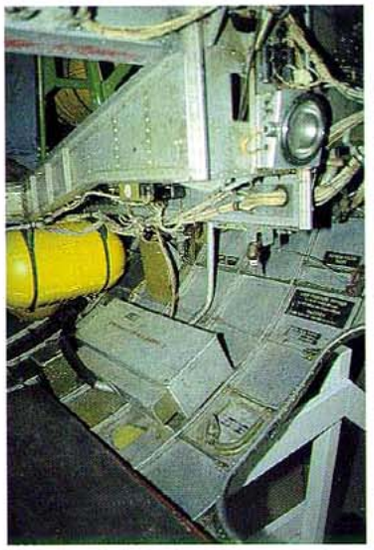


The Astrodome with compass viewed from below. Two locking side levers secure the hinged dome. Note the gun cable reels aside the dome and the forward upper observer window.

To the right of the bombardier's station is a bombardier's loading panel and oxygen flow regulator. Note the bombardier is seated on top of the open chin turret, overlooking the twin .50 cal guns (dummy's installed here).

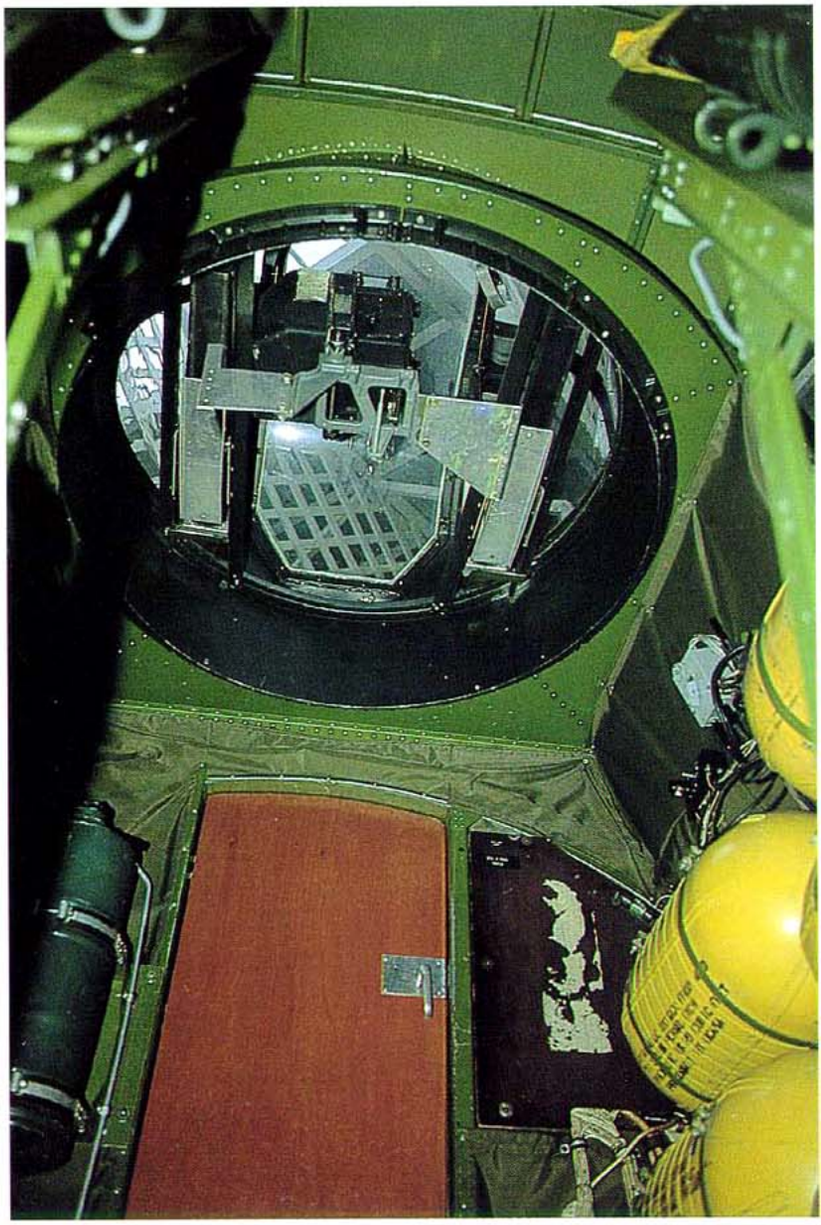


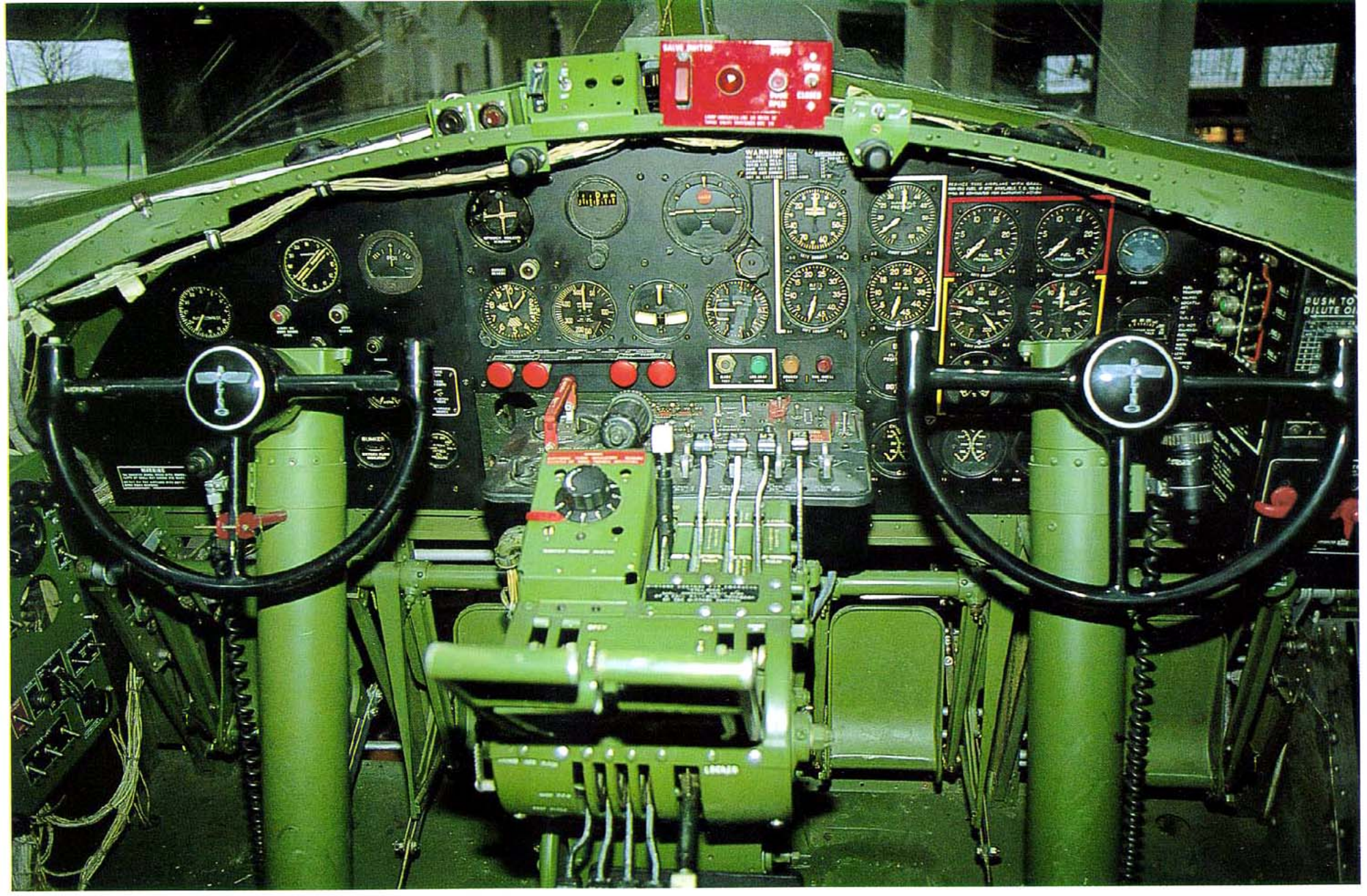
A drift meter is installed on a fuselage console in the right rear of the compartment.



Oxygen bottles can be found all over the aircraft like the ones stowed here below the cockpit entrance platform (note emergency exit in the right corner of the bottom center photo).

Below is a view looking up into the upper fuselage Sperry turret and at the door to the bomb bay.





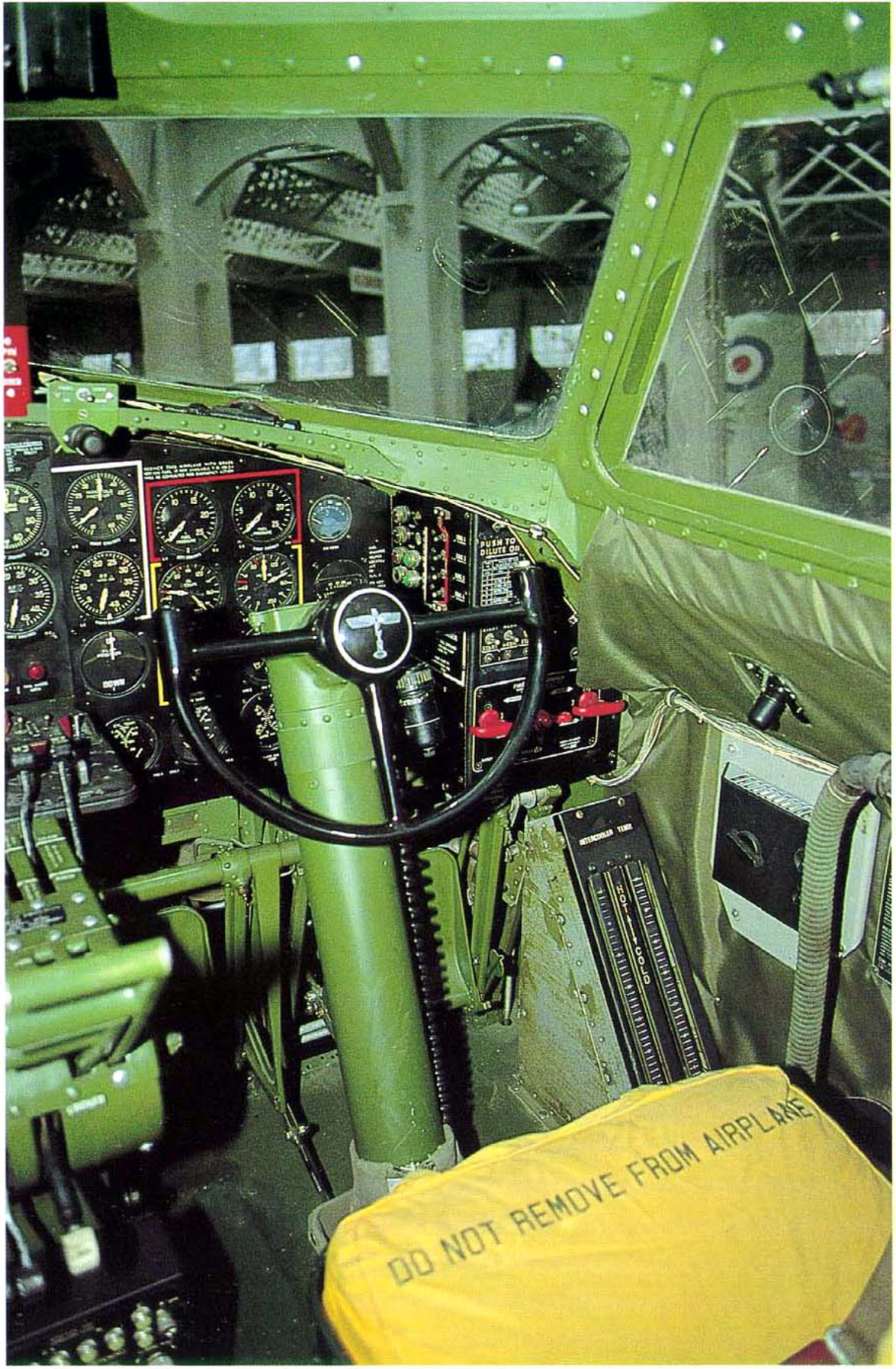
B-17G main instrument panel, with pilot and co-pilot control columns and engine control console in the center. Note that most of the engine monitoring instruments are located in front of the co-pilot whereas the pilot has only minimal flight instruments at his disposal. Also note the emergency warning lights and control boxes on top of the main panel. The four bright red knobs are the propeller feathering switches. Note the black instrument panel in contrast with the Interior Green overall finish of the cockpit.

(Next page, top left photo) Mounted overhead the pilot's and co-pilot's position are the radio remote control units (aft) together with the engine cowl flaps operator box (most forward). The latter also features a standard clock to the left.

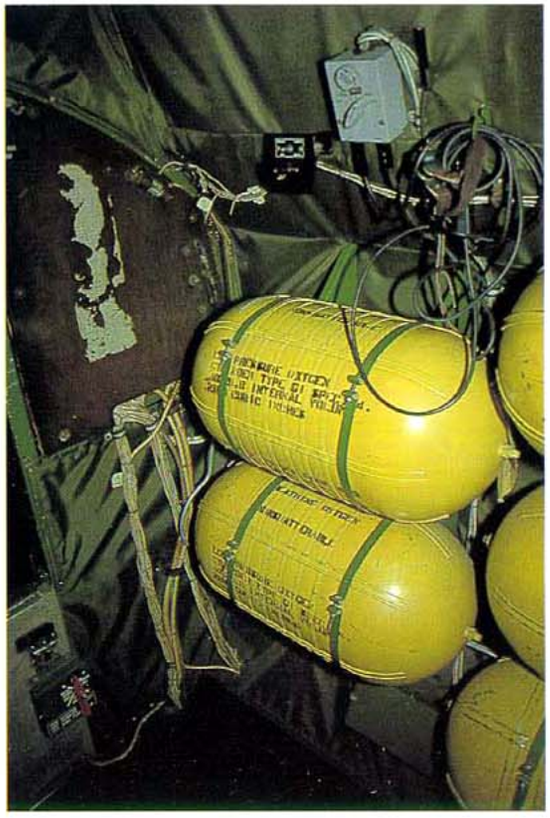
(Next page, bottom left photo) At the bottom of the center console is the auto-pilot control box. In front of it is the rudder tab control wheel and two levers, the left one being the elevator and rudder locking lever whereas the right lever can be engaged to lock the tail wheel.

Engine starter switches and fire extinguisher control box are at the co-pilot's right hand side, together with the intercooler control panel. The black device on the gray panel is the suit heater outlet.


PLANE
DO NOT

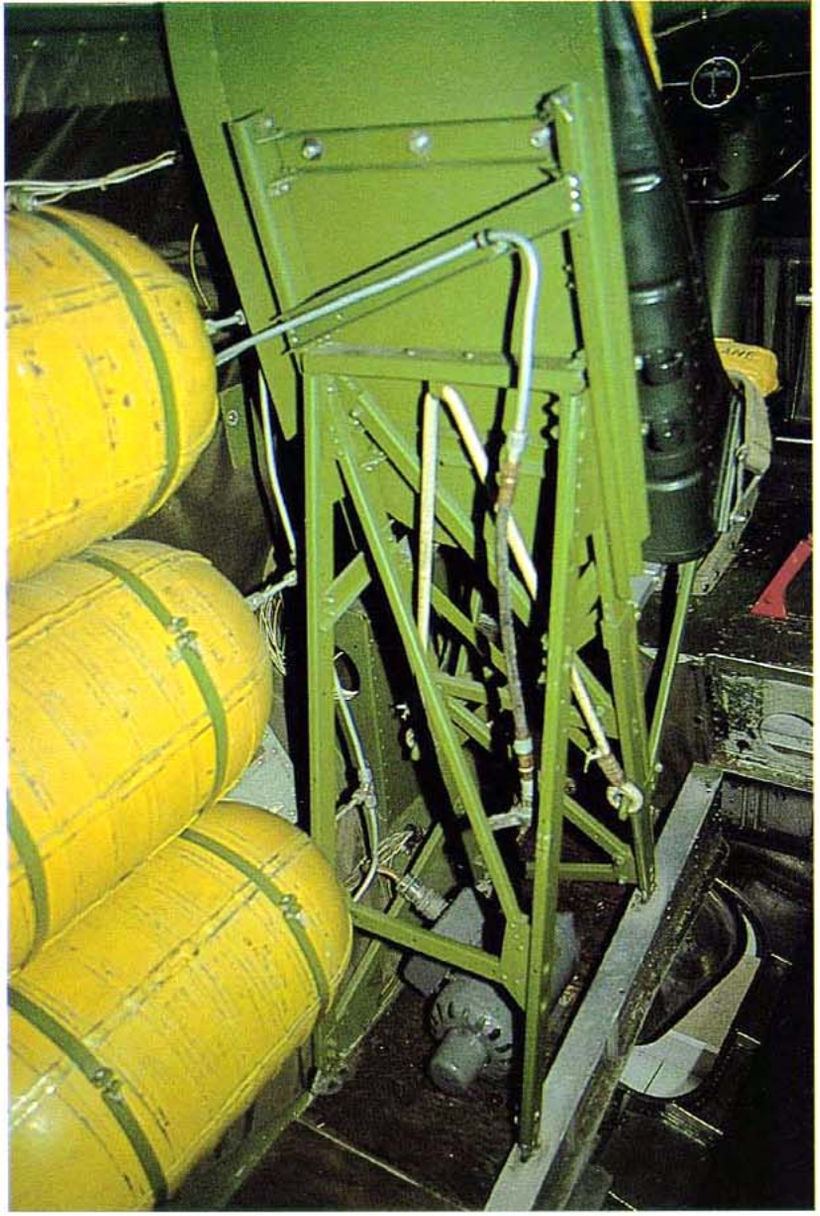

DO NOT REMOVE FROM AIRPLANE

Further aft are the interphone jackbox and oxygen regulator. Note the neat fuselage lining.



The area behind the seats is taken by more oxygen bottles and emergency back-up systems. Even a portable oxygen bottle is racked within arms reach for emergency situations. Note the crewmember's seats are mounted on solid beams rather than on platforms, providing stowage room below the seats.

Electrical systems are controlled by the pilot through a control box at his left hand side (next page, large picture). Next to it is the gyro system vacuum pump switch panel. Note the cabling running along the canopy frame.

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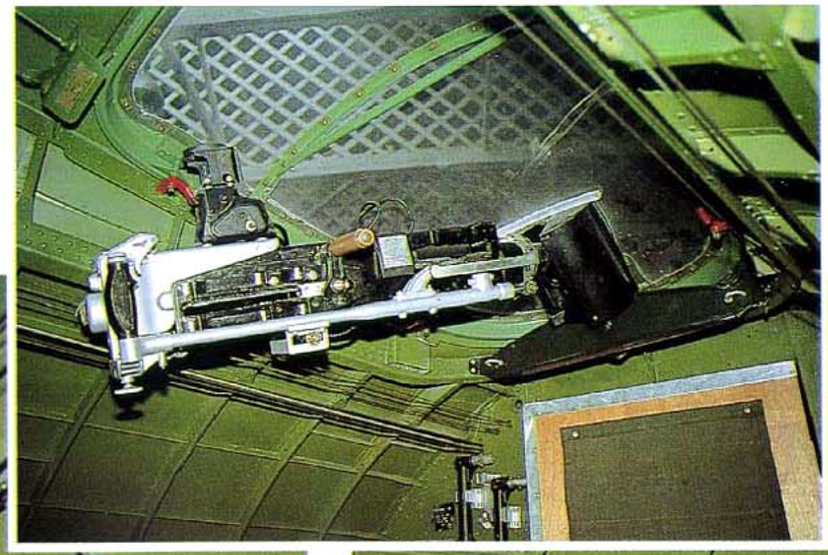
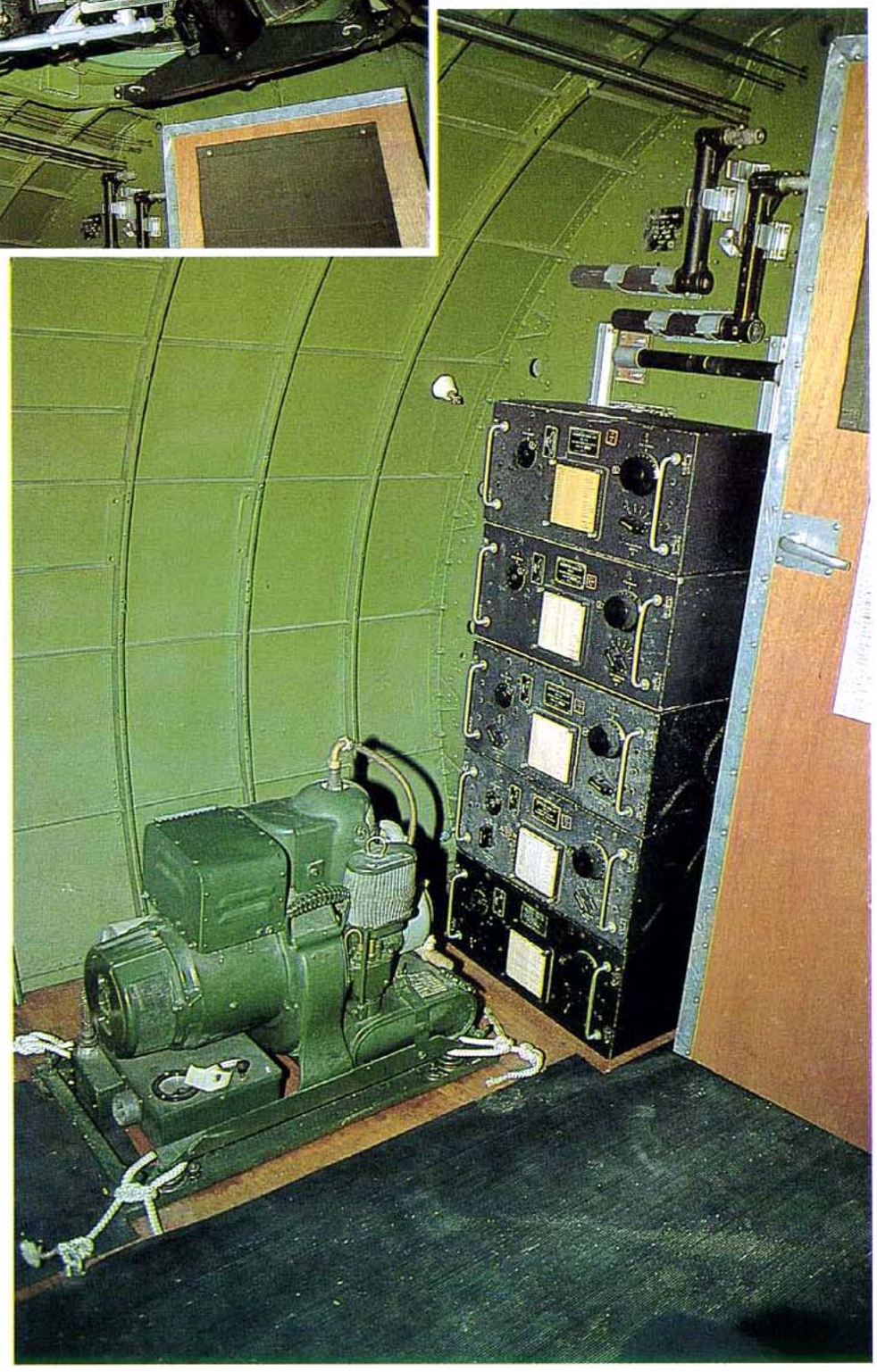
DO NOT REMOVE FROM AIRPLANE

Inside of the radio compartment looking forward. A rack holding command radio transmitter and receiver is attached to the N° 5 bulkhead (seat being omitted here). Part of the rooftop gun is revealed at the top with an overall view of the area in the photo at right (looking aft).

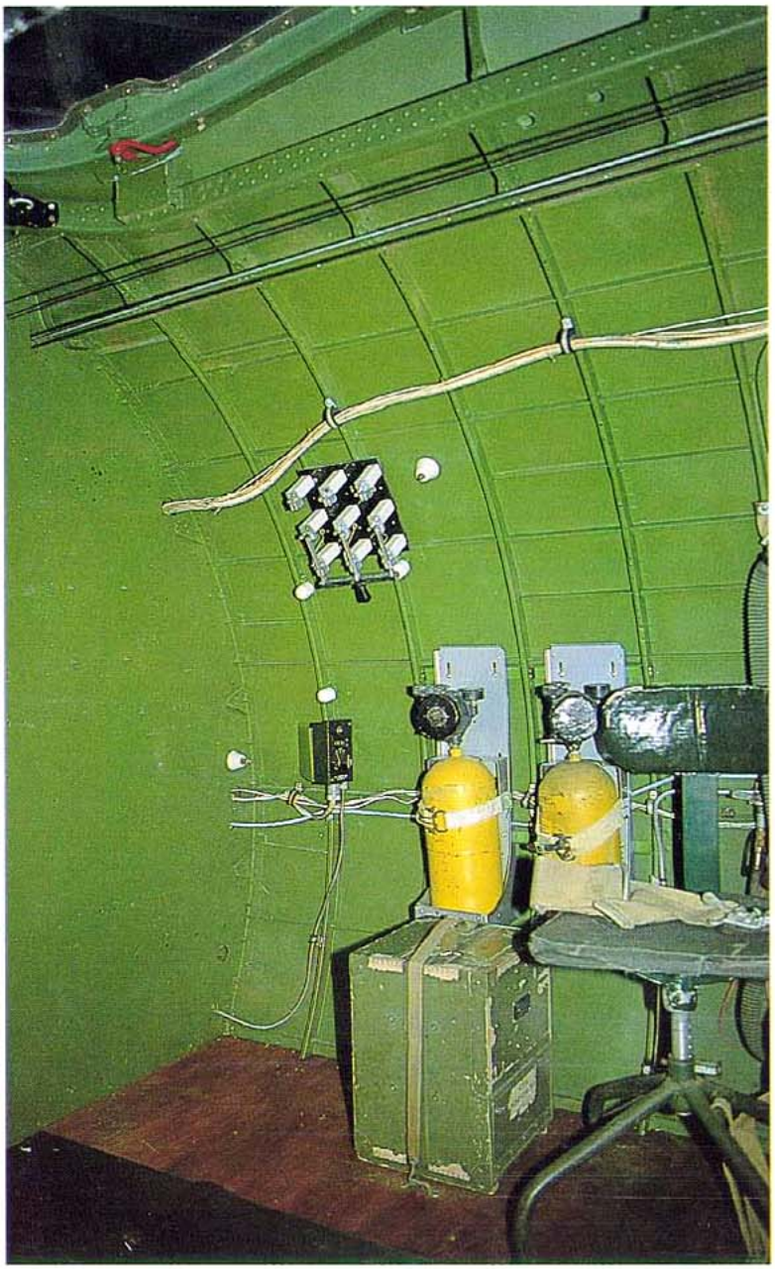


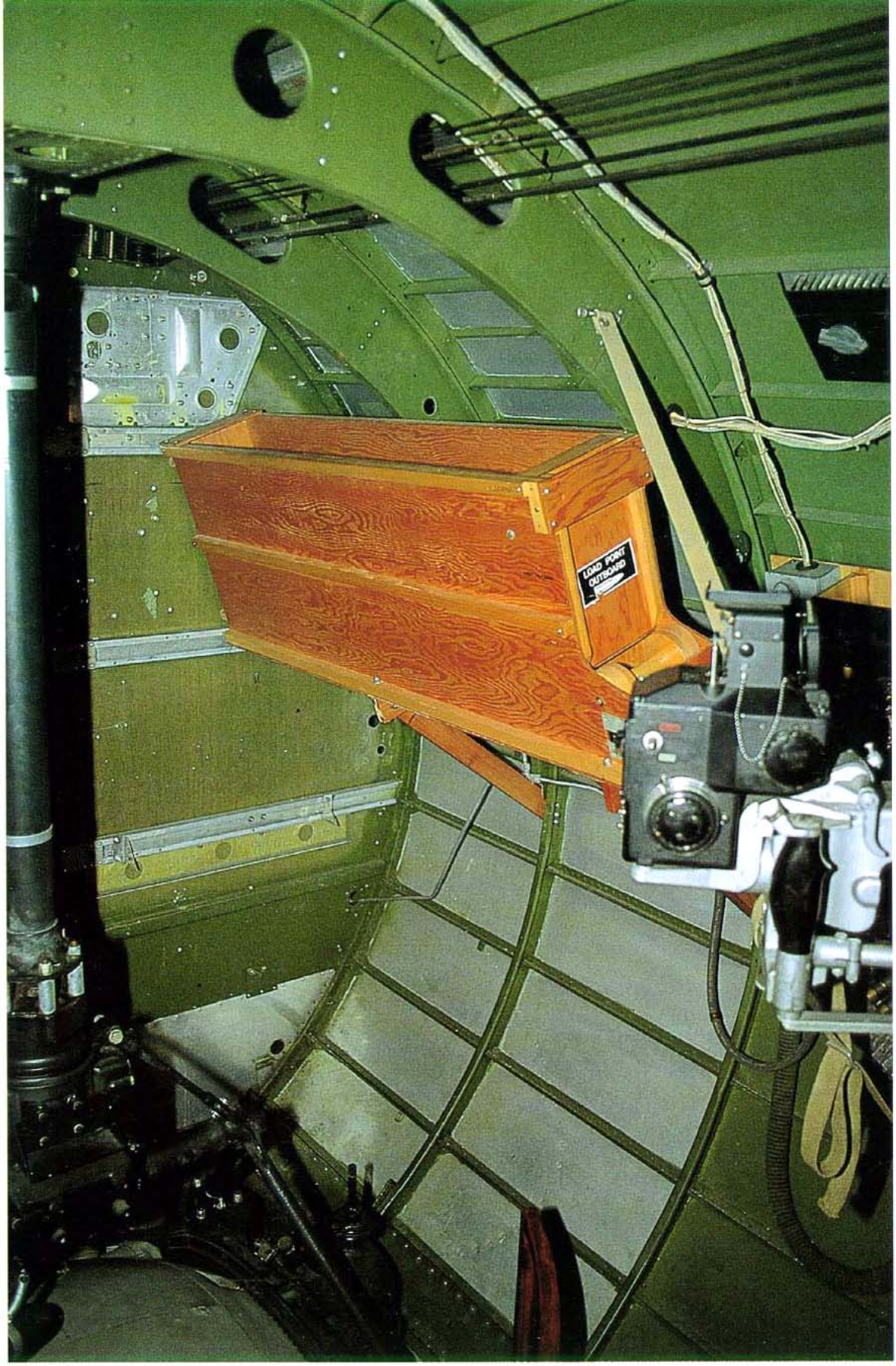
Up to five tuning units are stowed against bulkhead N°6, together with two hand crancks and the bomb door crank extension. The door is leading to the rear compartments. Note the dynamotor.

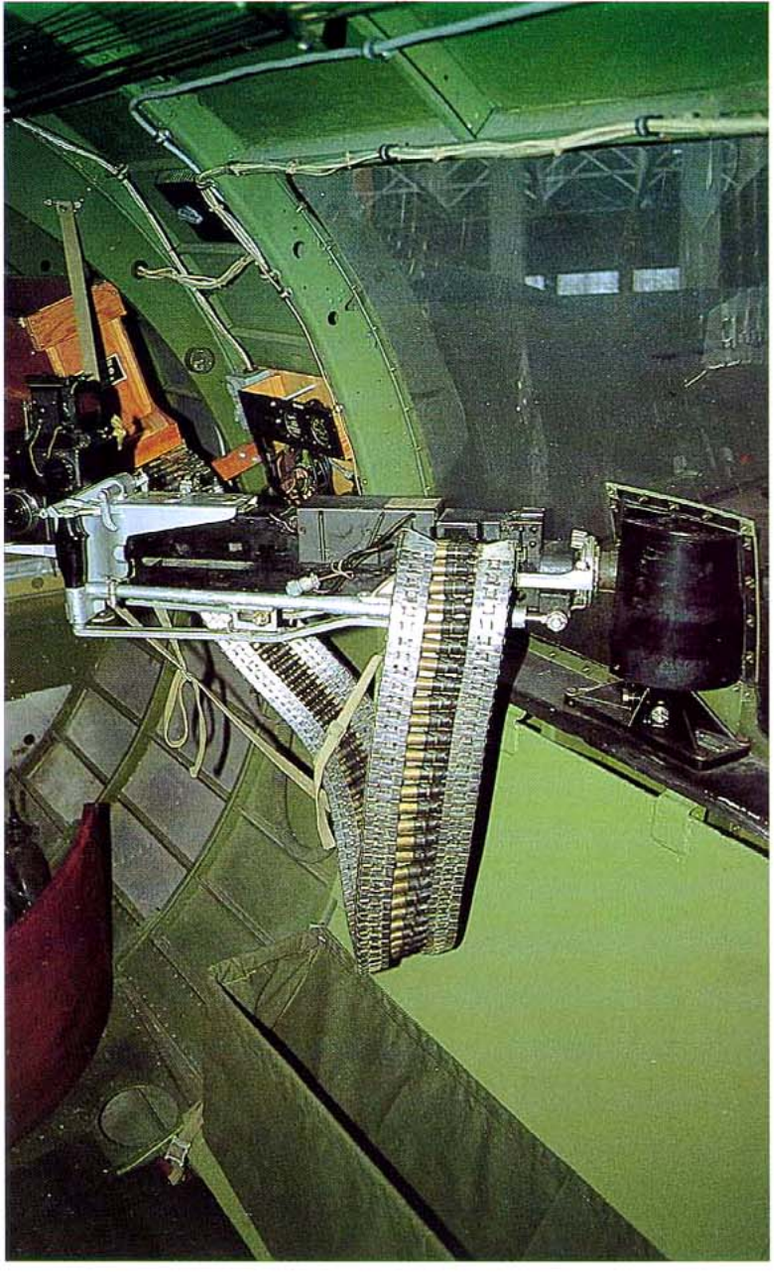


The left side of the radio compartment with two more portable oxygen bottles, the radio operator's seat and console. Various B-17's featured various outfits, the one shown here not necessarily setting the standard.

(Next page) The Sperry ball turret and yoke assembly inside the fuselage. The ball gunner's oxygen bottle was usually attached to the pole but was omitted in this example. Note the hatch with handle is not the turret entrance hatch which is a bit larger as shown on page 12.

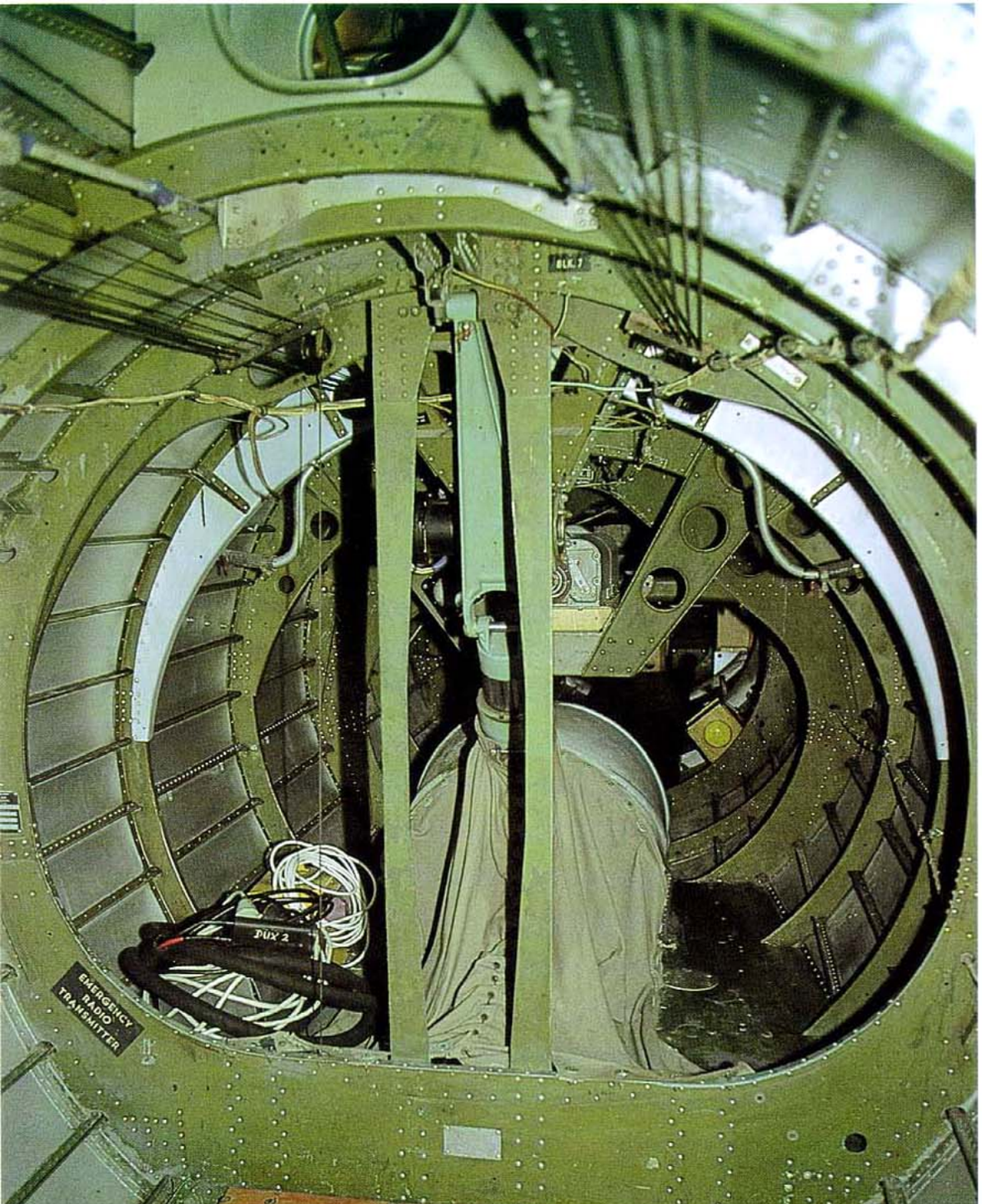


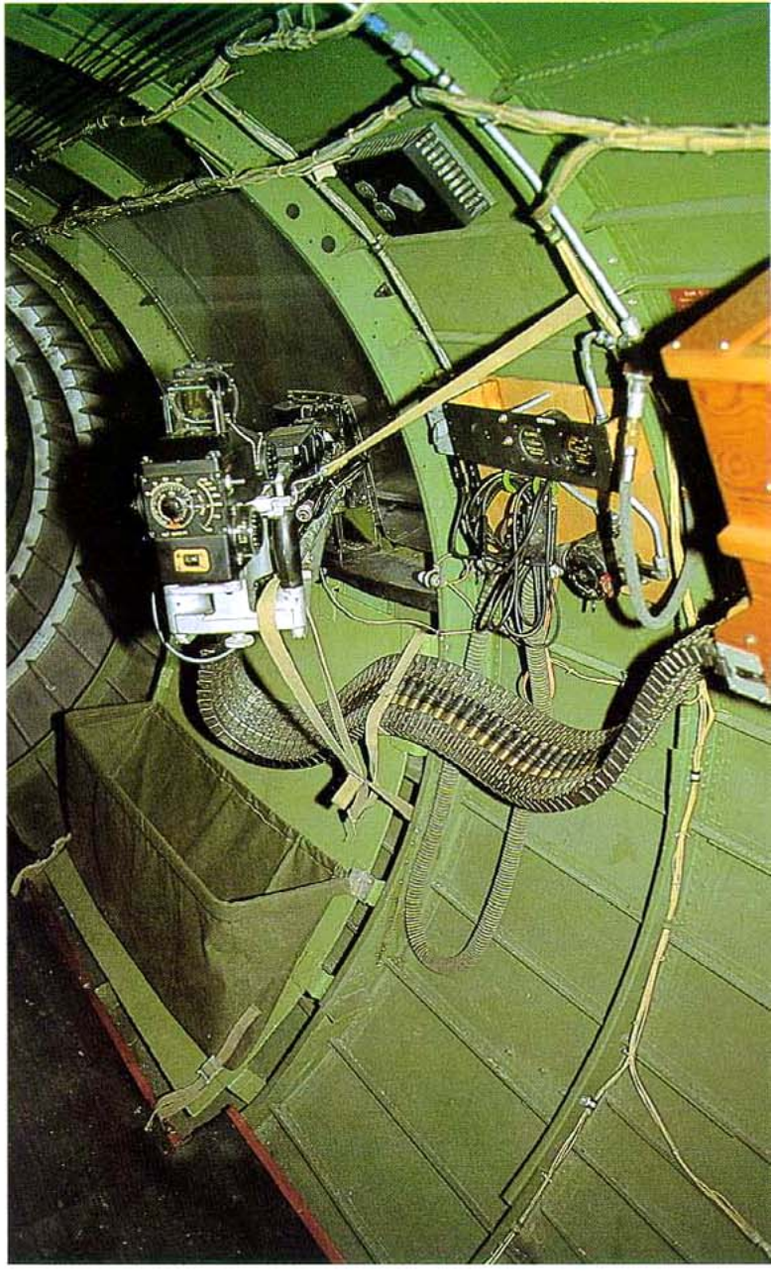

LOAD POINT
OUTBOARD



The starboard side waist gunner's position is slightly aft of the ball turret with the wooden ammo feed box at turret height (see previous page). Note the armor plate below the plexiglas window and the empty shell casing collect bag.

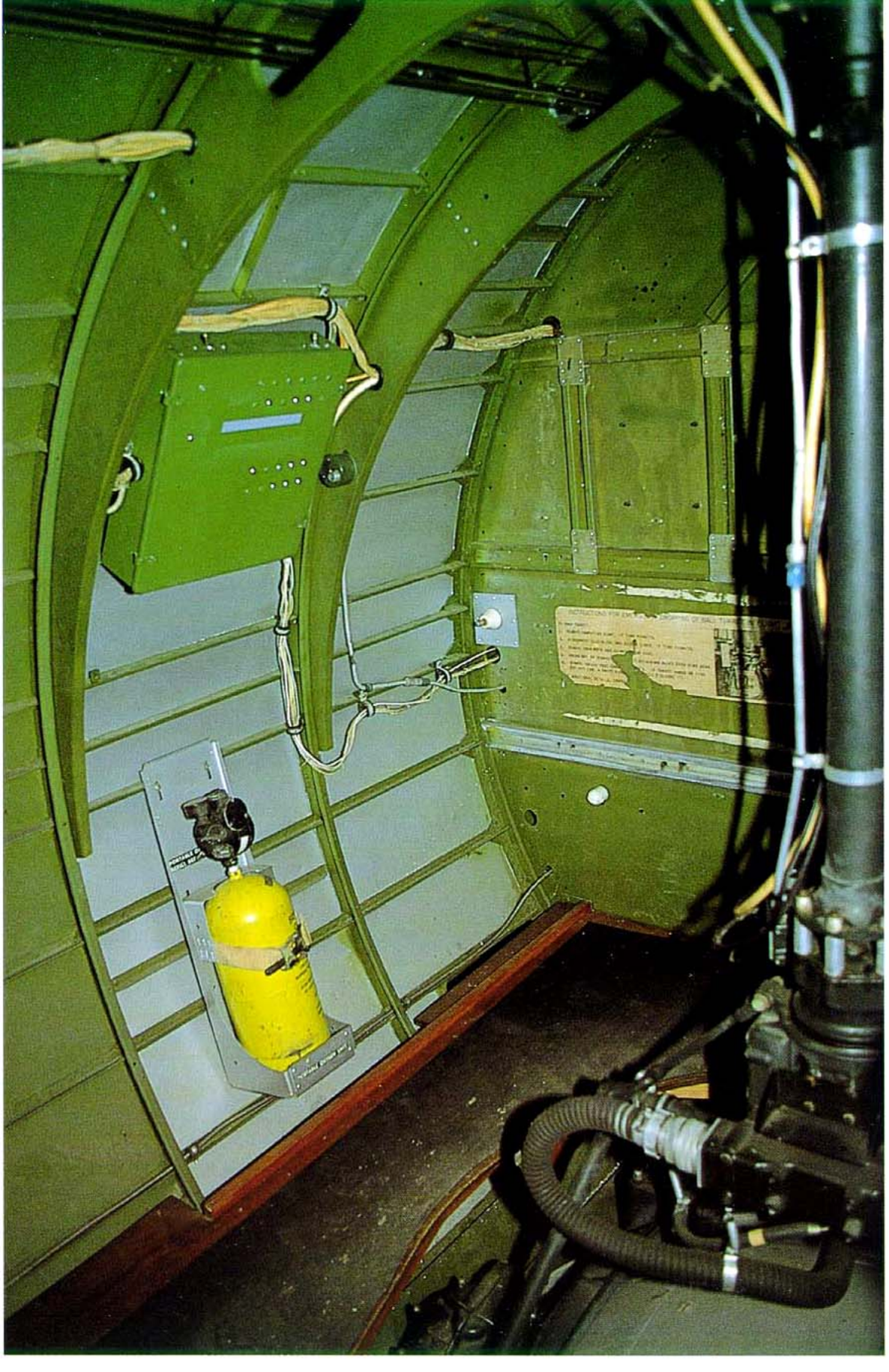
Structural fuselage detail looking up and aft with flight control cables running along the rooftop. Note the aluminum finished structural strengtheners in the back.



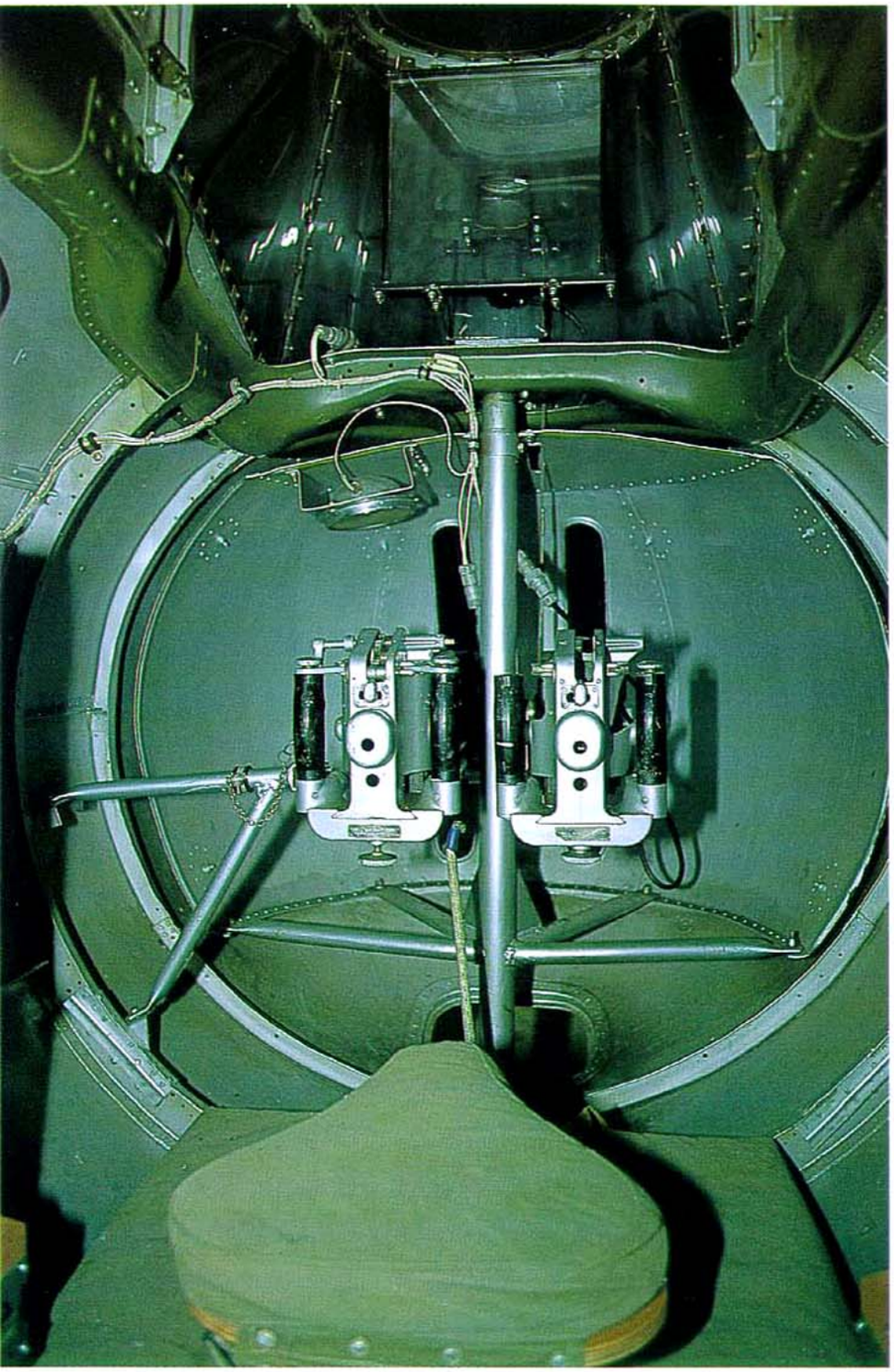


A better view of the armor plate and attachment to the fuselage strentgtheners can be seen in this view of the port waist gunner's station. Note the oxygen connector and regulator against the fuselage side.

Just aft of the side entrance door is a center spar holding the tail wheel oleo assembly. The canvas cover first mentioned on page 10 is clearly visible over the aluminum wheel housing. At right is the walking platform for the tail gunner to reach his station. Forcing yourself through this narrow passage in full bomber gear is no laughing matter, especially in emergencies. The position of the tail gunner and ball turret gunner were therefore the least envied for obvious reasons.



Before concentrating on the tail gunner's compartment a final look in the waist gunner's compartment and to the left forward area with fuse box. The ball turret is partly visible at right. Another portable oxygen bottle sits in a fuselage-mounted rack.



Finally, the tail gunner's compartment with twin .50 cal Browning guns, one on each side of the central spar. The seat installed here is very simple without any protection at all. It is known the tail gunner had armor plating installed in front of him and that the windows of the enclosure were bullet proof. Oxygen regulator and wooden ammo box were installed to his left side (not shown here).
Above is an interesting view of the Cheyenne turret inner structure with sliding window to the left.

Wearing the colors of the "Sally B", another famous B-17, when viewed from this side, the same aircraft retained the 124485 tailcode of the "Memphis Belle". The B-17 is definitely one of the most familiar bombers of WWII and certainly one of the most graceful aircraft that ever flew.