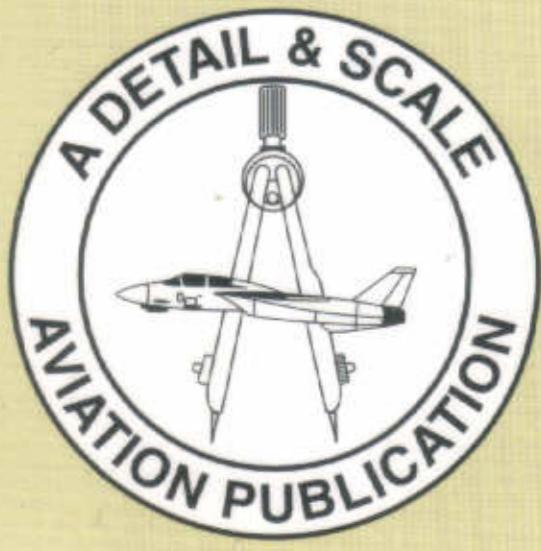


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VOL. 66

INCLUDES ALL FLYING BOAT  
AND AMPHIBIOUS VERSIONS

# PBY CATALINA



in detail & scale

Bert Kinzey

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squadron/signal publications

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National Archives  
National Museum of Naval Aviation  
United States Air Force Museum  
Confederate Air Force

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Special thanks is also expressed to the United States Air Force Museum at Dayton, Ohio. Mr. Bob Spaulding and his excellent team of volunteers made the interior of the PBY-5A (OA-10) available to the author for photography. The Research Division of the Air Force Museum was also very helpful during the preparation of this book. As with the National Museum of Naval Aviation, the ongoing cooperation of the U. S. Air Force Museum has been essential to the continuing detailed coverage provided by Detail & Scale publications.

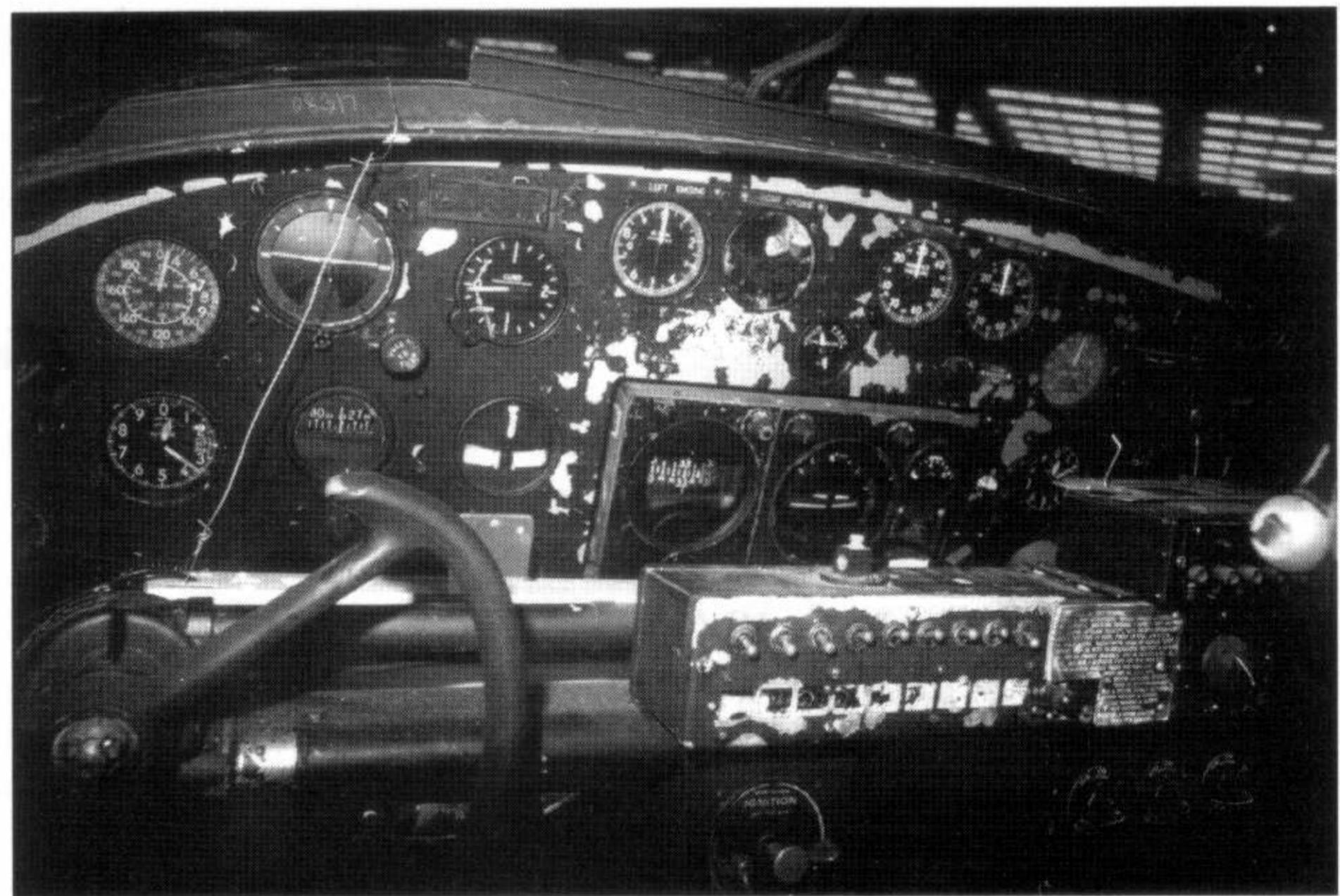
The author also thanks aviator extraordinare, Charles Largay. Charles is a former Navy PBY and PBM pilot, and he now flies the Confederate Air Force's PBY-5A.

Many photographs in this publication are credited to their contributors. Photographs with no credit indicated were taken by the author.

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*Above, front cover photo: With its engines still idling, a PBY-5 is about to be secured after a flight. Note the man in the water who will retrieve the mooring line from a crewman inside the aircraft. (Piet collection)*

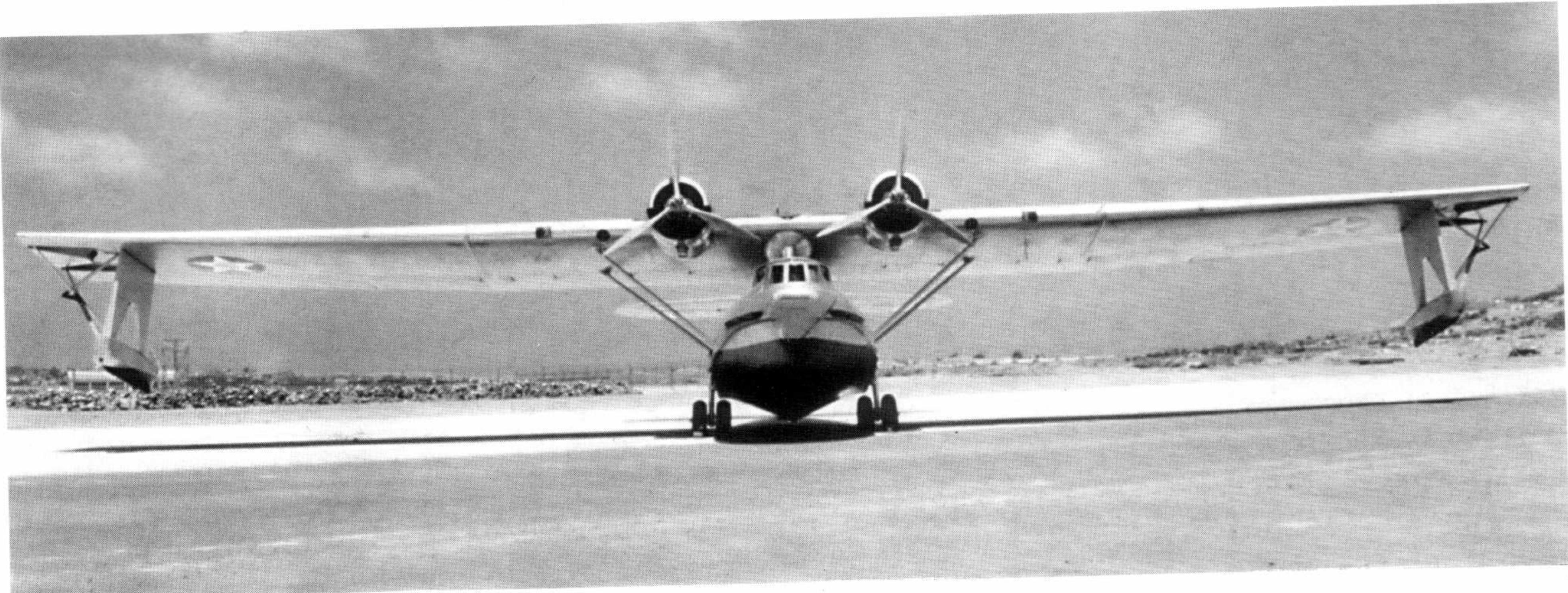


*Above right, rear cover top photo: Details and colors of the instrument panel in the PBY-5 on display at the National Museum of Naval Aviation are revealed in this photograph. For additional color photos taken in the cockpit of this Catalina, see pages 39 through 41.*



*Below right, rear cover bottom photo: A gunner mans the starboard waist gun position in a PBY-5. This vintage photograph shows the accurate colors and details for an operational Catalina in World War II. (National Archives via Piet)*

# INTRODUCTION



*Designed as a flying boat, the PBY looked ungainly and awkward when wheeled ashore on its squatly beaching gear. Its wide hull and huge wing earned it the nickname, "Dumbo," after Disney's flying elephant appearing in books and cartoons. But to the downed airmen it rescued from the sea, it was the most beautiful sight in the world.*

(National Archives)

At the beginning of the twentieth century, man finally conquered the air when the Wright Brothers made the first flight in a powered machine that was heavier than air. It was only a short time before the military began to study the possible value of the airplane on the battlefield, and the very first role for which it was considered was that of observing the enemy's disposition and movement from a mobile vantage point high above the action. By the time World War I began, the major navies of the world were also developing seaplanes and flying boats of all sizes to search the oceans around their fleets and off the shorelines of their homelands.

During World War I, airplanes began to join in the actual fighting, and the development of fighters and bombers began. Nevertheless the utilitarian duties of scouts and patrol aircraft remained of paramount importance. In World War II, the fighters and bombers grabbed the headlines and glamor, but the real value of patrol aircraft remained undiminished in the eyes of the commanders who needed the information they provided in order to plan a strategy that would defeat the enemy.

The PBY Catalina was the primary flying boat in service with the U. S. Navy when America entered the war in December 1941. Before the war ended, more Catalinas would be built than any other type of flying boat or amphibian in history. Catalinas searched for and found the Japanese fleet on its way to Midway Island, and as the war continued, PBYs were often fitted with radar to increase their abilities to search for the enemy. Whether using radar or only the eyes of their crewmen, Catalinas flew tens of thousands of hours searching for the enemy and providing critical information to military leaders and planners.

Apart from its primary patrol mission, the PBY was the U. S. Navy's first flying boat also designed to serve as a bomber. Black Cats became famous as they harassed the Japanese at night in the southwest Pacific.

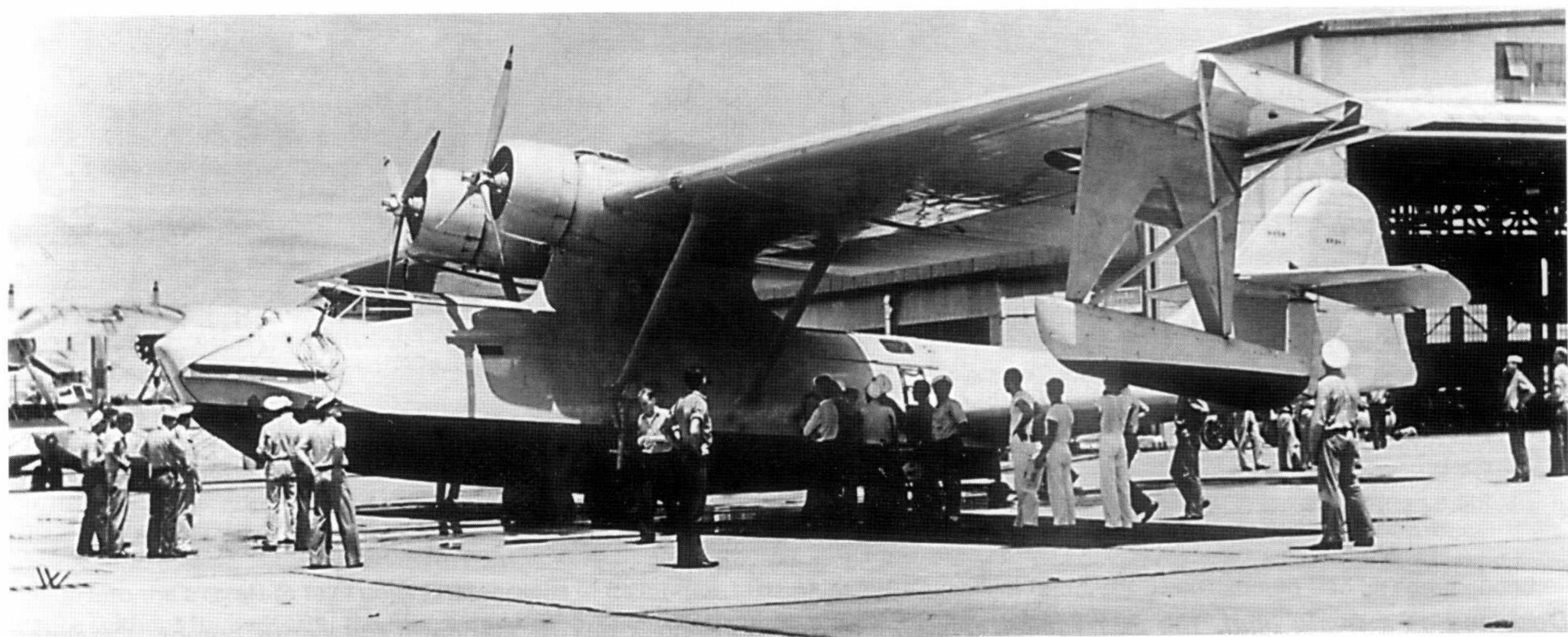
Carrying a mix of standard and depth bombs, Catalinas attacked Japanese submarines along the Aleutian Island chain and German U-boats on both sides of the Atlantic. They transported high ranking officers and other VIPs, carried cargo and mail, supported guerrilla forces, and rescued hundreds of downed airmen from the sea. When all of the Catalina's contributions to the Allied war effort are considered, its importance is difficult to overstate even though its role may not have been as glamorous as that of the fighters or bombers.

Very little has been written about the Catalina, and what references do exist often provide very little information on the early variants. For example, we have been unable to find a book that shows details of the waist gun positions used in the PBY-1 through PBY-4. In this publication, all versions are covered, and numerous detailed photographs are included. The PBY-1, which was the first production variant, is illustrated in extensive detail, then for each subsequent version, differences are illustrated and described. With the PBY-5A, which was the most numerous variant, we again provide comprehensive detailed coverage as a comparison to the PBY-1.

Most publications that do show details have limited their photographs mostly to restored aircraft in museums, and some of these are far from accurate. In our color section, we have also included some detailed photos of Catalinas that are in museums, but we have carefully selected ones that accurately represent the features and colors for operational PBYs. Any exceptions are noted in the captions. Throughout the rest of the book, we have used original Consolidated and U. S. Navy photographs taken of all versions of the Catalina when they were actually in service. Dozens of these detailed photographs are included, and most have never been published before. Both inside and out, they provide the most comprehensive look at this famous aircraft ever made available to the public. Differences between variants are also indicated on 1/144th scale drawings developed specifically for this publication by Lloyd Jones.

Concluding this In Detail volume is our usual Modelers Summary that reviews the plastic scale model kits of the Catalina in all standard scales from 1/144th through 1/48th. Comments are included to help the scale modeler make the necessary corrections and improvements required to build an accurate and detailed replica of the Catalina regardless of which scale he decides to use.

# DEVELOPMENTAL HISTORY



*The XP3Y-1 was the prototype for Consolidated's PBY series of flying boats and amphibians. It is shown here at Coco Solo in the Panama Canal Zone in October 1935 after flying there non-stop from Norfolk, Virginia.*

*(National Archives)*

Reuben Hollis Fleet was the vice president and managing director of the Gallaudet Aircraft Corporation until May 1923 when he resigned from Gallaudet and founded the Consolidated Aircraft Corporation. In less than a year he had purchased all of Callaudet's and Dayton-Wright's designs as those two companies went out of business. In 1924, Fleet opened a new plant in Buffalo, New York, where he concentrated his efforts on producing trainers, seaplanes, and flying boats for the Navy.

In 1928, Consolidated received a contract to produce a single XPY-1 which would become the U. S. Navy's first monoplane flying boat. Although the Glen L. Martin Company won the contract to build the production versions for the Navy, Consolidated was not deterred, and they submitted an improved version of the XPY-1 to the Navy. On May 26, 1931, a contract was signed for the production of the XP2Y-1 prototype. The success of this aircraft resulted in an order for twenty-three P2Y-1s, one of which was later used as the XP2Y-2 prototype. With more powerful engines mounted on the leading edge of the wing, rather than below it, the XP2Y-2 offered increased performance over the P2Y-1, and twenty-three P2Y-3 production examples followed. With their success and dependability, Consolidated established a reputation as a builder of reliable flying boats.

In 1932, Consolidated submitted its Model 28 design in response to a competition announced by the Navy for a new flying boat. After reviewing the design, the Navy placed an order for a single XP3Y-1 prototype on October 28, 1933, and the wheels were set in motion for the development for what would become the most famous and numerous flying boat ever produced.

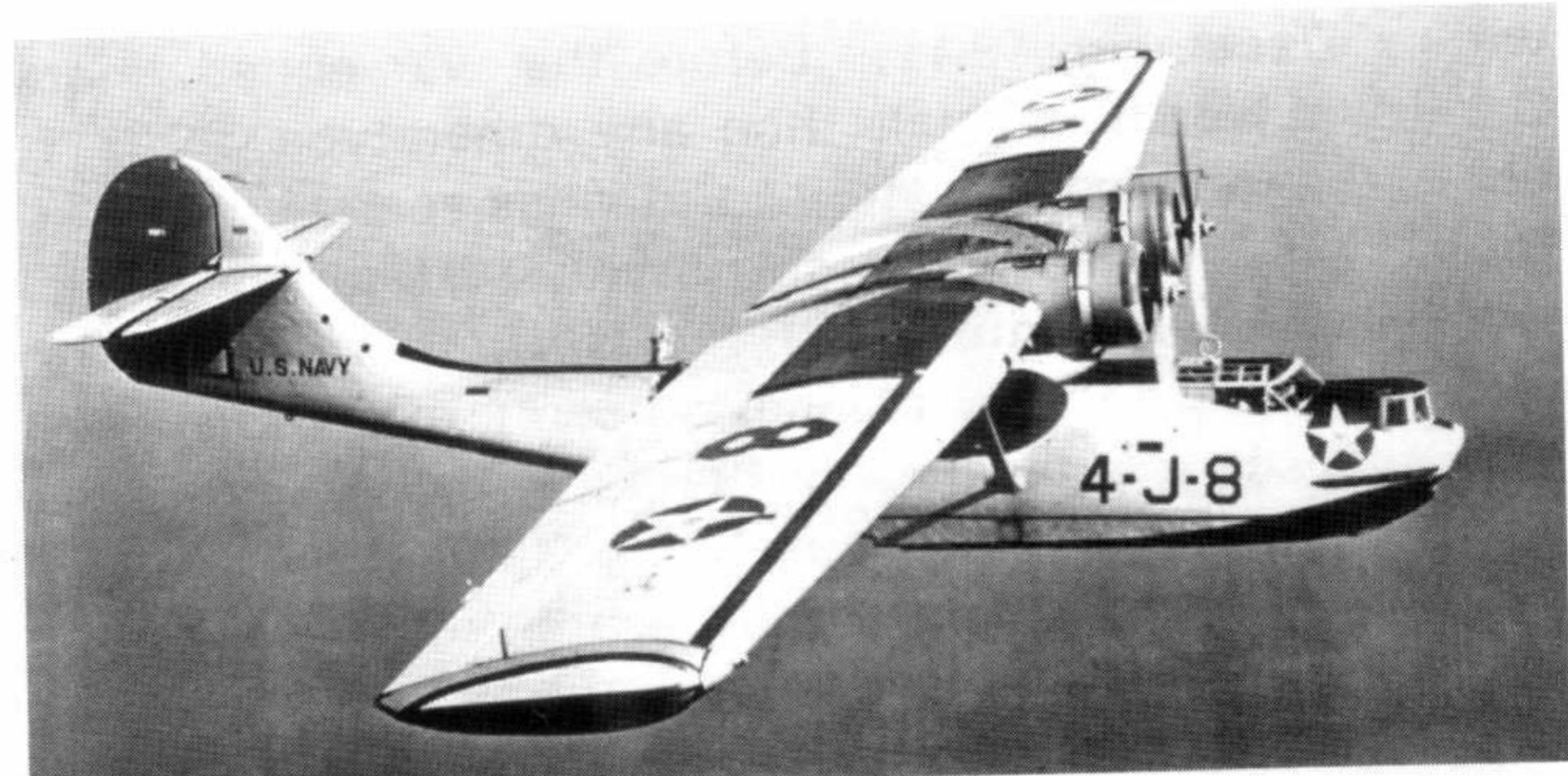
The XP3Y-1 first flew on March 21, 1935, and its performance exceeded the figures promised by Consolidated. Nevertheless, several refinements were made to the design, the most important of these being a redesigned rudder with a larger surface area.

After the change to the rudder had been made, the Navy flew the XP3Y-1 non-stop from NAS Norfolk to Coco Solo in the Panama Canal Zone. From there it flew 3281.4 statute miles to San Francisco Bay, thus establishing a new distance record for seaplanes.

The XP3Y-1 was also the first flying boat designed with an offensive capability to carry bombs and torpedoes under its wings. To reflect this added bombing capability, the Navy changed the designation of the aircraft to XPBY-1. The design of the rudder was changed once again, then the Model 28 was ready for operational service.

The first production version was the PBY-1, and sixty were ordered to be produced at Consolidated's new plant in San Diego, California. These were soon followed by an additional fifty PBY-2s.

One PBY-1 had been modified for commercial use after being ordered by Dr. Richard Archbold for an expedition to New Guinea. Named GUBA, this aircraft was instead turned over to the Russians to search for aviators who had become lost during an attempt to fly over the North Pole. Although the search was unsuccessful, the Russians were impressed with GUBA's performance, and in 1938 they purchased three Model 28-2 flying boats from Consolidated. One of these was completely assembled in the United States, but the other two were shipped to Russia as sub-assemblies. Final assembly was completed after these two aircraft arrived in the Soviet Union. The Soviets also obtained a license to build addi-



*The first production version was the PBY-1, and sixty were ordered by the Navy.*

*(National Archives)*



**Fifty PBY-2s followed the PBY-1s into service with the Navy. A color profile of this PBY-2 from VP-11 appears on page 33.**  
*(National Archives)*

tional examples at Taganrog, Russia. Designated GSTs, they were powered by Mikulin M-62 radial engines which were Wright R-1820s built under license in Russia. Official records of how many GSTs were built in Russia have never been released, but evidence indicates that the number was in the hundreds. The original GUBA continued to be used in World War II by the Russians, but it was destroyed on July 25, 1942, when a German submarine shelled it in the harbor at Novaya Zemlya Island.

Following the PBY-2, sixty-six PBY-3s and thirty-three PBY-4s were delivered to the Navy. This completed what is known as the early variants of the PBY. One of the PBY-4s was flown to England for evaluation by the British, and this would eventually lead to orders for hundreds of later versions of the flying boat as well as a few amphibians.

The French ordered thirty Model 28-5s (PBY-5s) from Consolidated, but when France surrendered to the Germans, these aircraft were delivered to England instead. It was the British that began the use of the name Catalina,

and these former French aircraft became known as Catalina Is. Further orders for Catalina Is were placed directly by the British, and a few of these were delivered to Australia and Canada. Orders for subsequent versions continued throughout the rest of the war, and more extensive information about the British Catalinas can be found on pages 76 and 77.

The PBY-5 was the first version to be ordered in large quantities, and the U. S. Navy followed the French and British orders with a contract for 200 PBY-5s in December 1939. Ninety more were ordered in September 1941 for use in the Neutrality Patrols that had begun in September 1939. The PBY-5 was essentially the same as the PBY-4, but it was the first production variant to feature the large blisters over the waist positions on each side of the aft fuselage. These blisters permitted much better observation and scanning by the waist gunners, and they also provided better fields of fire for the two .50-caliber machine guns.

The PBY-5A was the first amphibious version of the Catalina. With a retractable landing gear, the value of the amphibians was significantly improved beyond that of the flying boats. Both PBY-5s and PBY-5As were in service with the U. S. Navy when America entered World War II in December 1941, and they became operational



**Beaching gear has been attached to this PBY-5, and it is being towed from the water at NAS Salton Sea, California.**  
*(NMNA)*



**A large number of Catalinas were supplied to the British, Canadians, and other Commonwealth nations during World War II.**  
*(NMNA)*



*The first amphibious version of the Catalina was the PBY-5A. The retractable landing gear significantly increased the utility of the aircraft by allowing it to operate from the water or land with equal ease. (National Archives)*



*PBY-5Bs were flying boats comparable to Consolidated's PBY-5. A total of 225 were built by Boeing of Canada, and most served with the British as Catalina IBs. Sixty were delivered to the U. S. Navy. (National Archives)*

in ever increasing numbers throughout the rest of the war. In spite of the fact that more capable designs, like the PBM Mariner and PB2Y Coronado, were developed and entered service, the PBY Catalina remained the most important and significant flying boat and amphibian based on sheer numbers alone.

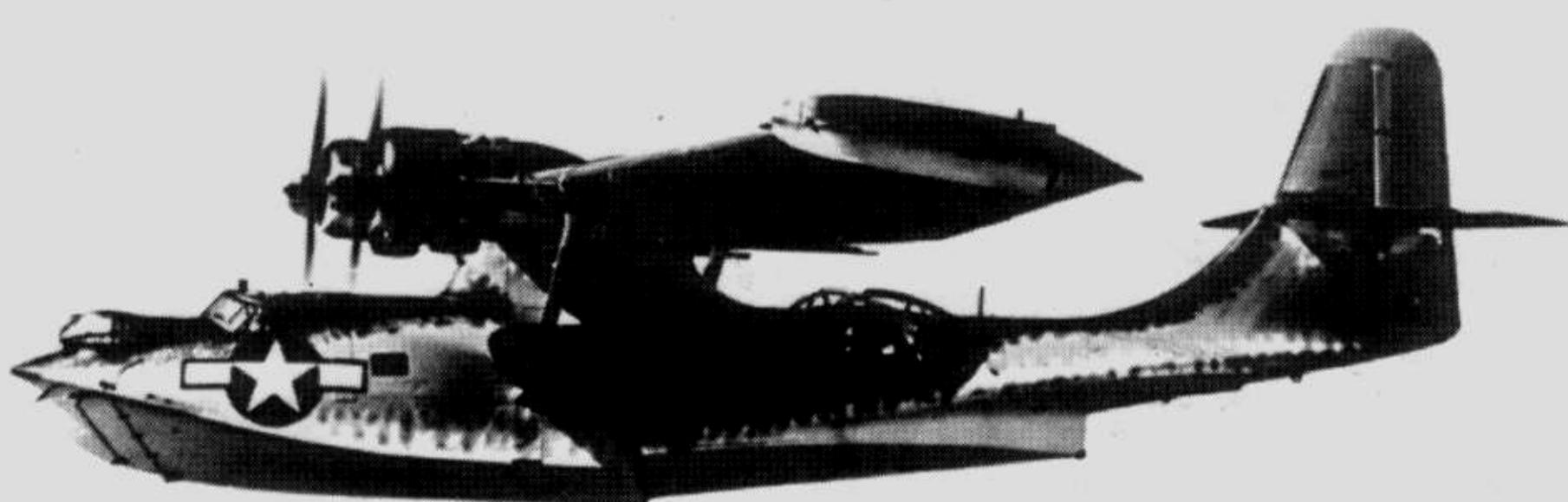
As the war intensified, more production lines were needed, and additional companies began building Catalinas. In Canada, Vickers began production of the aircraft as did Boeing of Canada. The Naval Aircraft Factory also opened a production line of a derivative known as the PBN-1 Nomad. The PBN-1 flying boat was longer than the standard PBY-5, and it had a redesigned bow, hull, tail section, and outrigger floats. A retractable bow turret replaced the standard turret used on all PBY variants up until that time. Of the 156 built, only 17 PBN-1s were delivered to the U. S. Navy, with the remainder going to the Soviet Union.

The final production version built by Consolidated was the PBY-6A amphibian. These were produced at the company's new plant at New Orleans, and the first flight by this variant was made in January 1945. These had the taller vertical tail found on the PBN-1 Nomad, but otherwise they were similar to the late production PBY-

5As.

In the days of high technology and spy satellites, the importance of a lumbering patrol bomber may be hard to understand. But in World War II, there were no spy satellites or high speed means of data transfer. The Navy had to depend on long range aircraft to search the vast expanses of oceans to locate the enemy fleet or spy on his activities. Information had to be radioed back to the home base or delivered in person when the aircraft returned. The flying boat was ideally suited for this role, because several of these aircraft, operating with a seaplane tender, could move to a harbor or even an unprepared lagoon almost anywhere and begin operations without having to wait for runways and other facilities to be built. In World War II, it was the Catalina that was used in this role far more often than any other flying boat. When the PBY-5A and PBY-6A amphibians entered service, their ability to operate effectively from the land and the sea increased their value even further.

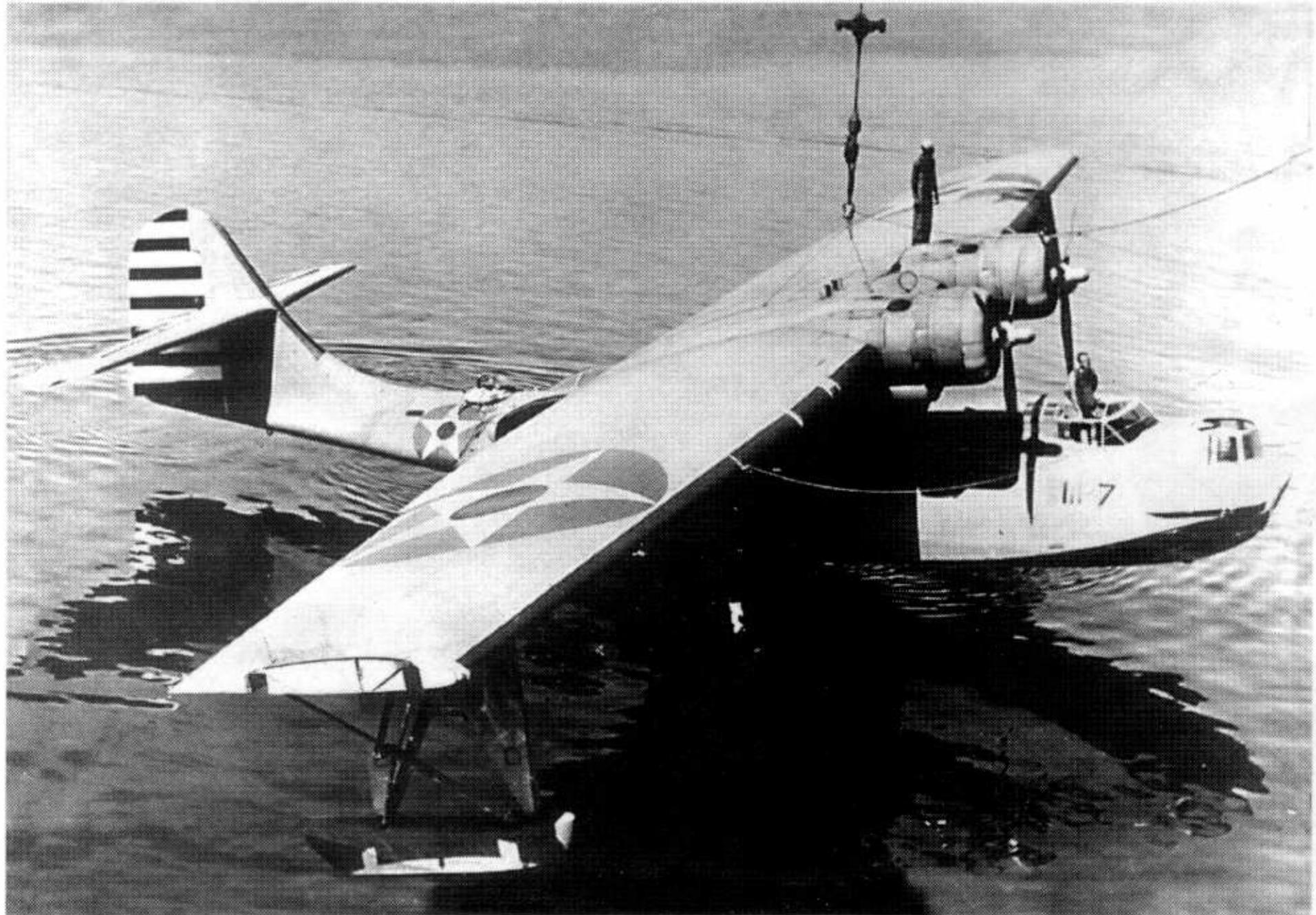
As the first flying boat able to deliver a significant load of offensive ordnance, the role of the Catalina was not limited merely to patrol duties. Most often they were armed with conventional and depth bombs with which they could attack enemy shipping that was spotted dur-



*The PBN-1 Nomad was a derivative of the Catalina that was built by the Naval Aircraft Factory. It had several different design features, and these are explained and illustrated on pages 69 through 71. (National Archives)*



*The final production version was the PBY-6A amphibian. This aircraft from NAS New York is painted in the post war overall Sea Blue scheme. A color profile of this Catalina appears on page 34. (National Archives)*



*A PBY-5 is hoisted aboard the seaplane tender USS TANGIER, AV-8. The photograph is dated March 8, 1942.* (National Archives)



*"Black Cats" prowled the Pacific at night, attacking the Japanese under the cover of darkness. This black PBY-5A was photographed on Palawan in 1945. (NMNA)*

ing patrol duties. But Catalinas were used on planned bombing missions as well, and the most famous examples were the Black Cats that attacked the Japanese at night throughout the islands of the Pacific. Flying long ranges under the cover of darkness, and often operating alone or in small numbers, the Black Cats literally hit the enemy while he was sleeping. But whether patrolling or flying bombing missions, Catalinas often left on long sorties, never to be heard from again. Not until Japanese records were studied after the war did the Navy learn the fate of many of the Catalinas that took off alone and in radio silence for their thankless but important missions against the enemy.

In the Atlantic, Catalinas from the United States, Canada, and Great Britain searched for and attacked German U-boats that were trying to sever the lifeline of convoys operating between America and England. Along with other aircraft types and escorting ships, they played an important role in breaking the back of the wolfpacks and thus winning the Battle of the Atlantic.

As the war continued, advances in airborne radar sets enhanced the capabilities of the patrol aircraft.

Various antennas sprouted from the wings and fuselage of Catalinas, and the associated radar sets permitted the aircraft to locate the enemy even at night or in inclement weather.

Patrolling, bombing, and anti-submarine warfare were not the only important missions flown by Catalinas during World War II. Equally vital to the crewmen of other aircraft downed at sea were the search and rescue missions. It was primarily for this purpose that the U. S. Army Air Forces acquired a large number of Catalinas which it designated OA-10s. Most of these were OA-10A amphibians built by Canadian Vickers, and these were comparable to the PBY-5A used by the U. S. Navy. Additional information on the OA-10, OA-10A, and OA-10B can be found on pages 74 and 75.

Catalinas also transported high ranking officers and other VIPs, and some were even specifically modified for this purpose with windows, additional seating, and other accommodations for their passengers. An example of this type of conversion was the PBY-5R. Some of these were modified from PBY-5s, while others were originally PBY-5As. Standard PBYs also delivered the mail, hauled



*A two-tone gray over white camouflage scheme was developed for U. S. Navy Catalinas that operated in the Atlantic. Here a PBY-5A flies past a blimp as the crews of both aircraft search for German U-boats in the North Atlantic. Note the exhaust covers on top of the engine nacelles. These were part of the wing deicing system. This particular PBY-5A also has the magnetic anomaly detector (MAD) boom on its tail, although it is difficult to see in this photograph, because most of it is covered by the raised outrigger float on the right wing tip. The Catalina was assigned to VPB-63 during 1944, and a color profile of this aircraft appears on page 33. (National Archives)*



*The U. S. Army Air Forces acquired over four hundred Catalinas which it designated OA-10s. During World War II, they were used by emergency rescue squadrons to retrieve downed airmen from the sea. Some, like this white OA-10A, were retained in the inventory after the war and continued to be used for search and rescue duties as well as other utility roles.*

(NMNA)

cargo, and evacuated wounded soldiers and sailors.

Following the war, Catalinas remained in service with both the Navy and U. S. Army Air Forces. Some OA-10As and OA-10Bs were still operational when the U. S. Air Force was formed in 1947. Other PBYs were assigned to the U. S. Coast Guard. These post-war Catalinas were primarily used for search and rescue duties, and life boats were sometimes carried under the wings. When men were spotted in the water, the life boats could be dropped to them, and this capability saved lives when the sea state was too rough for the Catalina to land. Surplus Catalinas were sold to at least twenty foreign nations where they were used for a wide variety of military and civilian roles.

As Catalinas were retired from military service, many continued to be flown in civil aviation. Some were acquired by small airlines, while others became water and chemical bombers used for fighting forest fires. A number were even purchased by private individuals like Jacques Cousteau. Over sixty years after the prototype first flew, several Catalinas are still flying, and others remain in storage and may yet fly again. Whether they do or not, they performed invaluable service and a wide variety of missions when they were needed the most. Although they did not receive the glamor or the headlines that the fighters and bombers did, it is difficult to overstate the importance of these versatile aircraft during World War II. Without them, military leaders and planners would have known far less about where the enemy was or what he was doing.



*Quite a few Catalinas still fly in the year 2000. This PBY-5A is flown by the Confederate Air Force, and it is a famous and well traveled aircraft. After service with both the U. S. Navy and the Coast Guard, it was sold to Trans Alaskan Airlines for \$2,600.00 in 1953. It then changed hands several times in 1954, finally becoming the property of Paraguay. In 1955, it was modified for civilian use with extra seats, windows, and a large rear cabin door. On October 5, 1955, it was flown to Buenos Aires, Argentina, where it landed on the River Platte, alongside the warship PARAGUAY, to pick up the former President of Argentina, Juan Peron, who had been deposed by a military coup. Peron had sought sanctuary on the warship, and he was rescued and flown to Paraguay to begin his exile from Argentina. The Catalina remained in service in Paraguay flying cargo, mail, and passengers until November 1979. It was then placed in storage until it was sold to Frank's Aircraft of Ft. Worth, Texas, in 1993. It changed owners several times before becoming part of the Confederate Air Force. Although it has been modified extensively from its original PBY-5A configuration, it is now a popular attraction at air shows.*

# THE PROGENITORS

## XPY-1



***The XPY-1 Admiral was the U. S. Navy's first monoplane flying boat. The wing was mounted on struts as were the outrigger floats. The empennage featured twin vertical tails.***  
*(NMNA)*

With a fabric covered wing mounted on struts high above the fuselage, an all metal hull, and twin vertical tails, the XPY-1 Admiral was the U. S. Navy's first monoplane flying boat. On February 28, 1928, Consolidated Aircraft Company placed a bid of \$150,000 to build the single XPY-1 prototype based on designs developed by the Naval Aircraft Factory, and they proceeded with the construction of the aircraft immediately after being awarded the contract by the Navy.

The XPY-1 was completed in December 1928, and it was shipped to NAS Anacostia, Maryland, for flight tests. The first flight took place on January 10, 1929, with Navy Lieutenant A. W. Gordon at the controls. Flying with Gordon was Isaac Maclin "Mac" Landon, the aircraft's designer.

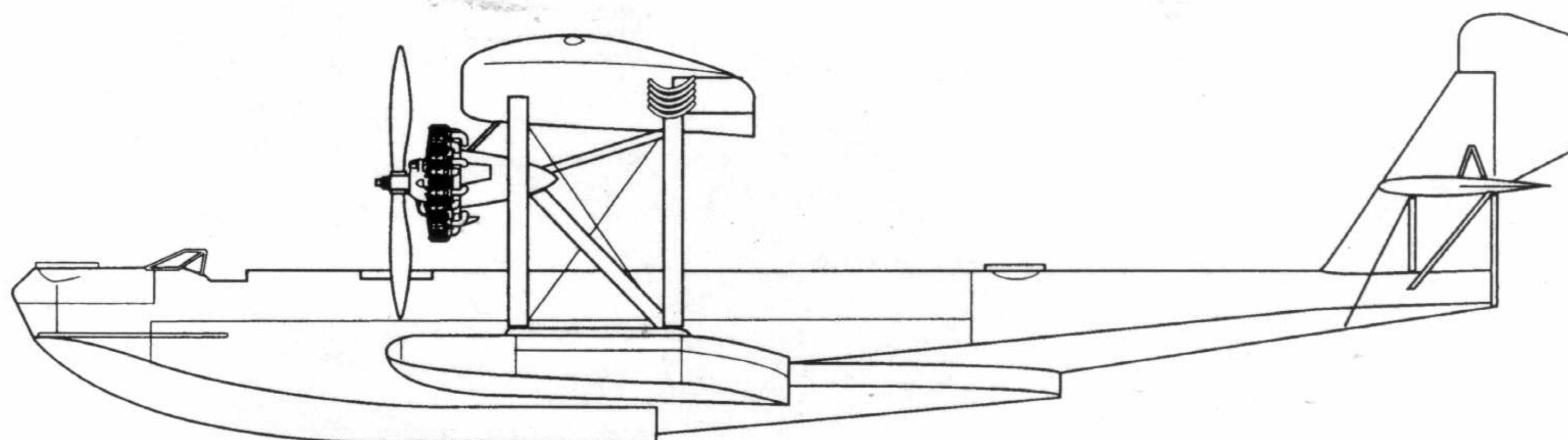
It might be expected that the Navy would have then awarded Consolidated a contract to build production examples, but because the XPY-1 was not an original Consolidated design, they made an open request for bids for the production versions. Consolidated figured its developmental costs associated with the XPY-1 into its bid, but the Glen L. Martin Company had no such costs

to recoup. As a result, Martin submitted a lower bid and was awarded the contract. Unable to build production PY-1s for the Navy, Consolidated produced a commercial version of the XPY-1 named the Commodore. It was used to fly passengers between New York, the Caribbean, and South America by a fledgling airline that later became Pan American Airways.

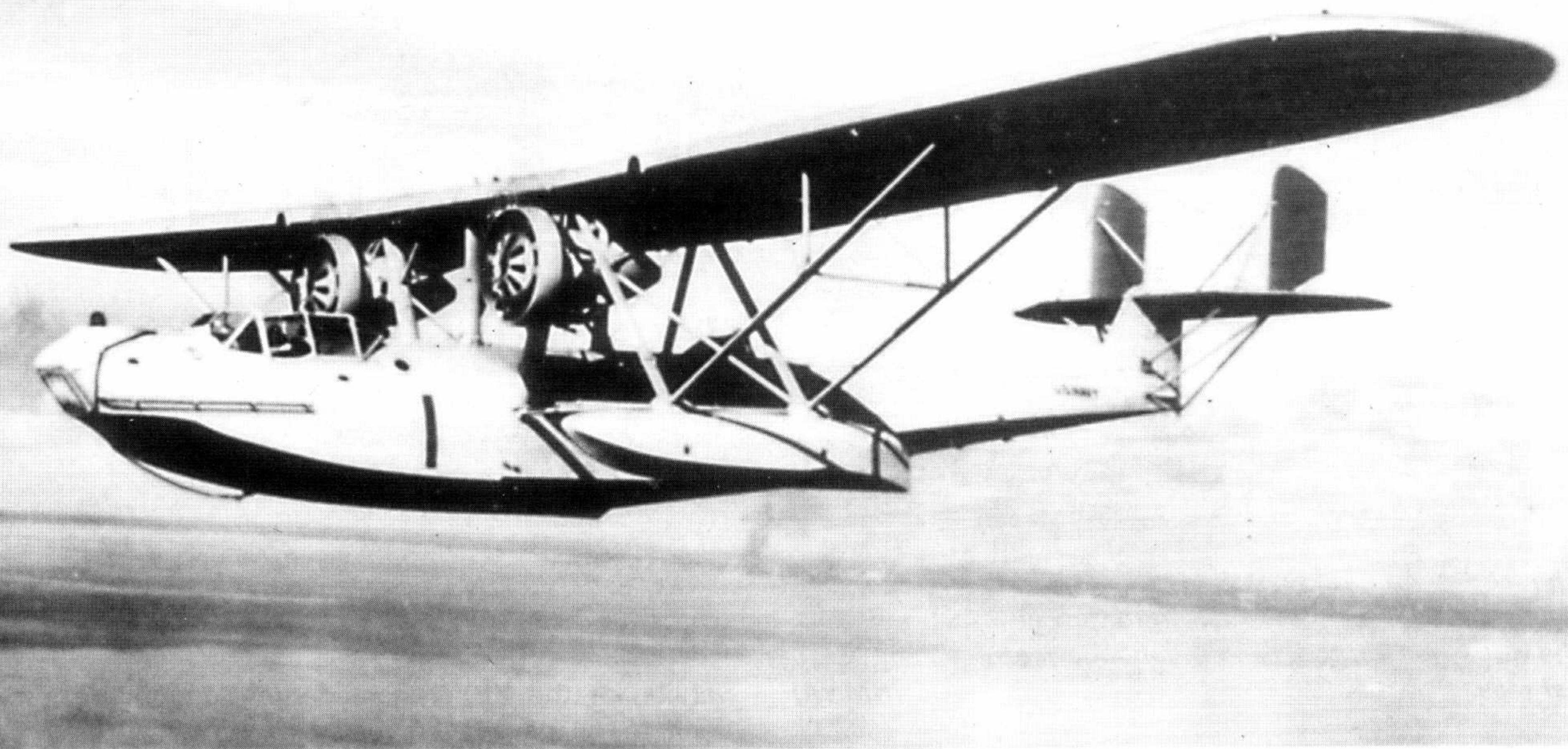
Included in the Navy's contract to Martin was another prototype that had the same 100-foot wing used on the XPY-1, but it was located closer to the fuselage. This prototype was designated the XP2M-1, and it was flown with a third engine above the wing. Tests proved that the standard twin engine arrangement was more satisfactory, so the third powerplant was deleted, and the designation was changed to XP2M-2. Two Wright R-1820-64 engines were enclosed in nacelles mounted on the leading edge of the wing rather than hanging below it as on the XPY-1.

In spite of the design changes and the different engine used on the XP2M-2, the production aircraft built by Martin consisted of only nine flying boats that were all very similar to Consolidated's XPY-1. These included three P3M-1s and six P3M-2s. Like the XPY-1, the P3M-1s were powered by two 450-horsepower Pratt & Whitney R-1340-38 engines mounted under the wing, but the P3M-2s were fitted with R-1690-32 powerplants, each producing 525 horsepower. These nine aircraft were used operationally for a very short period of time and were then relegated to training and utility duties.

### XPY-1 1/144th SCALE DRAWING



# P2Y



**The XP2Y-1 shared many features with the XPY-1. These included the twin vertical tails, the high wing mounted on struts, and the outrigger floats. However, unlike the XPY-1, the cockpit was covered with a framed greenhouse canopy.**

(NMNA)

Although disappointed that they did not receive the contract to build production examples of the XPY-1, the designers and engineers at Consolidated began work on a new flying boat that the Navy designated the XP2Y-1. On May 26, 1931, Consolidated was awarded a contract to build a single prototype of the new design. A second contract for twenty-three production P2Y-1s was issued a few weeks later on July 7.

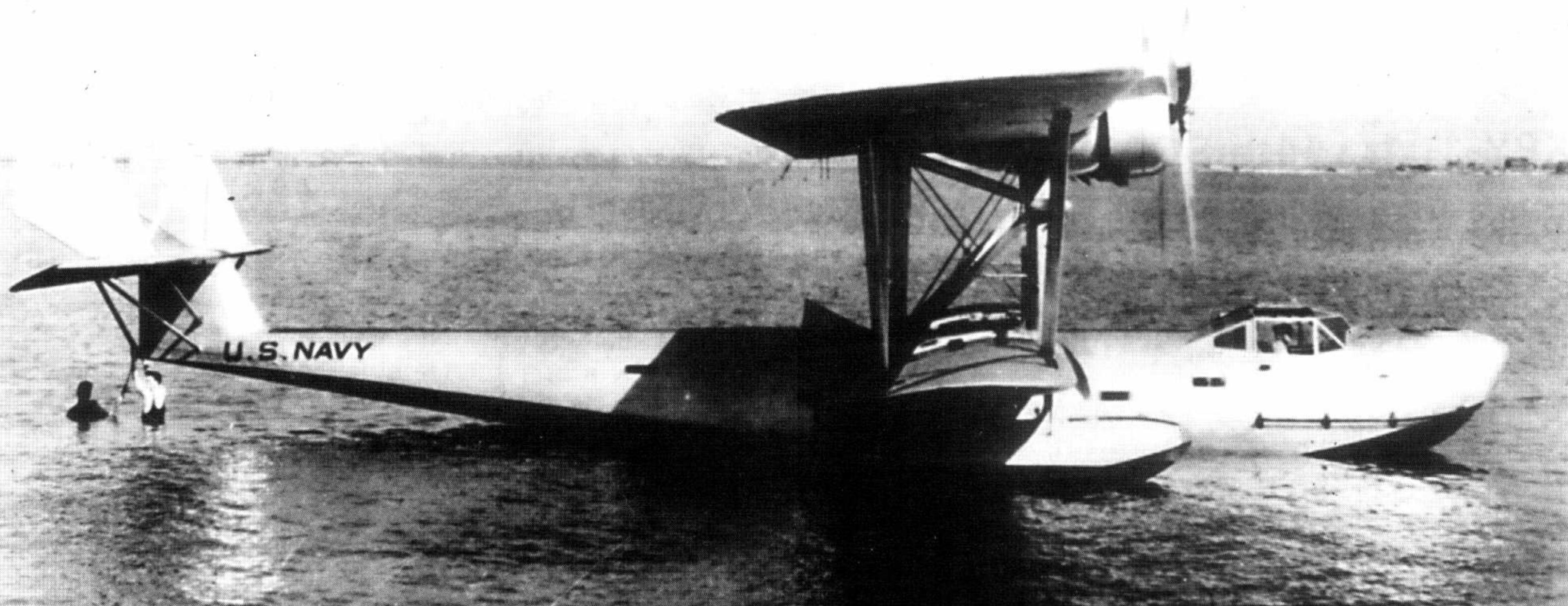
Although generally similar to the XPY-1, the XP2Y-1 had an enclosed cockpit. The outrigger floats were on

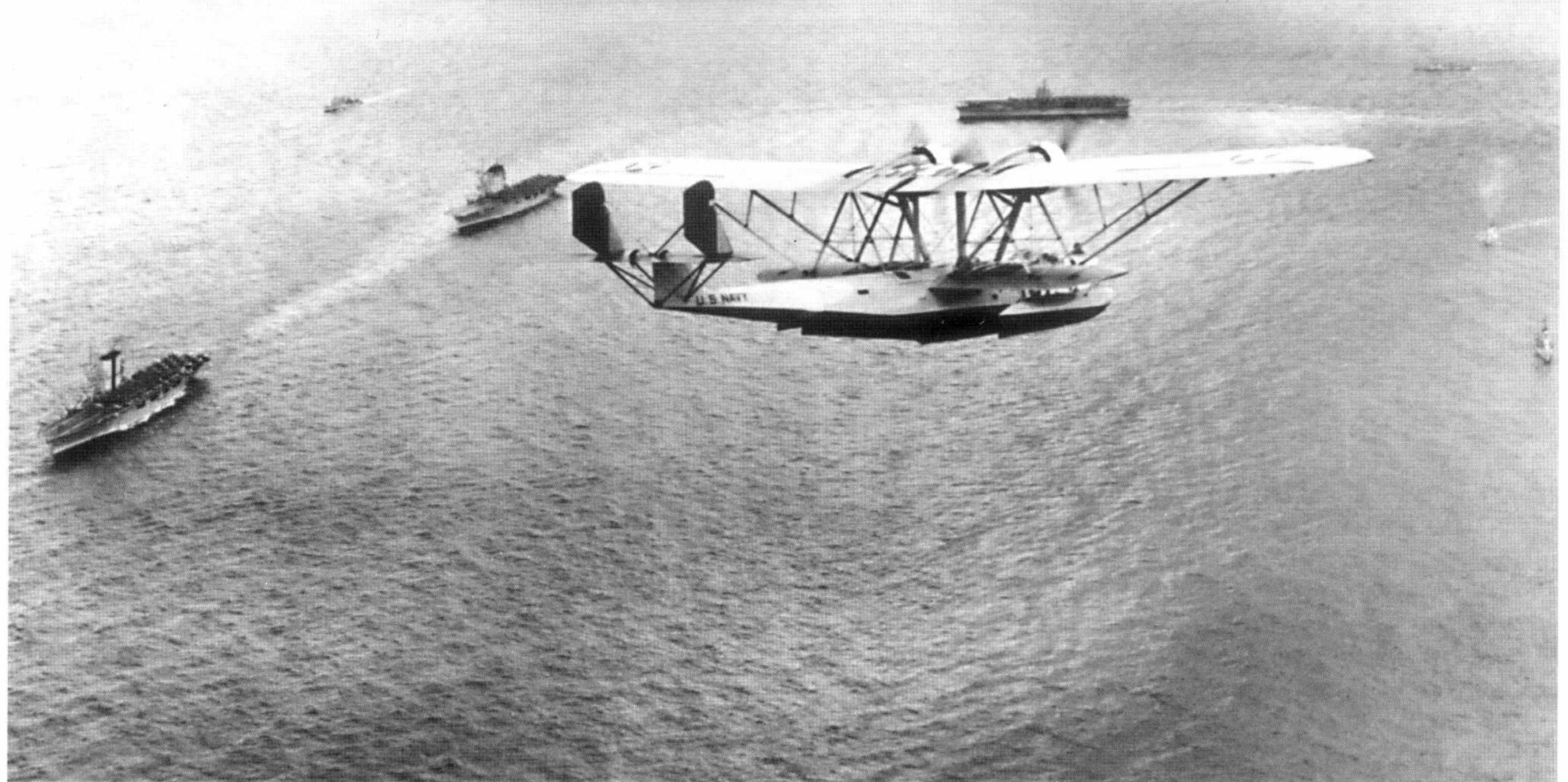
long V-shaped strut assemblies, and the Wright Cyclone R-1820-E engines, each producing 575 horsepower, were suspended under the wings. The first flight was made on March 26, 1932. Initially, the XP2Y-1 was flown with a third engine mounted above its wing, but this was later deleted.

Production P2Y-1s served with VP-10F and VP-5F, and one was used as the prototype XP2Y-2 with Wright R-1820-88 powerplants. Instead of being slung beneath the wings as on the P2Y-1, these engines were mounted

**One production P2Y-1 was modified to the XP2Y-2, and it had several design refinements. The engines were moved from below the wing to a position on its leading edge. The outrigger floats were mounted under a smaller lower wing instead of on struts.**

(NMNA)





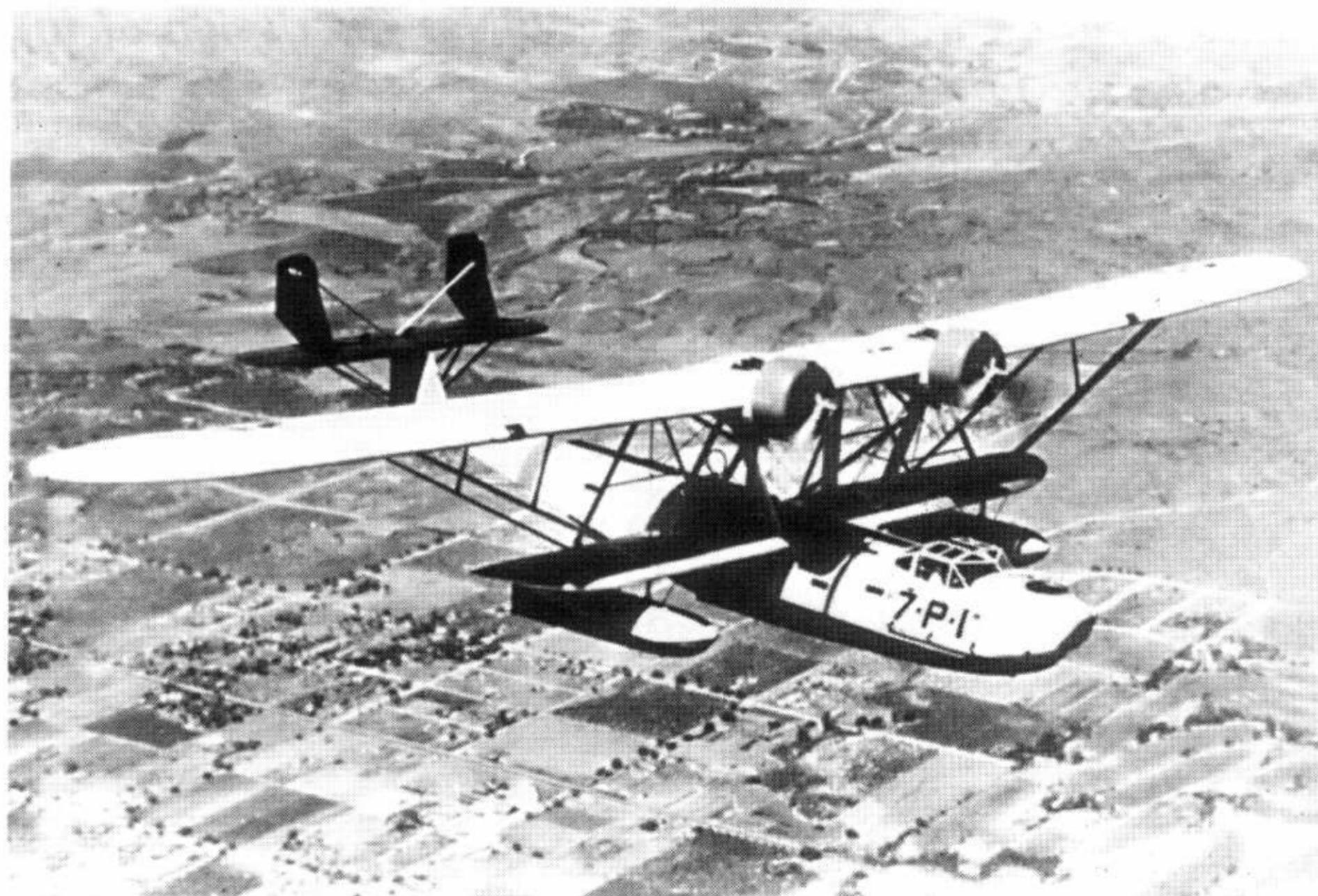
**A P2Y-3 flies over the aircraft carriers USS LEXINGTON, CV-2, USS SARATOGA, CV-3, and USS RANGER, CV-4, during exercises in April 1938. By the time the United States entered World War II, all P2Y-3s had been assigned to training duties.**

(National Archives)

on the leading edge of the wing. This installation was not only stronger, but it also produced less drag. The outrigger floats were attached beneath a small lower wing that was mounted low on the sides of the fuselage, and this design change also produced less drag than the long V-shaped strut assemblies used with the floats on the P2Y-1. Almost all existing P2Y-1s were subsequently

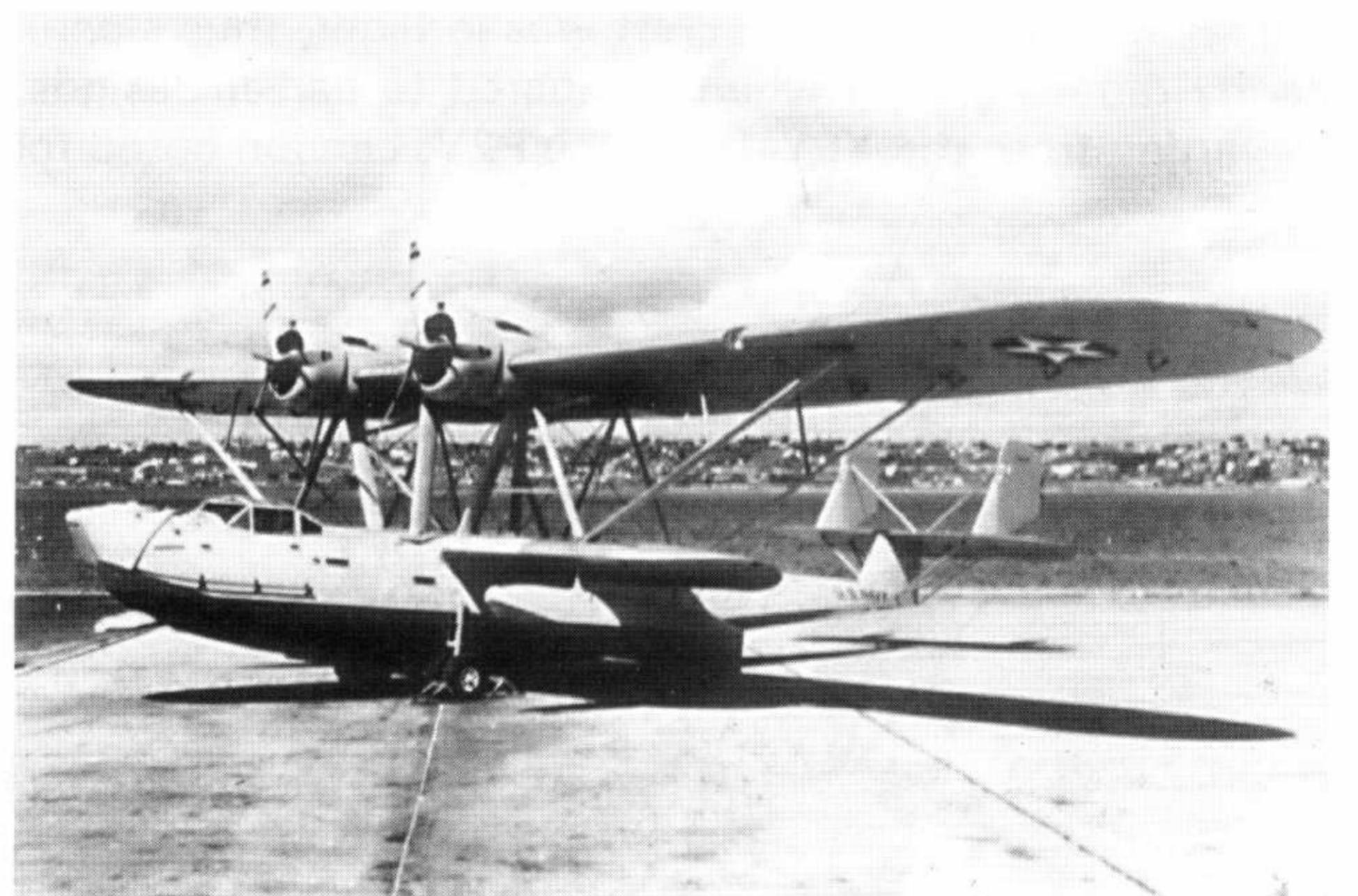
upgraded to these standards and redesignated P2Y-2s.

The Navy then ordered twenty-three production P2Y-3s on December 27, 1933. These were similar to the XP2Y-2, except that the R-1820-90 version of the Wright engine was used. Each of these produced 750 horsepower, and this was a significant increase over the R-1820-E used in the P2Y-1. P2Y-3s entered service in 1935, but by the end of 1941, all remaining P2Ys had been assigned to NAS Pensacola for training. Although its operational service was relatively short lived, the P2Y is considered to be the first "modern" patrol plane used by the U. S. Navy, and it set several records for range and endurance before being replaced with the PBY Catalina.



**This P2Y-3 was the commander's aircraft for Patrol Squadron Seven. The R-1820-90 engines, mounted on the leading edge of the wing, and the small lower wings with their outrigger floats are visible.**

(NMNA)



**A P2Y-3 was photographed on its beaching gear on March 28, 1935. Like the PBY that followed, the P2Y-3 had a bow turret in the nose section just forward of the cockpit.**

(NMNA)

# THE PROTOTYPE XP3Y-1 & XPBY-1



*The prototype for the PBY series of flying boats and amphibians was originally designated the XP3Y-1. It featured the retractable outrigger floats that remained a standard feature on all production versions of the PBY.*

*(National Archives)*

In 1932, the Navy announced a design competition for a new flying boat that would have a range of 3,000 miles, a cruising speed of 100 miles-per-hour, and a gross weight of 25,000 pounds. Also included was the requirement for the aircraft to carry offensive weapons including bombs and torpedoes. In response to this competition, Consolidated and Douglas submitted proposals. A single prototype of Consolidated's Model 28 was ordered on October 28, 1933. It was given the Navy's XP3Y-1 designation, and the Bureau Number 9459 was assigned. A prototype of the Douglas design, designated the XP3D-1, was also ordered, but it was more expensive and generally considered inferior to the XP3Y-1.

Designed by Isaac M. Landon, the XP3Y-1 had a cleaner metal covered wing with only two struts on each side. The stabilizing outrigger floats retracted to become the wing tips when the aircraft was in flight, thus significantly reducing drag when compared to earlier designs. Departing from the XPY-1 and the P2Y, Landon opted for

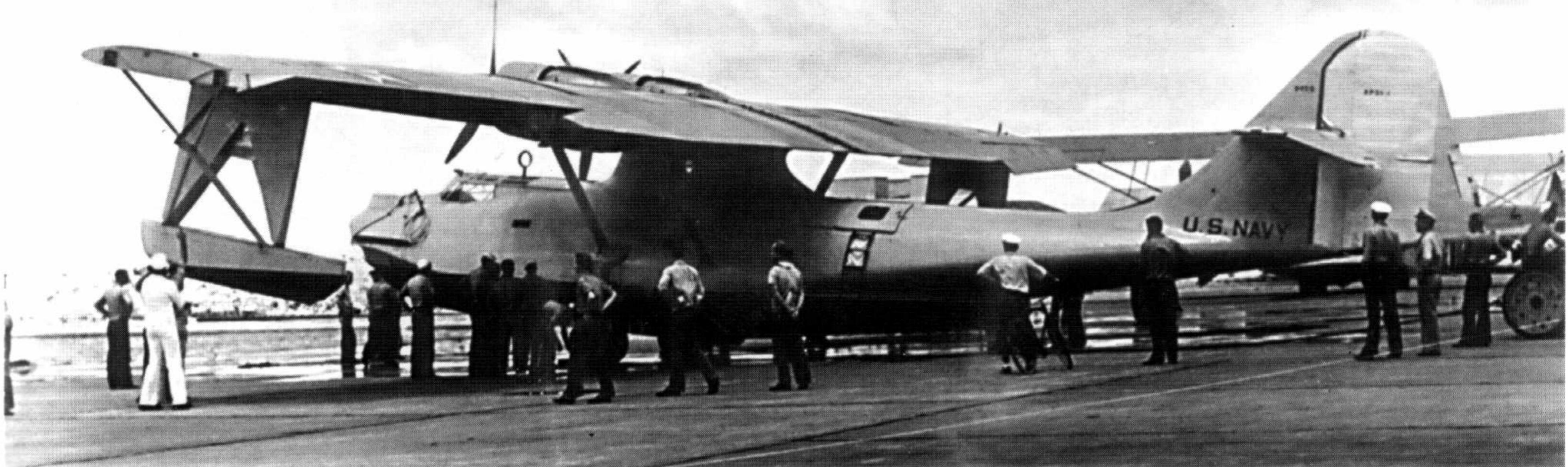
a single vertical tail. Two Pratt & Whitney R-1830-58 engines, each capable of producing 825 horsepower, were selected to power the XP3Y-1, and they were fitted with Hamilton Standard constant speed propellers.

Construction on the XP3Y-1 began in late 1933 and continued into early 1935. The first flight took place at NAS Norfolk, Virginia, on March 28, 1935, and it was flown by Consolidated's test pilot, William B. Wheatley. The aircraft was then delivered to the Navy where flight testing revealed directional stability problems, so the rudder was redesigned. Other changes were also made, and these included modifications to the bow turret, redesigned engine nacelles, and the addition of a tunnel gun in the aft fuselage beneath the tail.

With the changes made, the flight tests revealed that the performance of the aircraft exceeded Consolidated's guarantees in all respects. In October 1935, the XP3Y-1 was flown from NAS Norfolk, Virginia, to Coco Solo in the Panama Canal Zone, then to San Francisco, California. The record breaking flight from Coco Solo to San

*All of the major design features of the PBY series were established on the prototype, however the design of the tail section underwent several changes as subsequent production versions were developed. (National Archives)*





*The XP3Y-1 is shown here with the second of three rudder designs that were tried on this aircraft. Note the sliding hatches for the waist guns. The XP3Y-1 was later redesignated the XPBY-1 to reflect the aircraft's capability as a bomber as well as a patrol aircraft. From the beginning, the flying boat was designed with the capability to carry offensive weapons as well as its defensive armament.*

*(National Archives)*

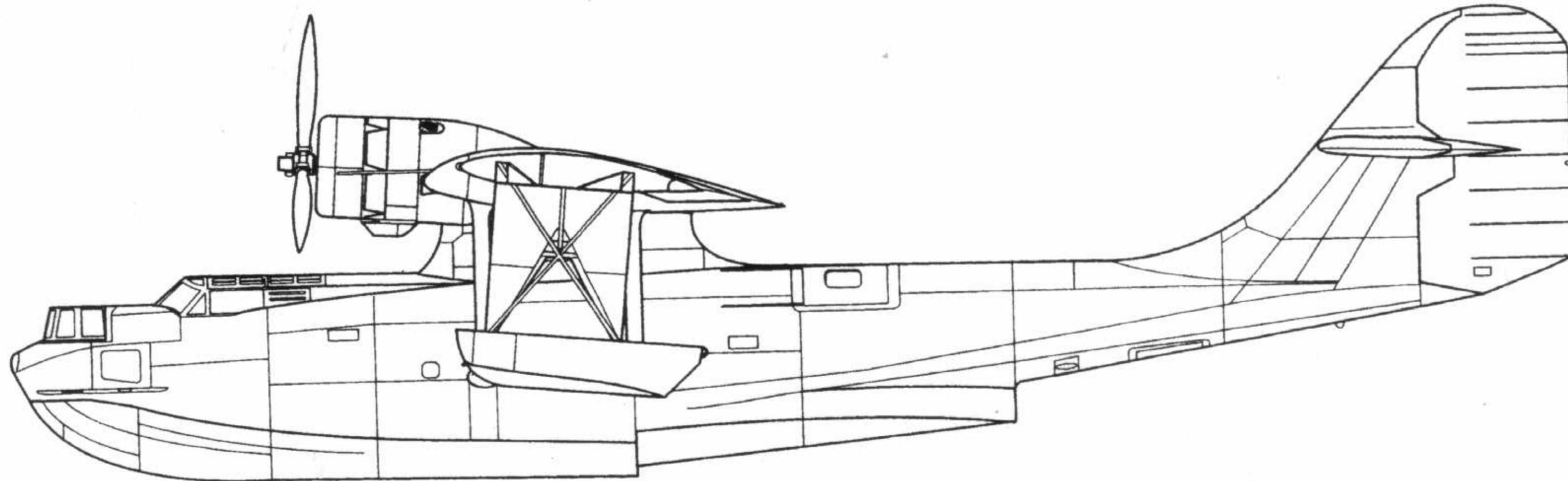
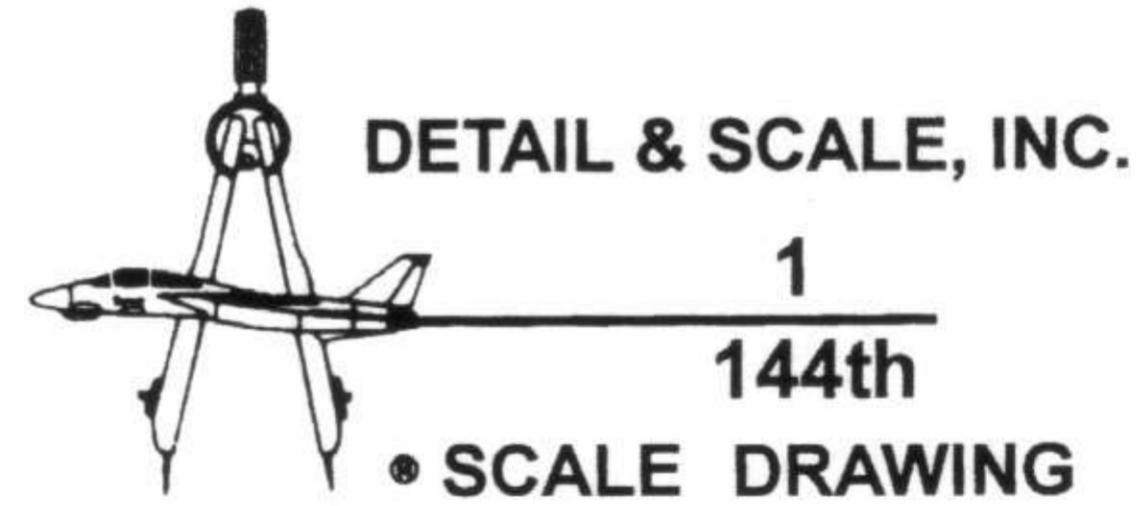
Francisco demonstrated the exceptional range and endurance of the flying boat.

Problems still persisted with the vertical tail, and the rudder sometimes dug into the water as the aircraft rotated for takeoff. The rudder was redesigned a second time, and the hull was extended below it to prevent this

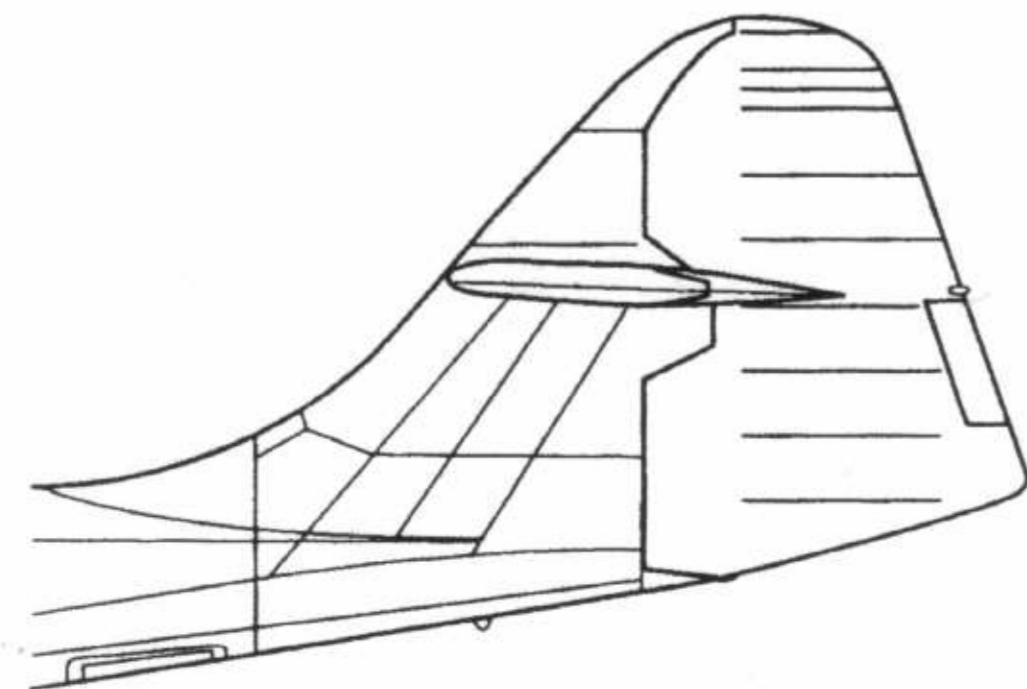
problem. This third configuration for the rudder was continued on the production PBY-1s that followed.

The XP3Y-1 was redesignated the XPBY-1 to reflect its bombing capability, and it was fitted with Pratt & Whitney R-1830-64 engines rated at 850 horsepower. It first flew under the new designation on May 19, 1936. Within the Navy's designation system, the X stood for experimental prototype, the P for patrol, the B for bomber, and Y was the letter designator for Consolidated. The -1 indicated that it was the first version of this particular design. In its final configuration, the XPBY-1 had a top speed of 184 miles-per-hour, a ceiling of 24,000 feet, and a gross weight of 20,225 pounds.

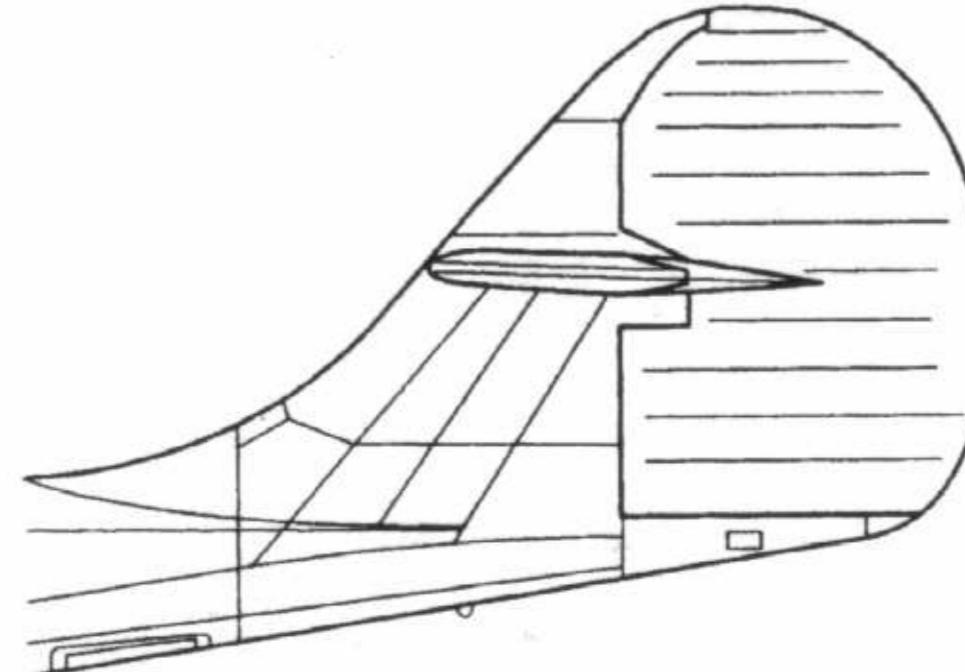
## XP3Y-1 1/144th SCALE DRAWING



FIRST  
RUDDER  
DESIGN

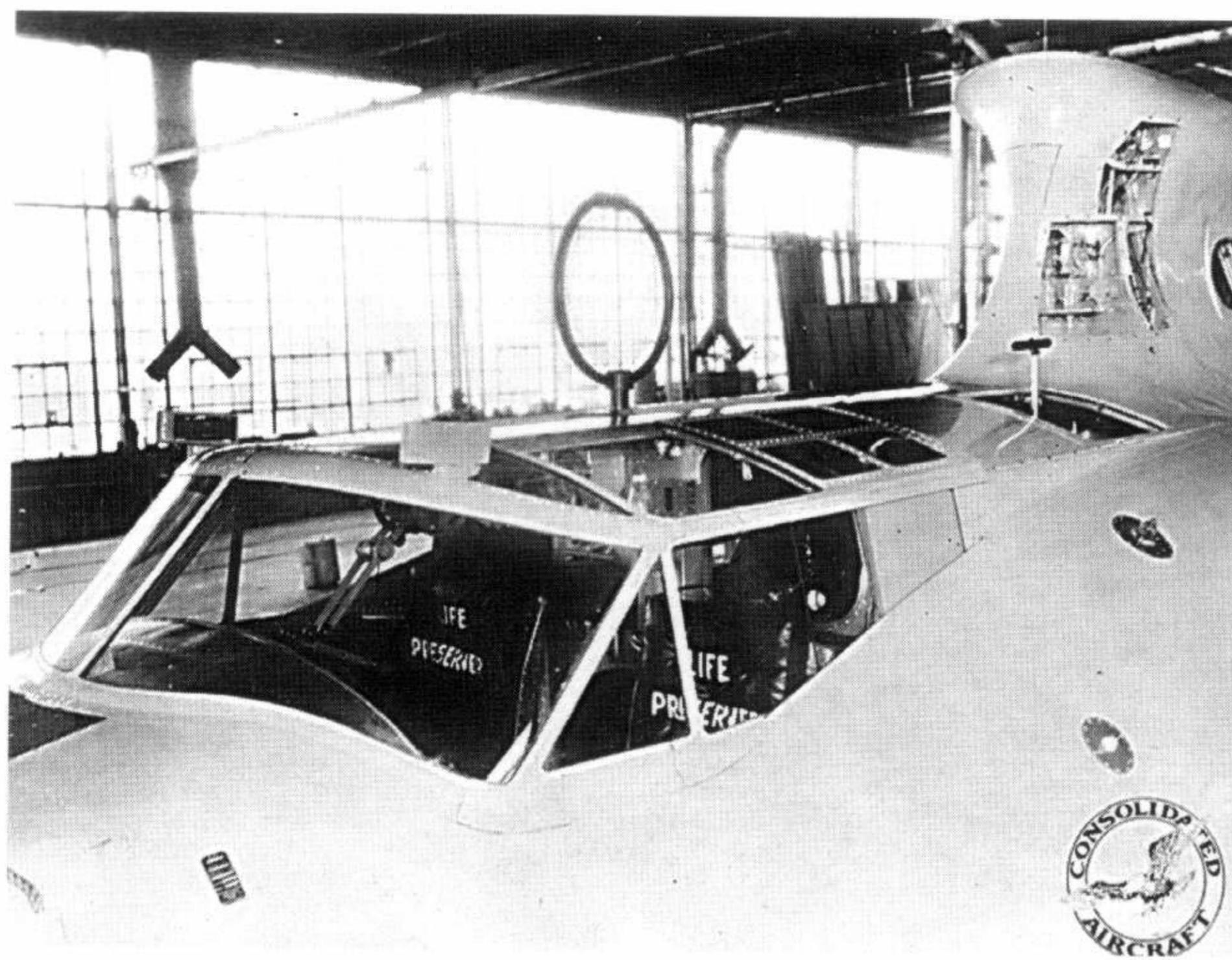


SECOND  
RUDDER  
DESIGN



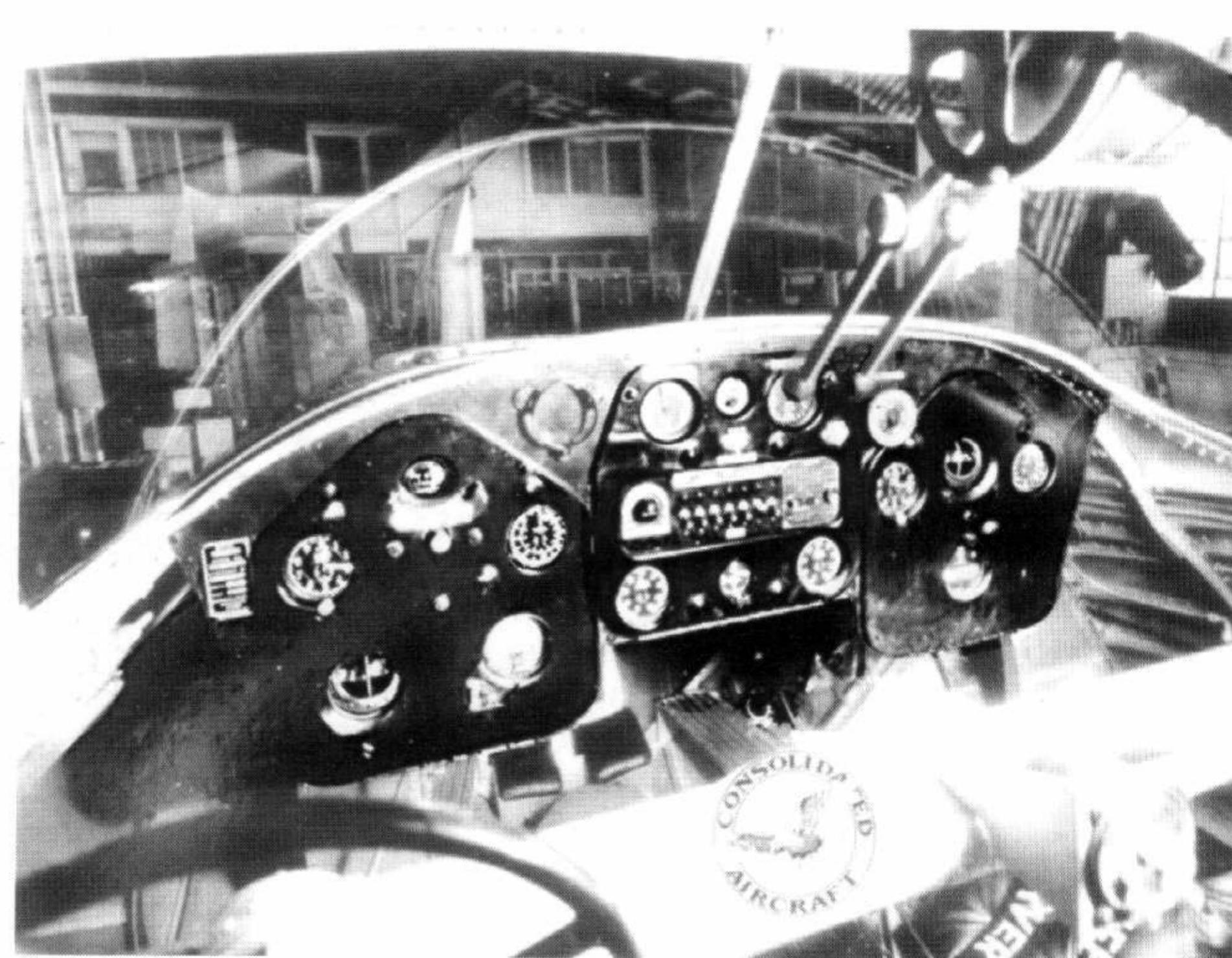
THIRD  
RUDDER  
DESIGN

# XP3Y-1 DETAILS



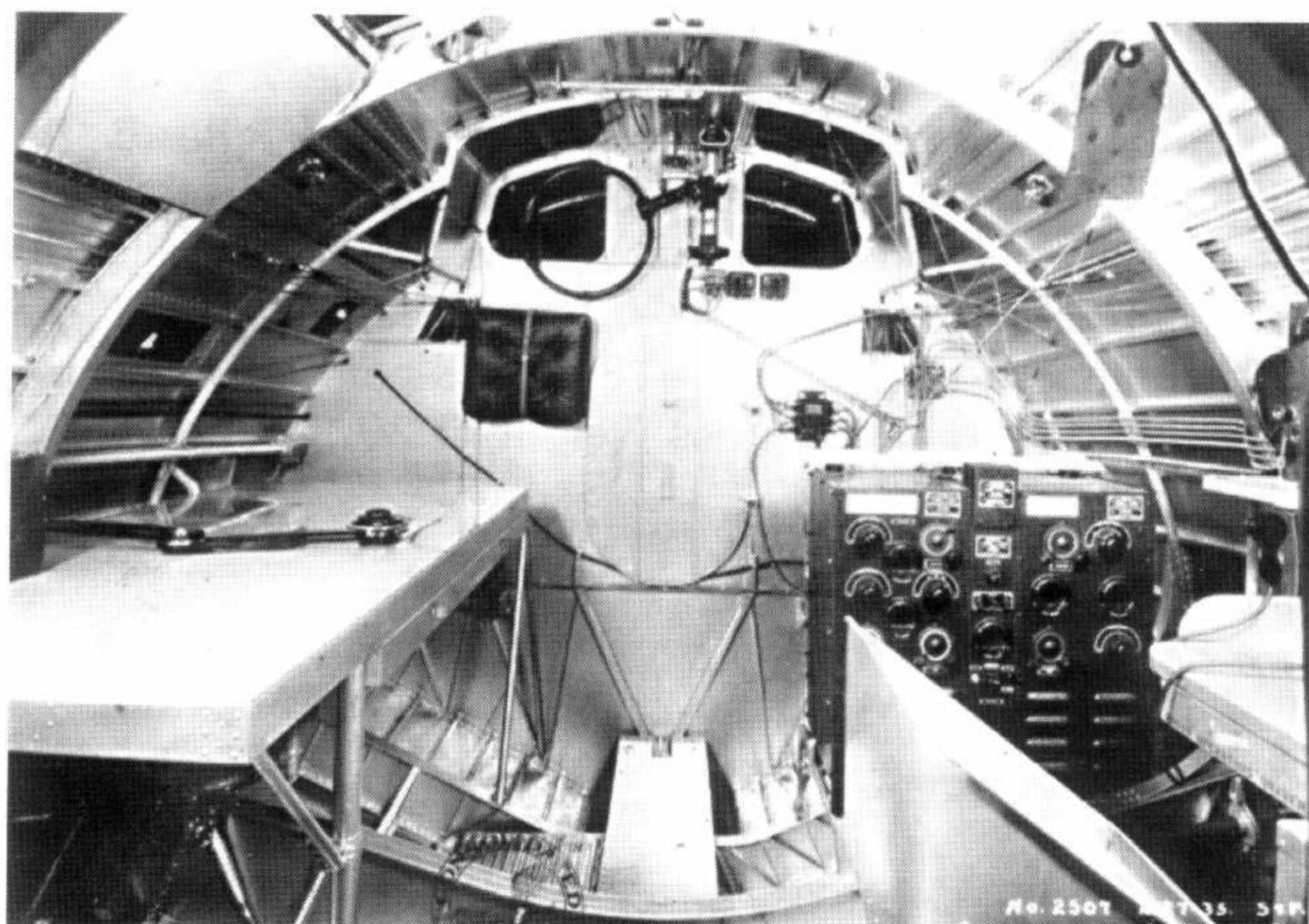
**Details of the cockpit enclosure on the XP3Y-1 included a loop antenna mounted on top of the structure. When not in use, the antenna could be removed and stored inside the aircraft.**

(National Archives)



**The instrument panel in the XP3Y-1 was very different from those found in the later production versions. However, a similar feature was the large yoke assembly with the dual control wheels.**

(National Archives)



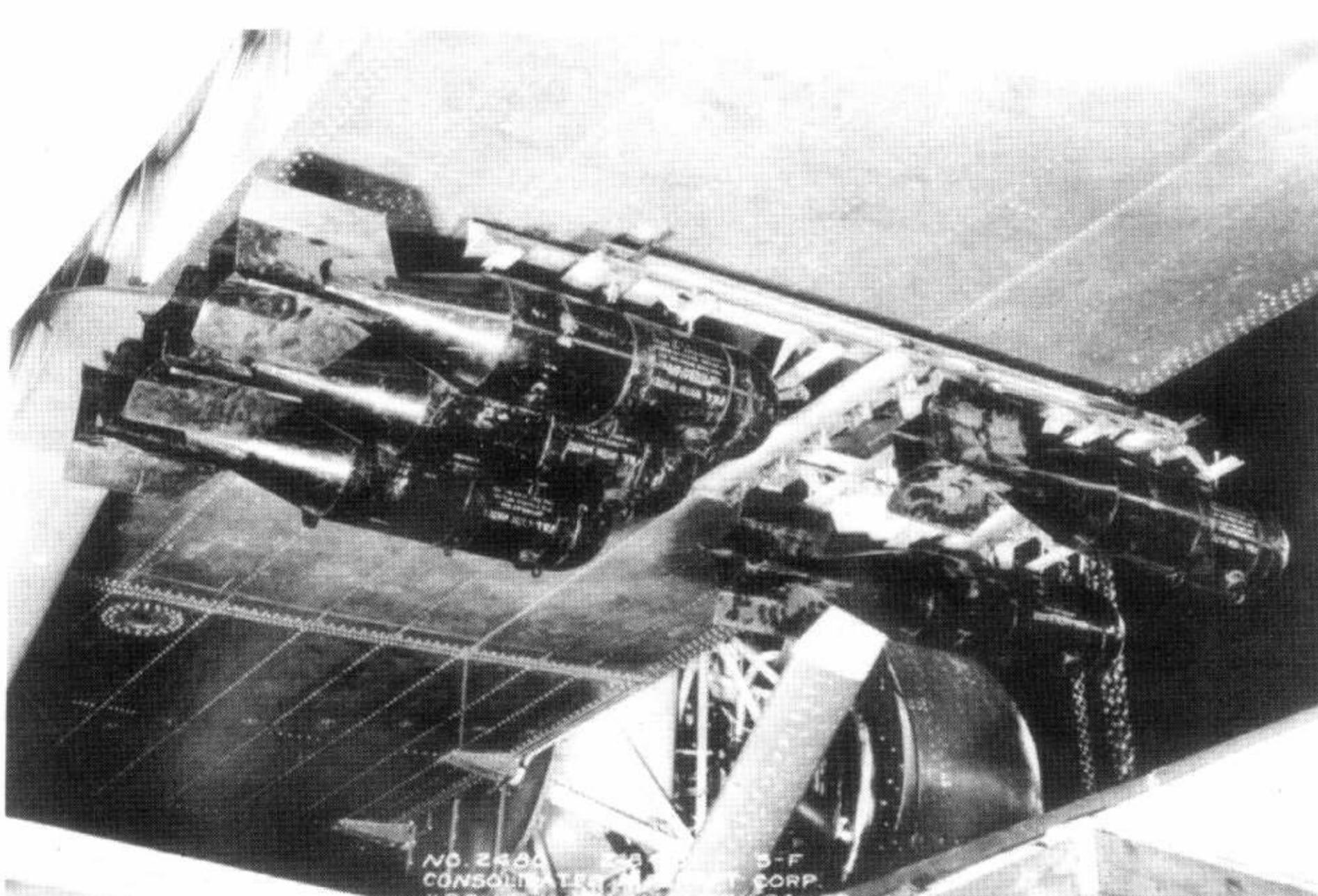
**The compartment just aft of the cockpit was shared by the radio operator and the navigator, just as it would be on all production variants. Note the loop antenna stored at the top of the bulkhead.**

(National Archives)



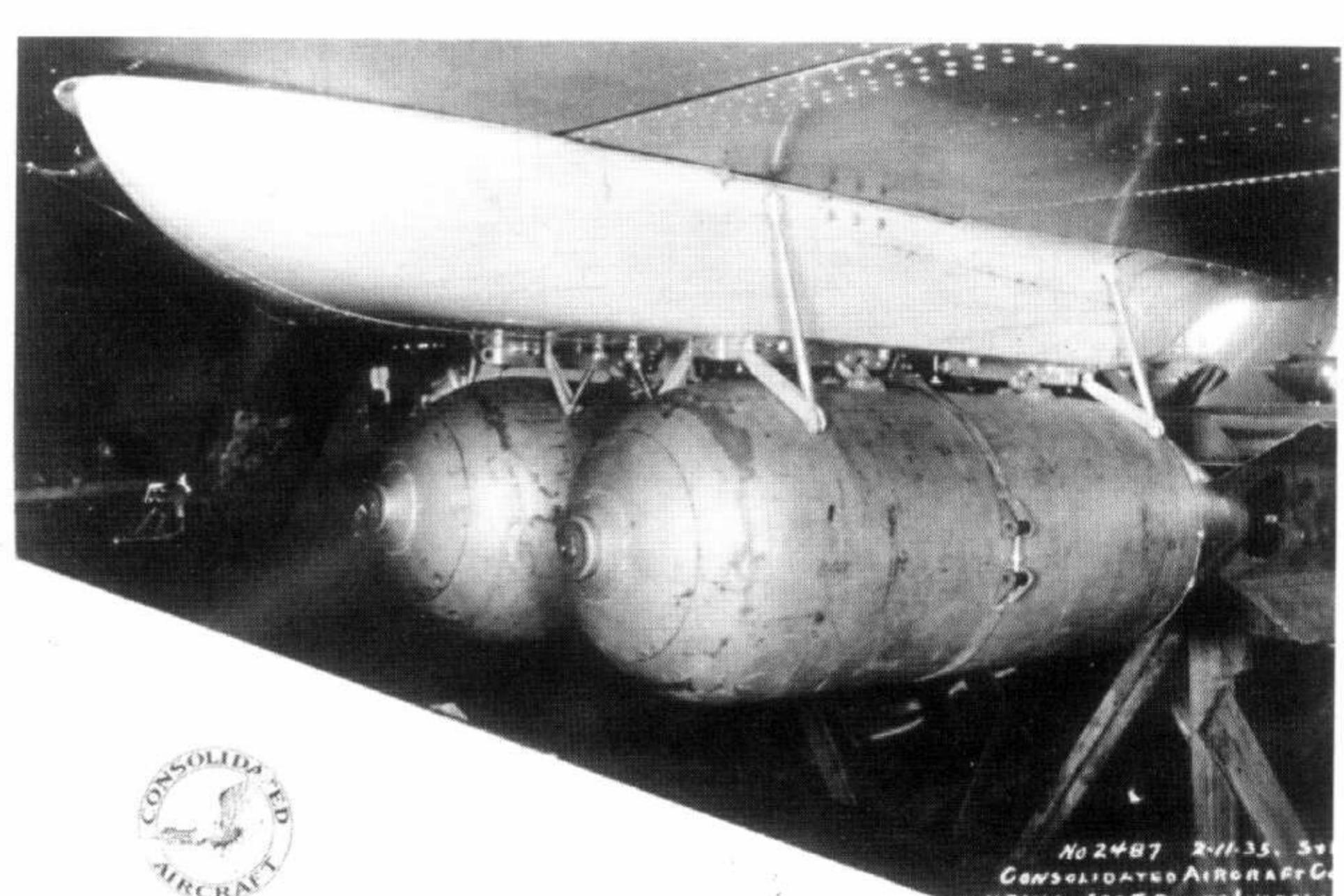
**Initially, Pratt & Whitney XR-1830-58 twin wasp engines powered the XP3Y-1. They were capable of producing 825 horsepower each and were fitted with Hamilton Standard constant speed propellers.**

(National Archives)



**Bomb racks could be mounted under the wings just outboard of the struts. Here, 100-pound bombs are in place under the right wing.**

(National Archives)

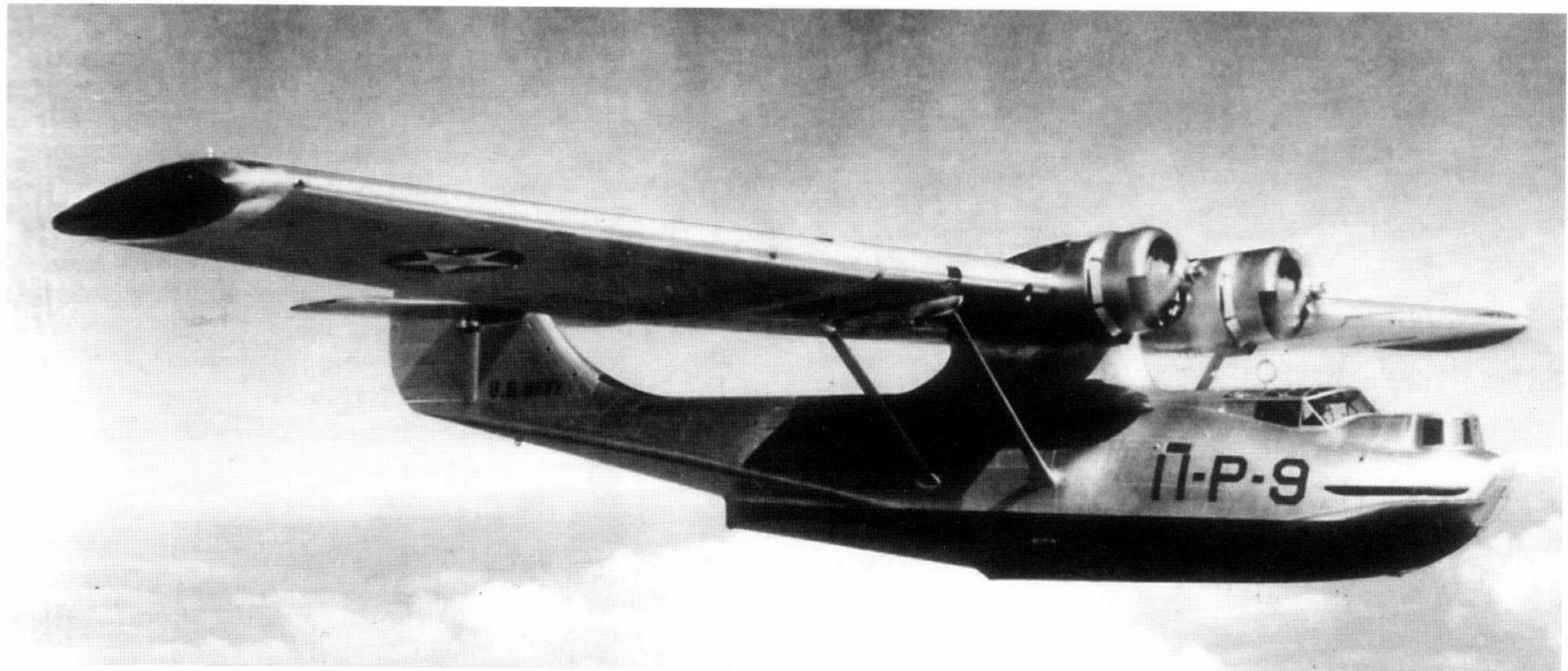


**This streamlined rack was designed to carry two 500-pound bombs, and one of these racks could be installed under each wing.**

(National Archives)

# PRODUCTION VARIANTS

## PBY-1



*The first production variant was the PBY-1. Sixty were ordered in June 1935, and the first was delivered in September 1936. VP-11 was the first squadron to receive the new flying boat.*

(NMNA)

Based on the success of early flight testing with the XP3Y-1/XPBY-1 in April and May 1935, the Navy placed an order for sixty PBY-1 flying boats on June 29 of that year. These were assigned the Bureau numbers 0102 through 0161, and they had a price tag of \$90,000 each. The first delivery was made in September 1936, and the Navy accepted the first PBY-1 on October 5. The first aircraft were assigned to VP-11 at NAS San Diego, and these were followed by deliveries to VP-6F which took its flying boats to Hawaii.

Production PBY-1s were almost identical to the final configuration of the XPBY-1, and they were powered by the same R-1830-64 engines rated at 850 horsepower. Defensive armament consisted of a .30-caliber machine

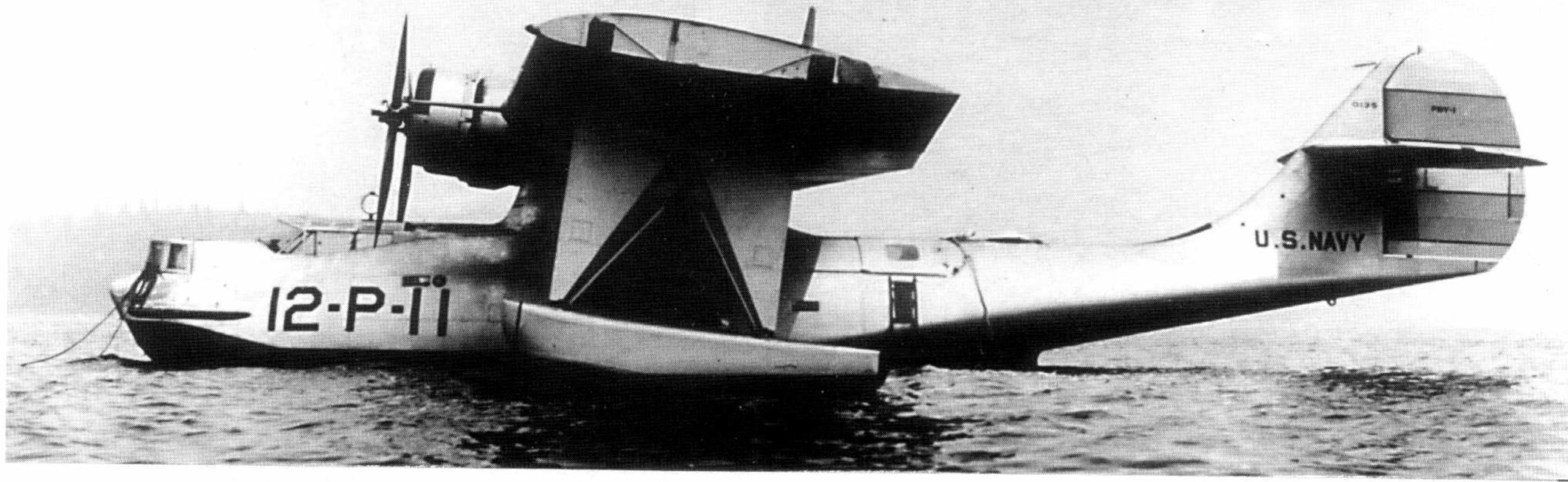
gun in a bow turret, and a .30-caliber weapon in the tunnel position in the tail. Initially, a .30-caliber machine gun was installed in each waist position, but these were soon replaced with .50-caliber weapons. Offensively, the PBY-1 could carry a 2,000-pound torpedo under each wing, or a combination of bombs could be loaded instead. Bombs ranging in size up to the 1,000-pound class were certified for use on the aircraft, and these included depth bombs which were effective against submarines.

Top speed of the PBY-1 was 183 miles-per-hour, and the service ceiling was 23,600 feet. It could take off at a gross weight of 20,671 pounds.

*Beaching gear was designed for handling the PBYs on land. It remained unchanged for all subsequent versions of the PBY, and it could even be used on the amphibians. This PBY-1 is from VP-6. Note how the bottom of the hull has been painted black.*

(National Archives)





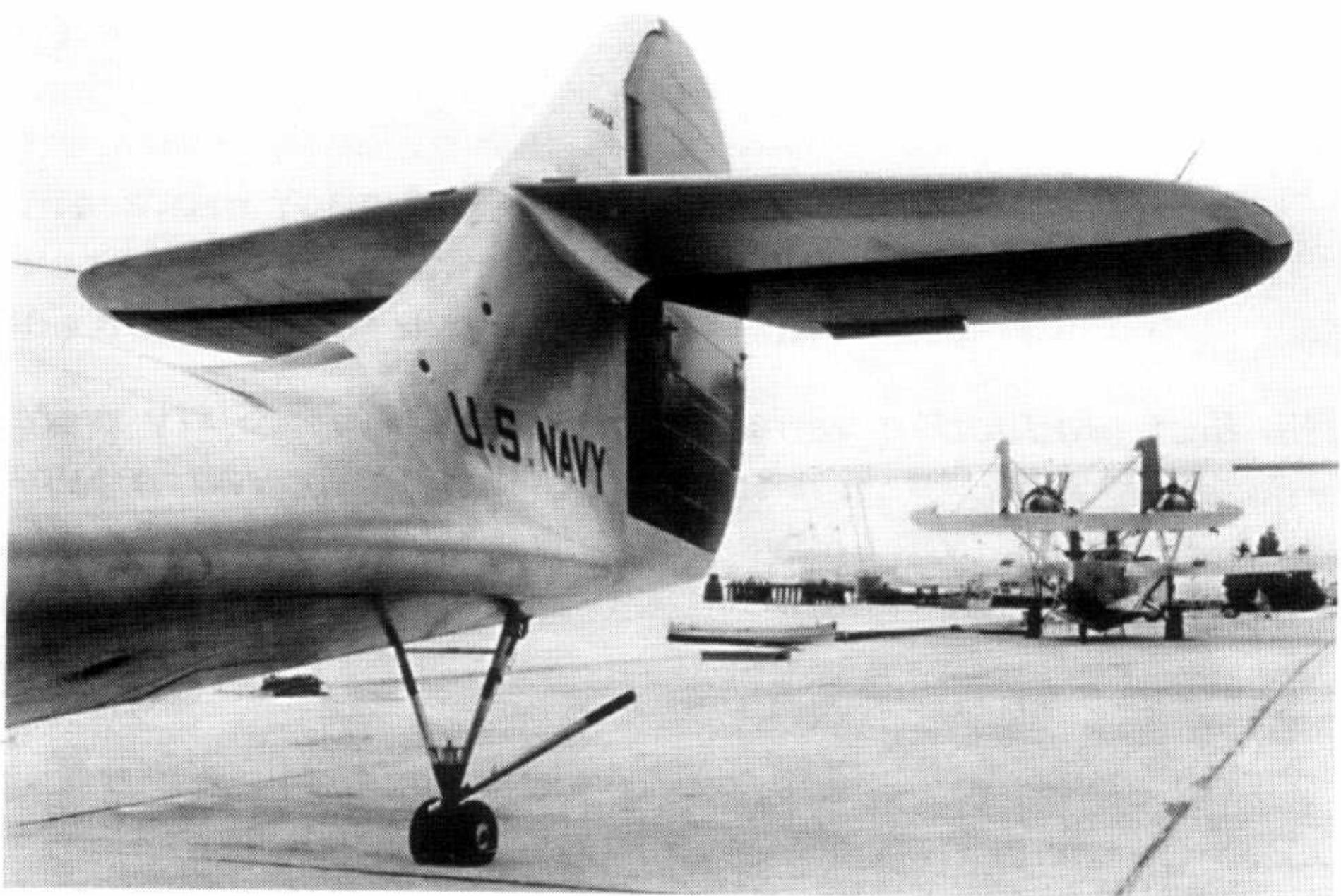
*A PBY-1 from VP-12 rests at anchor on Lake Washington near Seattle. A color profile of this aircraft appears on page 33.*

(NMNA)



*The GUBA was a modified PBY-1, and it was the first flying boat in the PBY series to be developed for commercial use. Assigned the registration number NC 777, it was purchased by Dr. Richard Archbold for use on an expedition to New Guinea, although it was never used for that purpose. Instead, it was turned over to Russia to be used to search for an aircrew that had become lost during an attempt to fly across the North Pole. After unsuccessfully looking for the lost aviators, Russia retained the GUBA as a utility aircraft.*

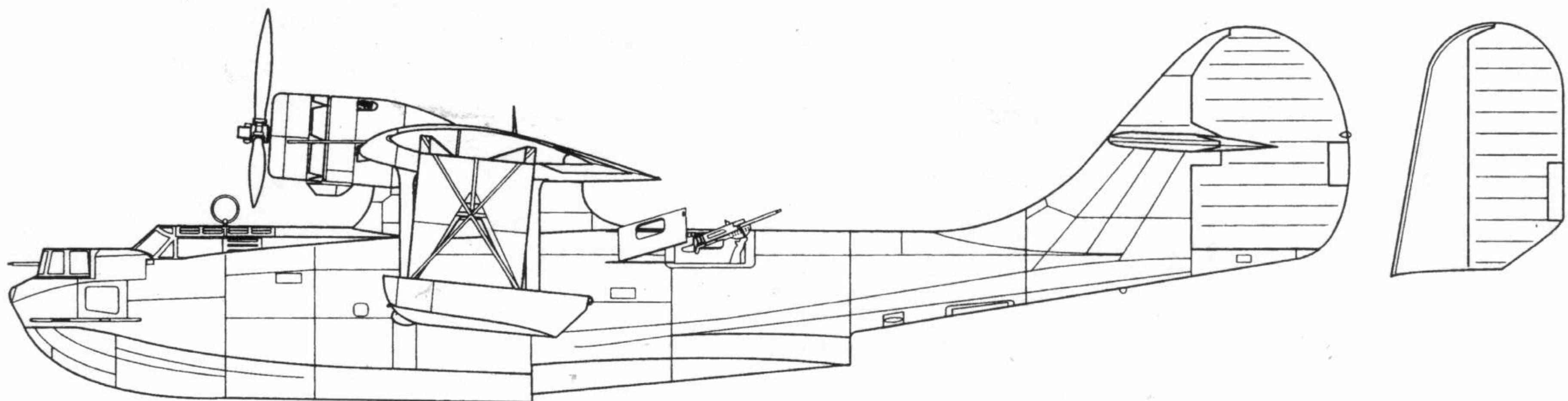
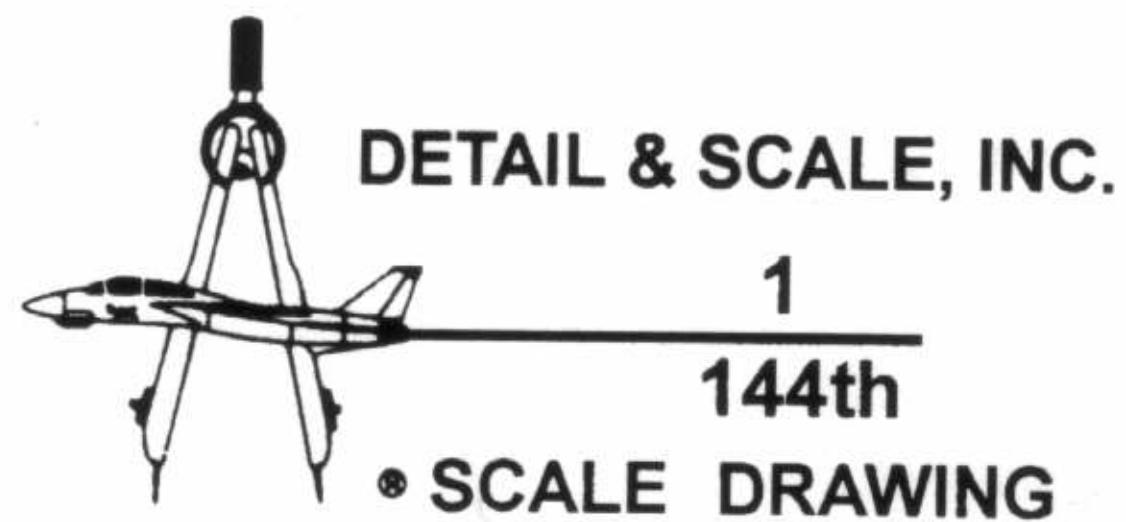
(NMNA)



*The PBY-1 was characterized by a tail unit which featured an angular inboard edge to each elevator to provide clearance for the movement of the rudder. Subsequent versions had a cutout in the rudder instead, and the elevators were redesigned without the angled inboard edges. The elevators and rudder, as well as the ailerons on the wing, were all metal framework covered with fabric.*

(National Archives)

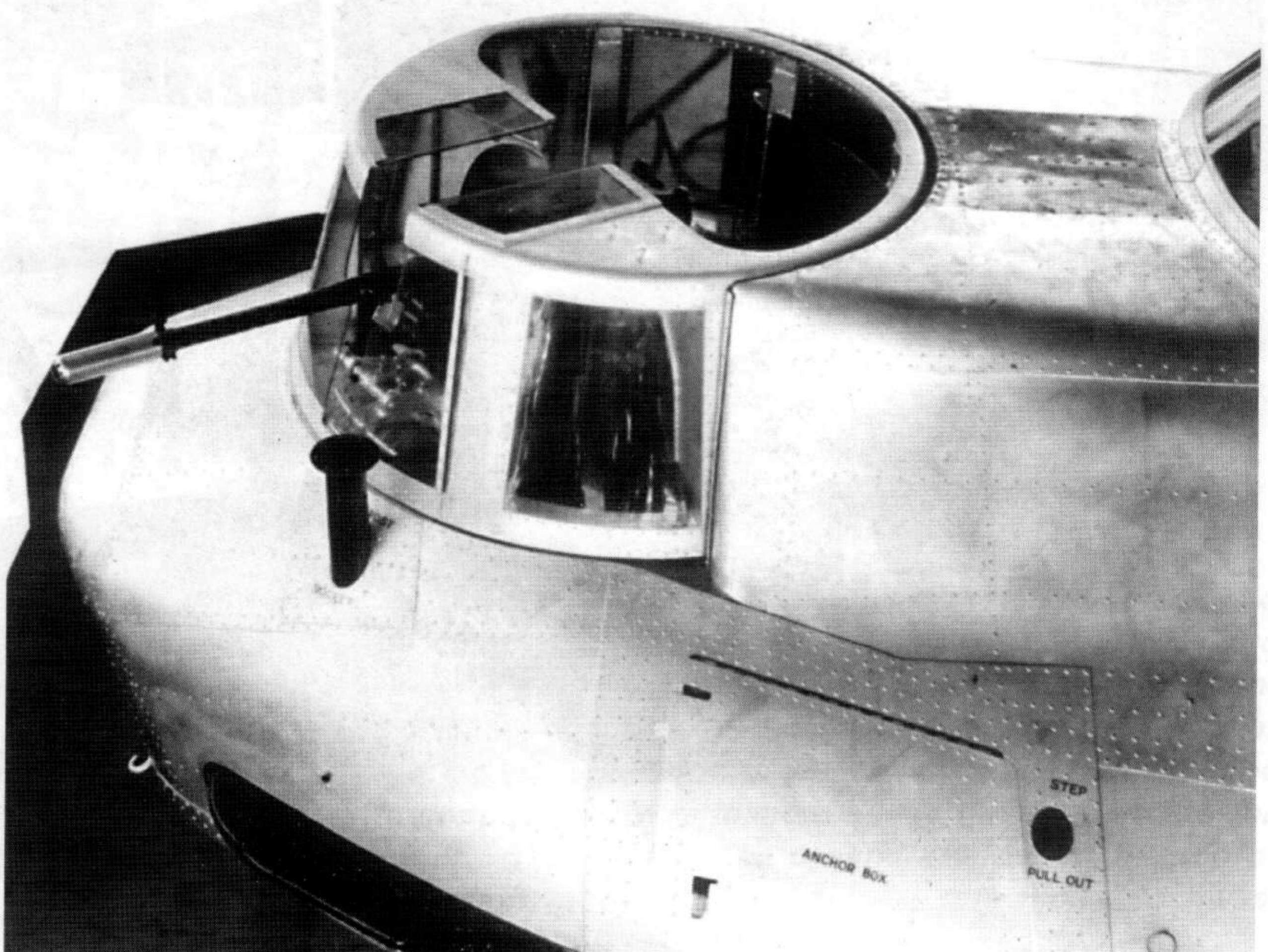
## PBY-1 1/144th SCALE DRAWING



# PBY-1 DETAILS

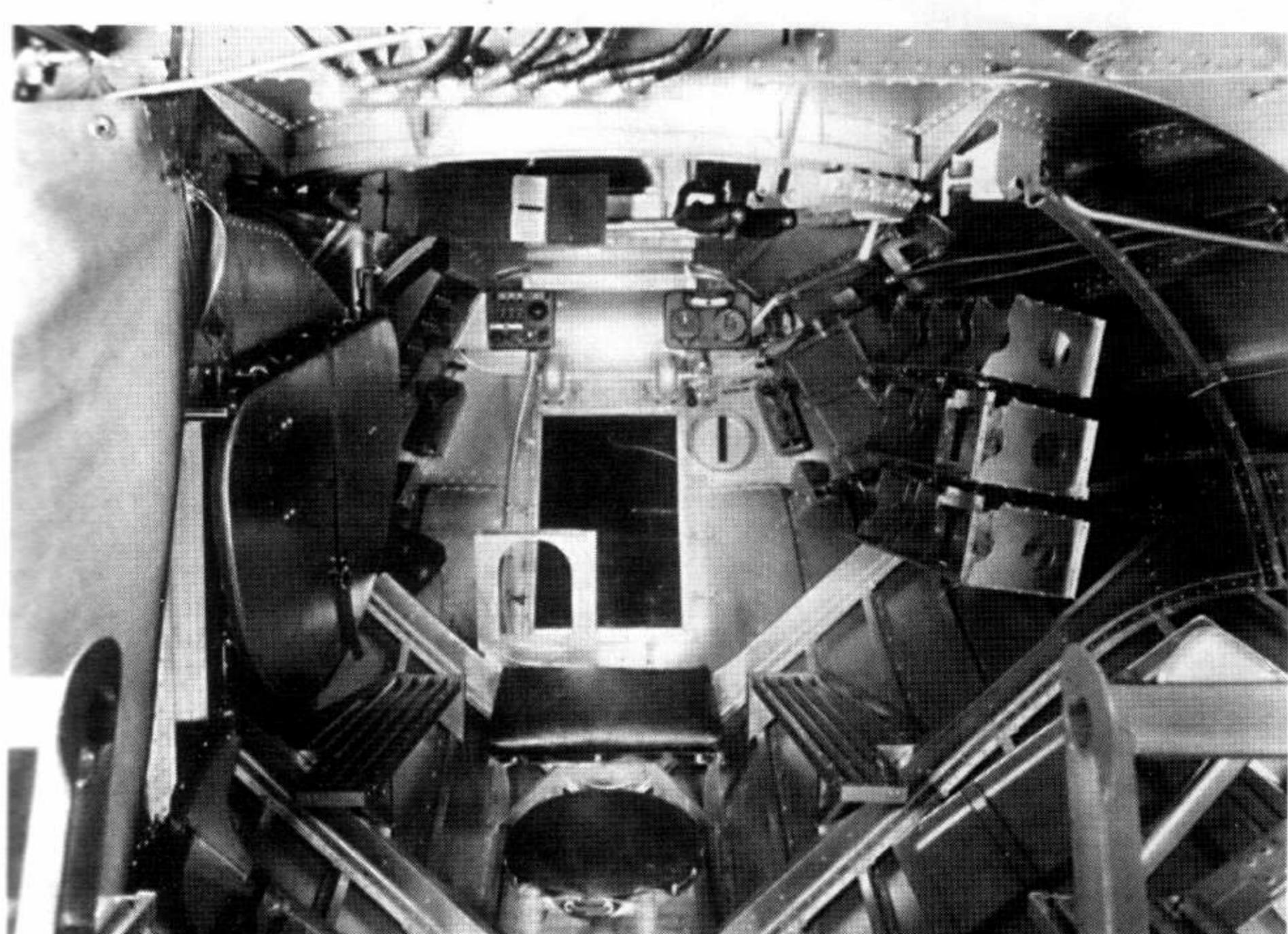
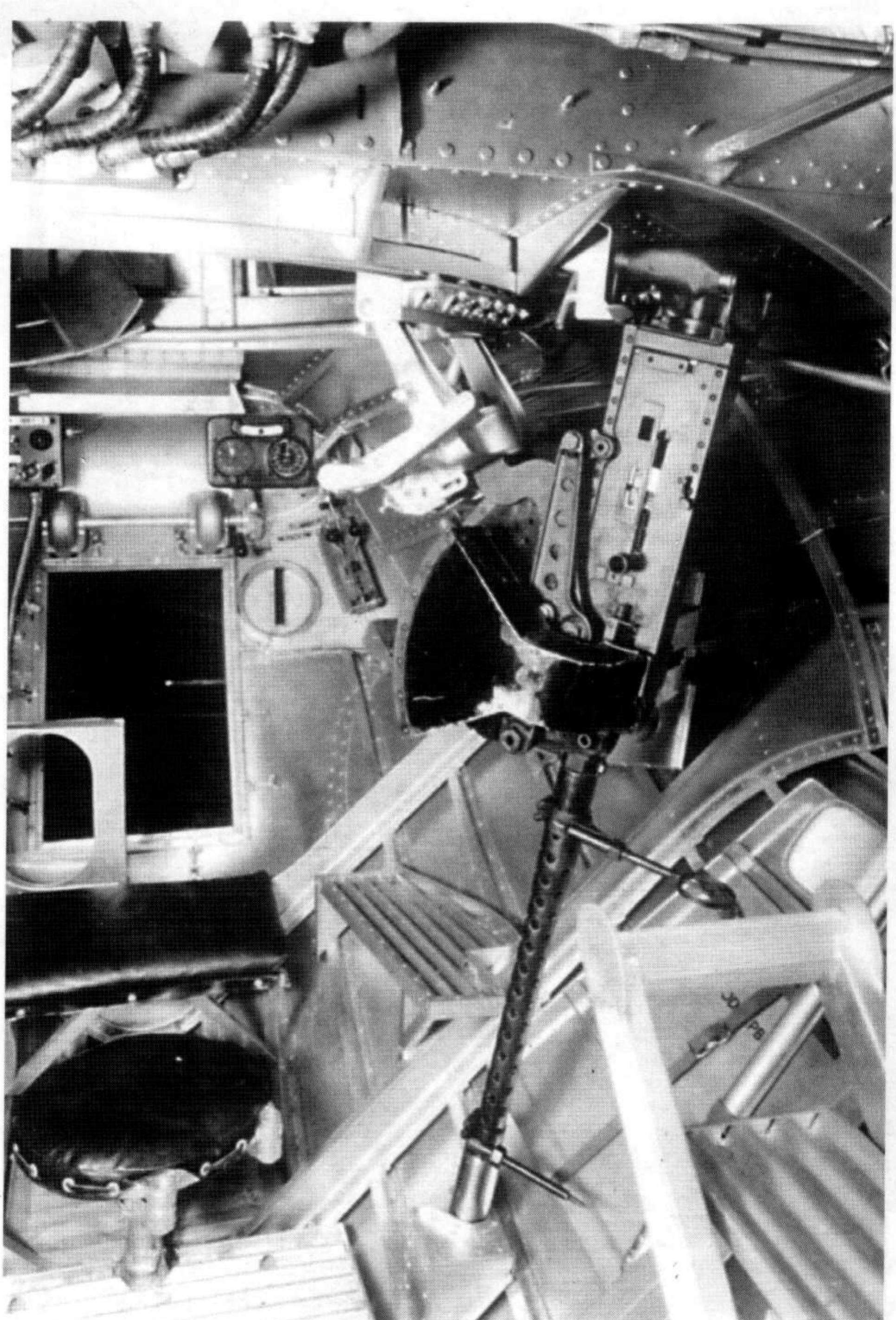
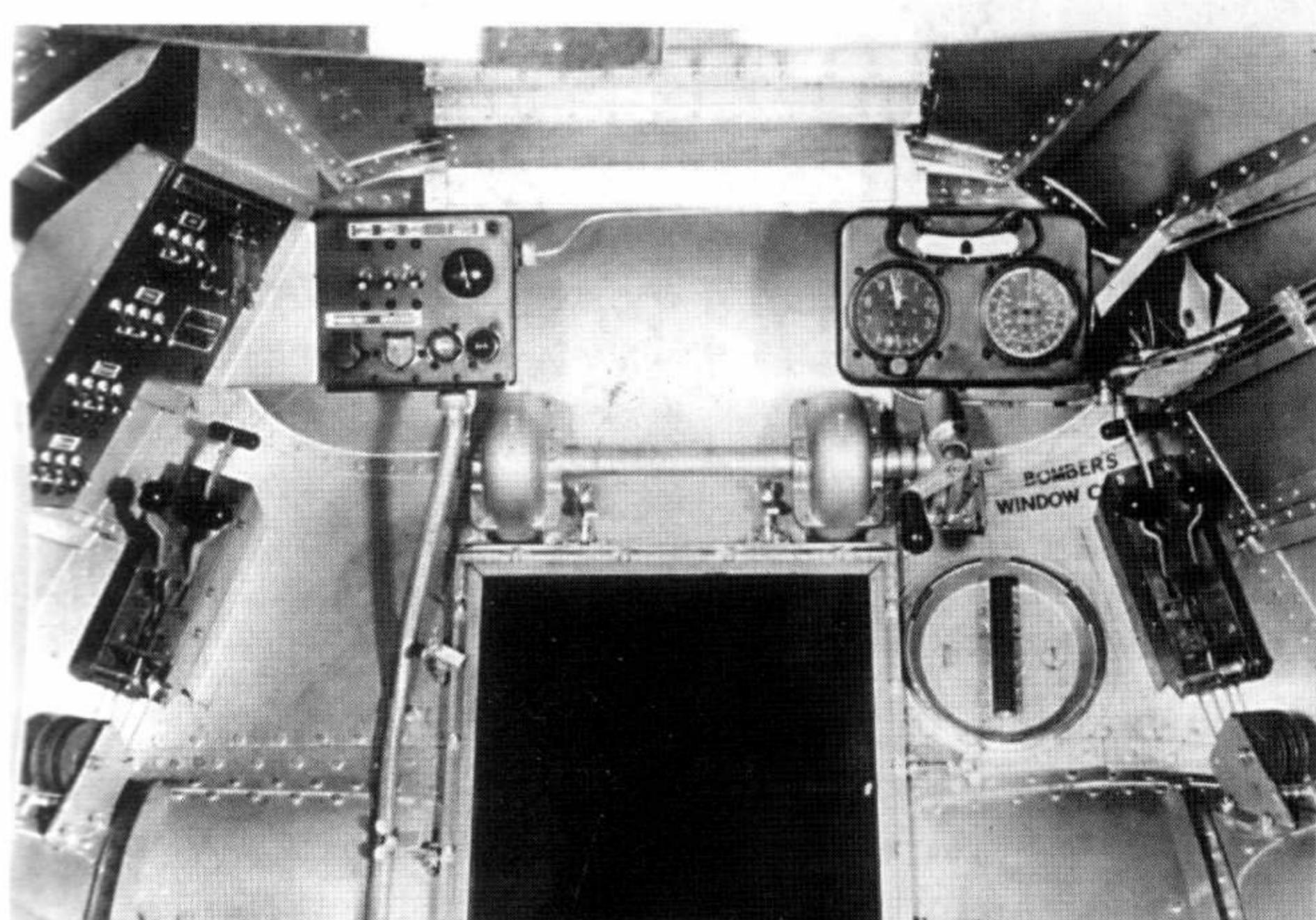
## BOW TURRET

*Right: A single .30-caliber machine gun mounted in a rotating turret provided defensive protection to the front of the PBY-1. The bombardier also served as the gunner. This turret design remained a standard feature until well into the production run of PBY-5s and PBY-5As.* (National Archives)



*Below, center left: A close-up of the forward end of the bombardier's compartment in a PBY-1 shows the instruments, switch panels, and controls used by the bombardier.*

(National Archives)



*An overall view of the bombardier's compartment reveals a rack on which to store ammunition boxes on the right side.* (National Archives)

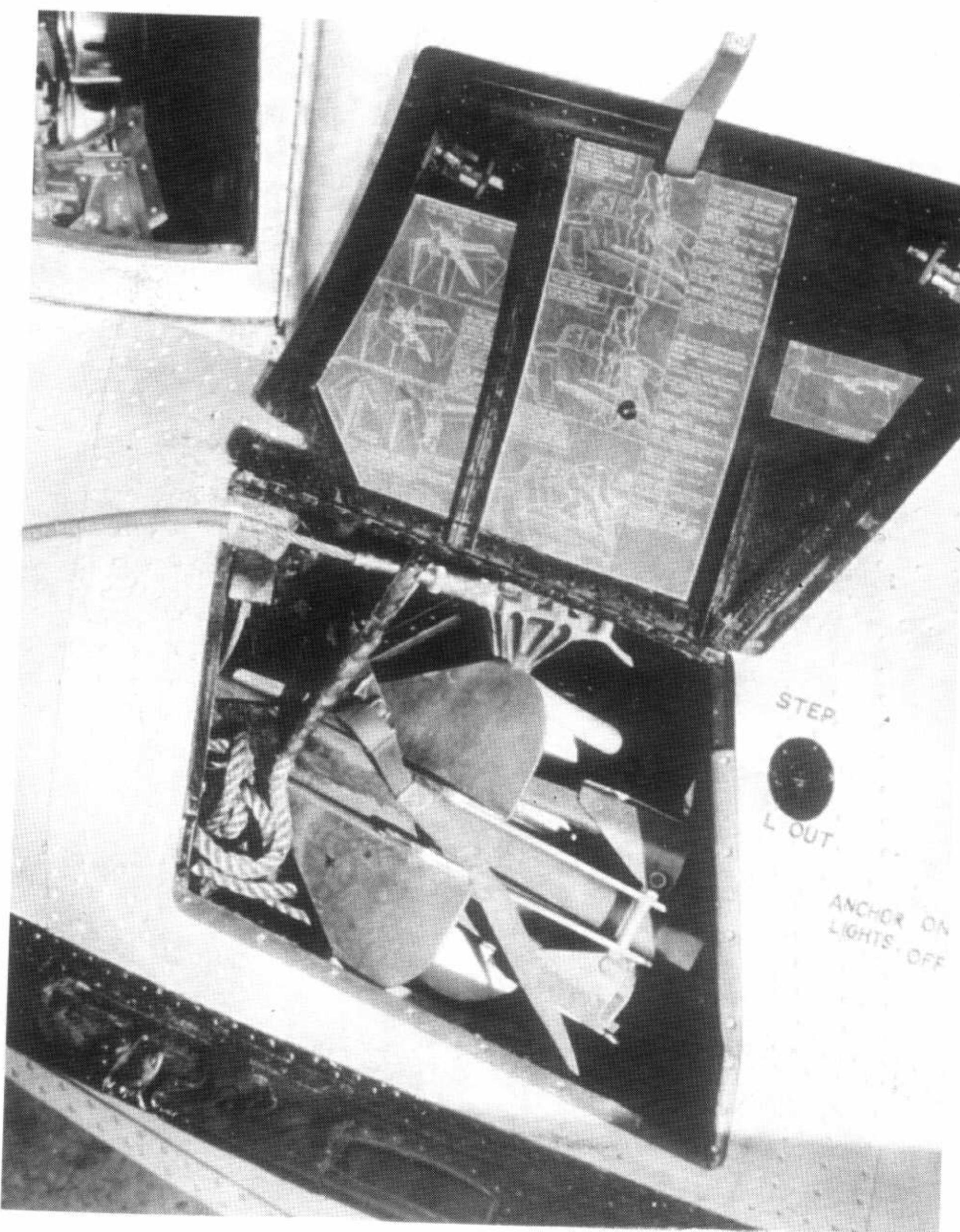
*When not in use, the machine gun could be removed from the turret and stowed in this position inside the bombardier's compartment.* (National Archives)

## ANCHOR COMPARTMENT



17-P-5

*The anchor was carried in a small compartment on the port side of the bow. In this view, the door to the compartment is open and the anchor is hanging down on a cable. Some of the gear from inside the aircraft has been made ready for an inspection prior to VP-17's deployment to Alaska in the fall of 1938. (National Archives)*



*When stowed, the anchor looked like this. Instructions for its use were on placards affixed to the inside of the door to the compartment.*

(National Archives)

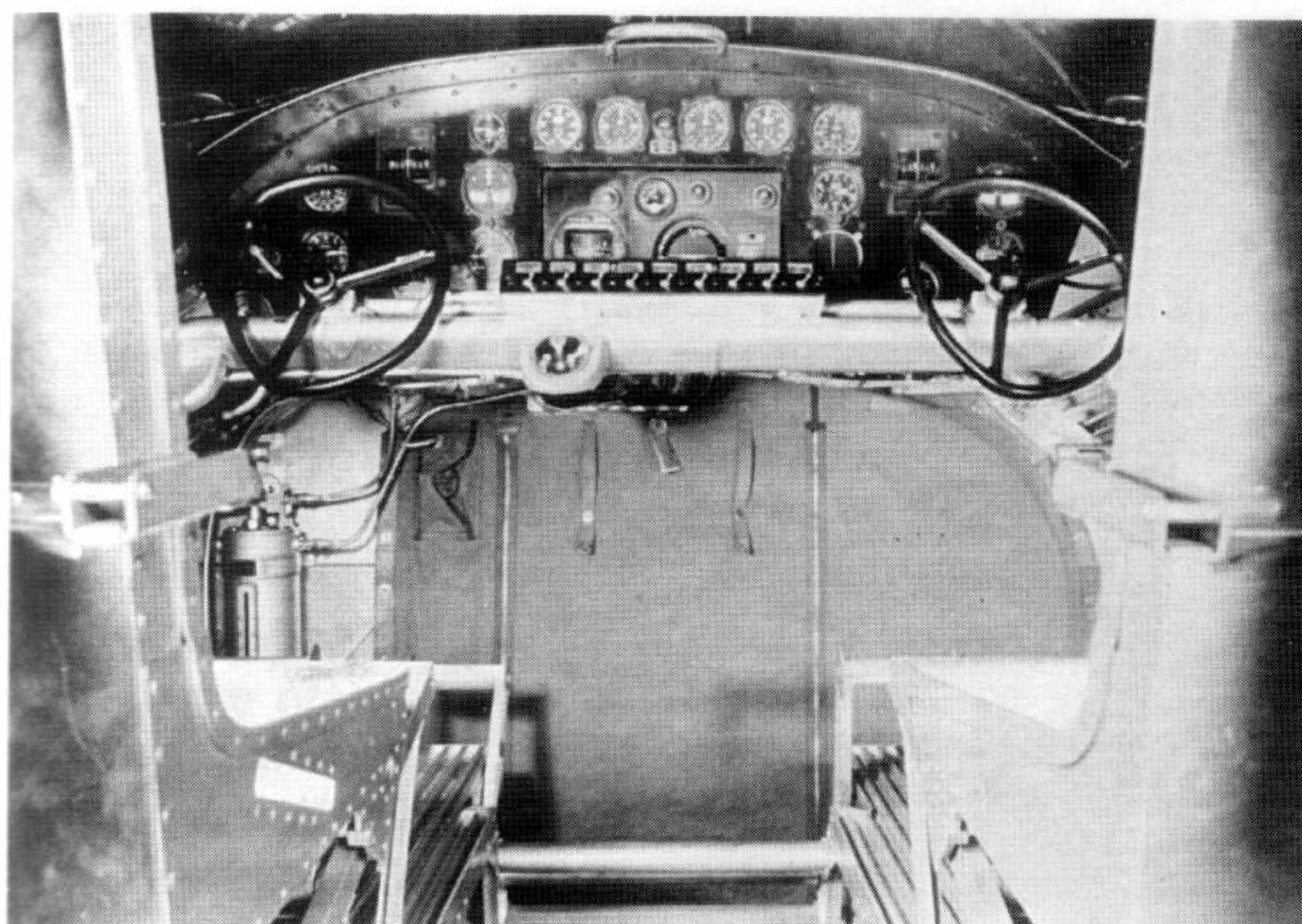


*In this view, the anchor is shown out of the aircraft and the pendant has been attached to the cable.*

(National Archives)

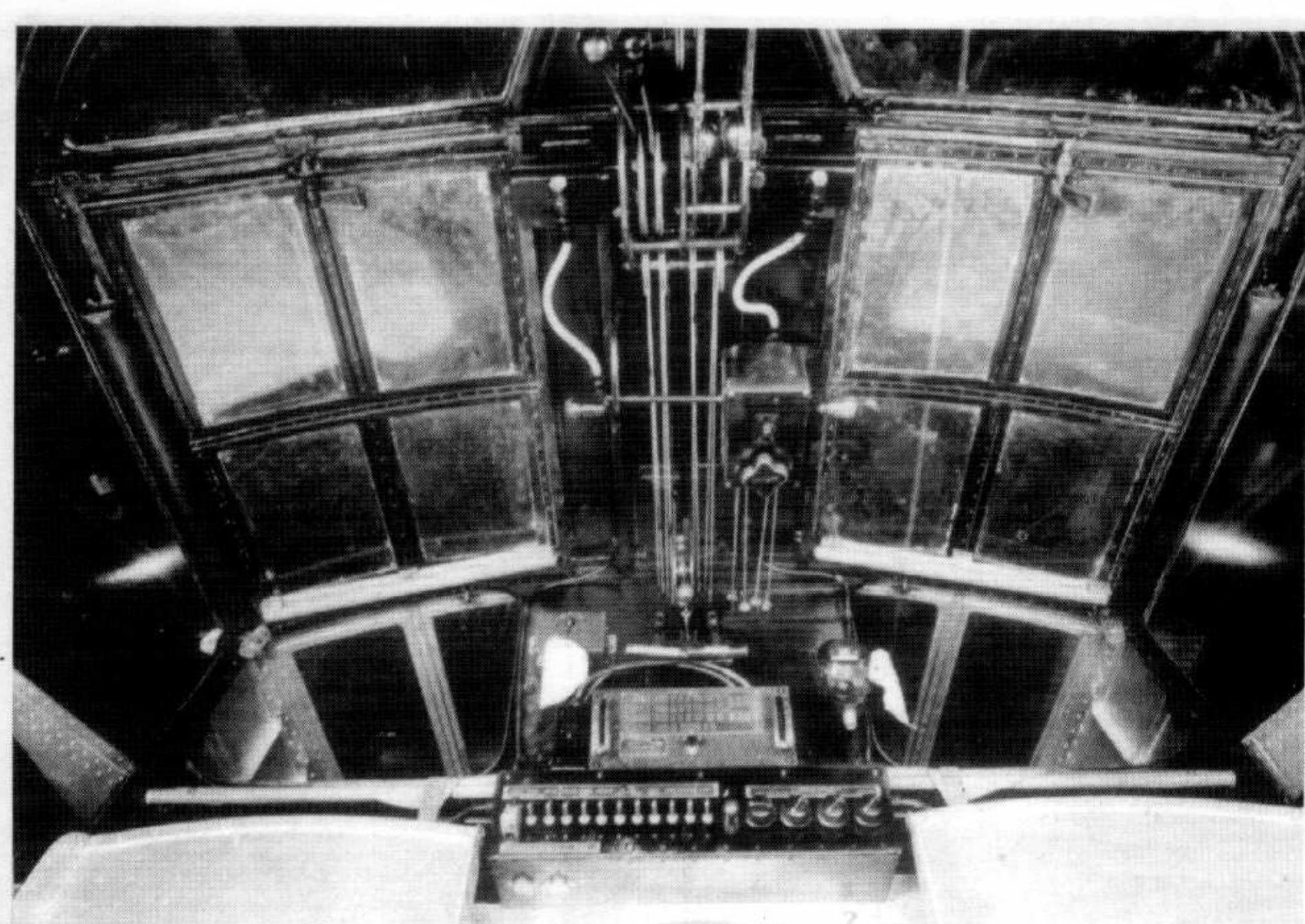
## INTERIOR DETAILS

### & TUNNEL GUN



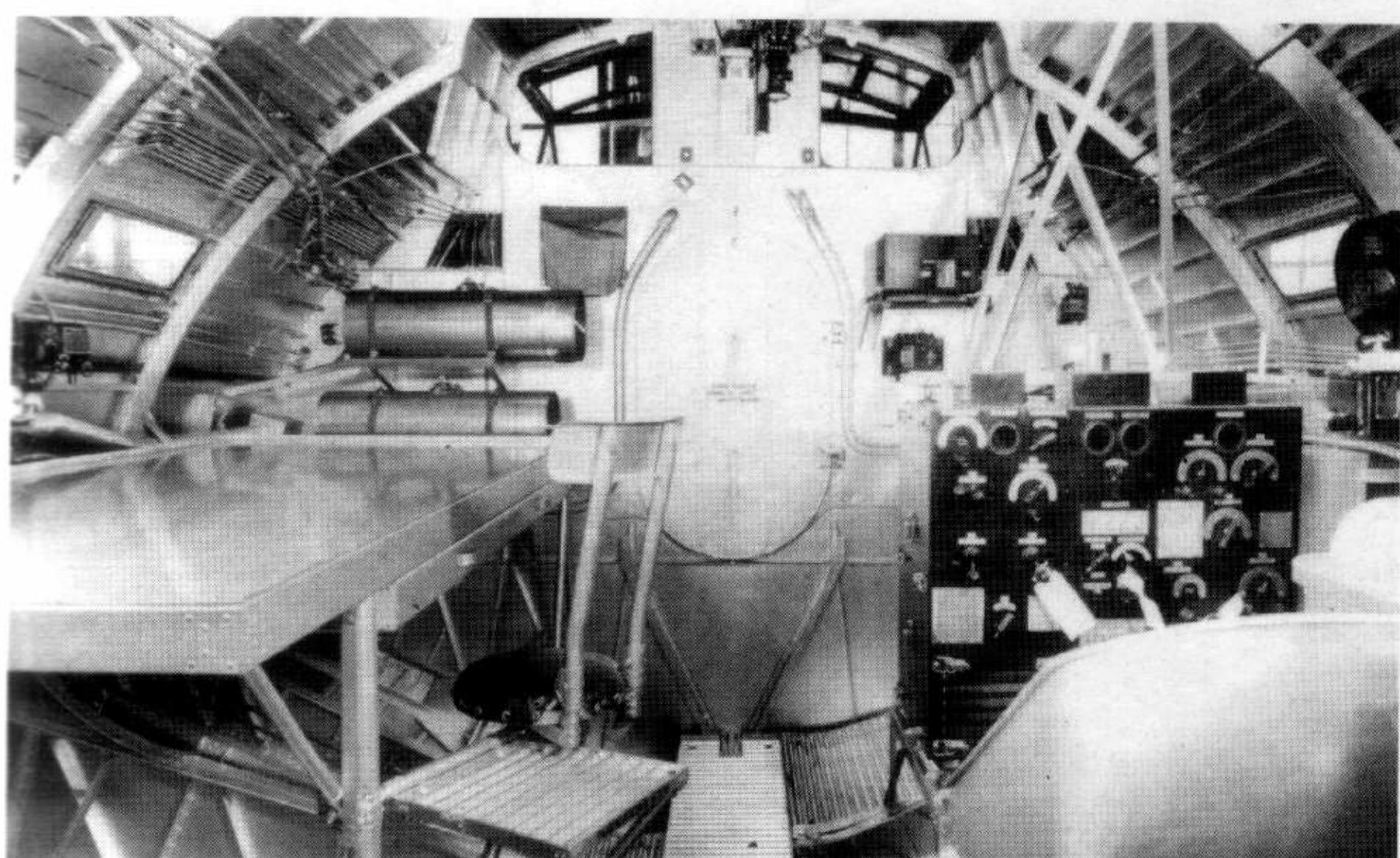
*The instrument panel, yoke assembly, and the two control wheels are all visible in this view looking forward into the cockpit of a PBY-1. The ignition switches for the engines are on a small panel on the lower horizontal bar of the yoke assembly.*

(National Archives)



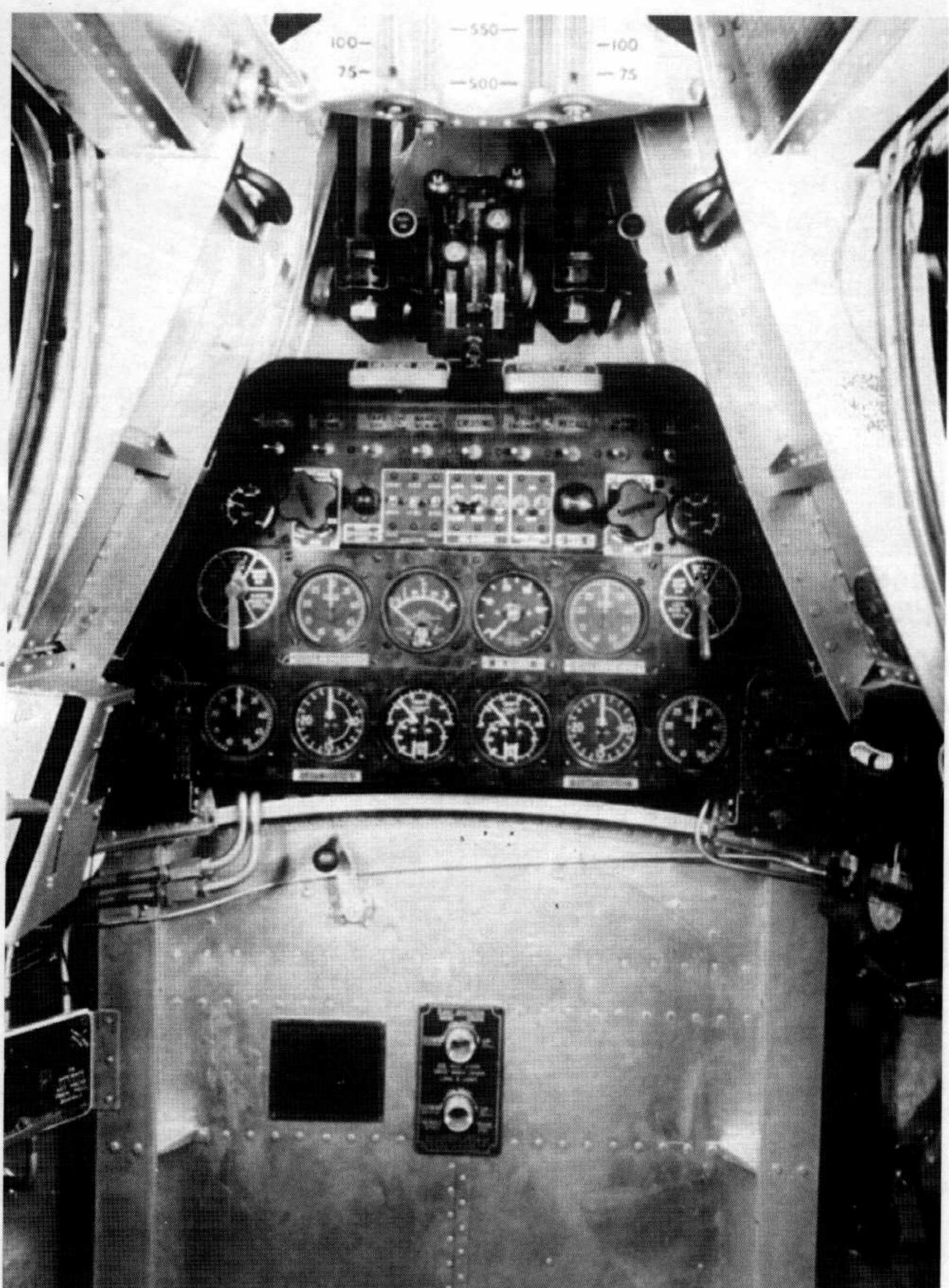
*The top of the cockpit was usually painted flat black and the overhead windows are visible here. The engine and propeller controls are at the very top of the photograph, and the levers hung down just above and slightly aft of the instrument panel. A control panel for the radios and intercom system was located above the entryway to the cockpit. This view looks up and aft toward the top of the cockpit.*

(National Archives)



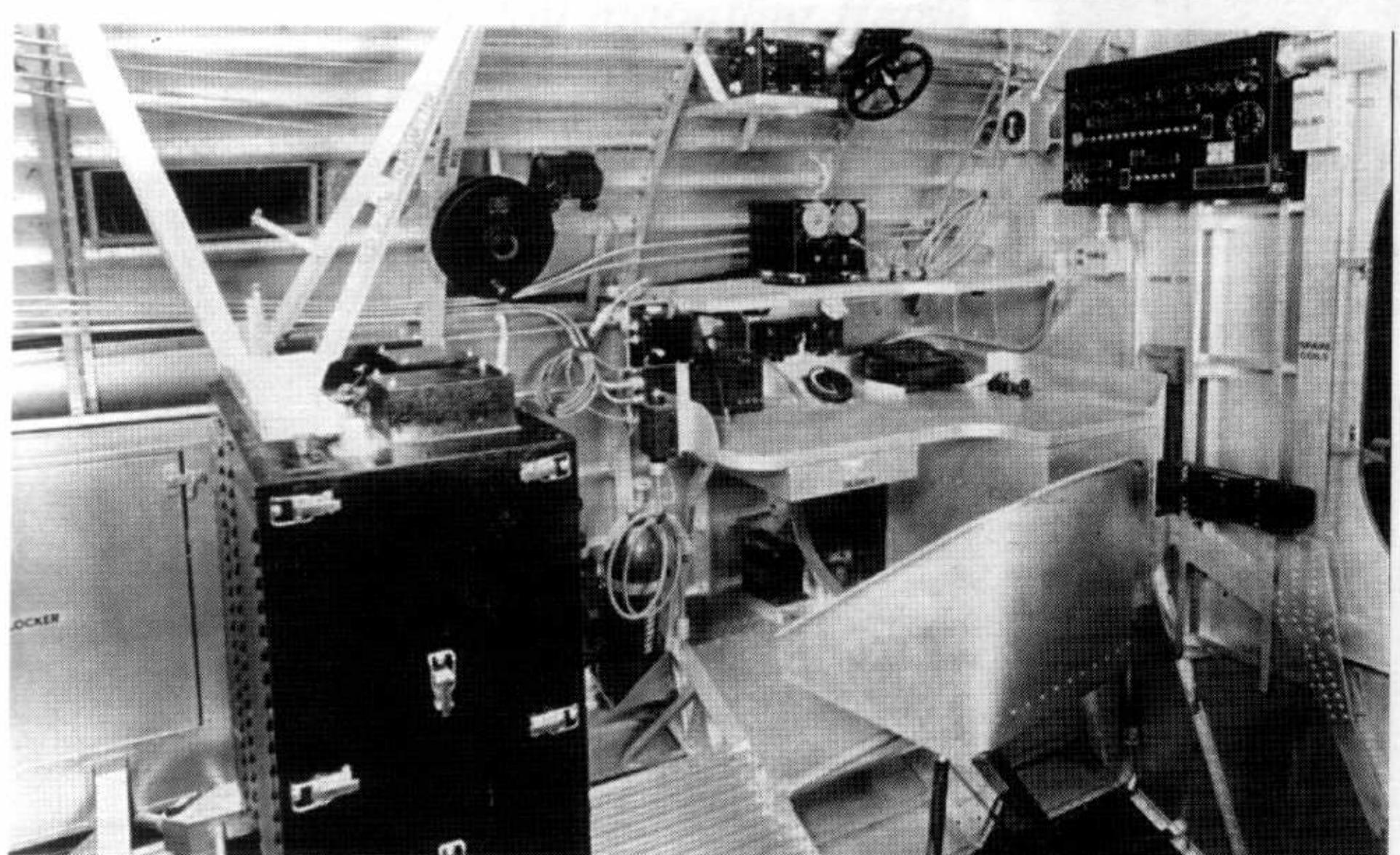
*The compartment immediately aft of the cockpit was shared by the radio operator and the navigator. While this would remain standard on all later variants of the PBY, the equipment and furnishings would be changed as newer versions were produced.*

(National Archives)



*The mechanic sat up inside the mounting structure for the wing, and he had a window on each side through which he could observe the engines and outrigger floats. His instrument panel was tapered to fit inside the structure, and he also had several levers and switches to control the systems of the aircraft.*

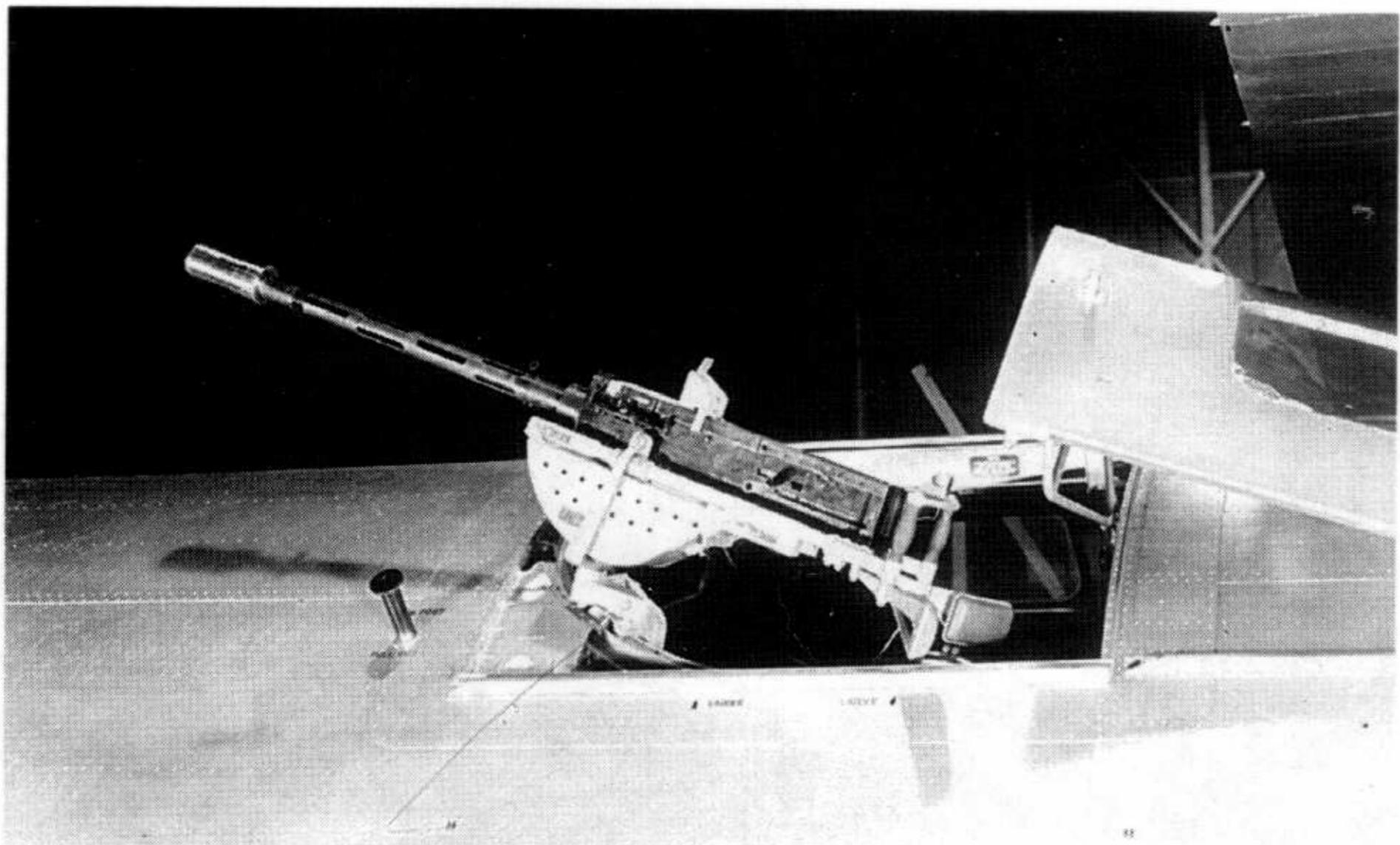
(National Archives)



*Radio equipment installed in the PBY-1 is shown here. Note the shape of the radio operator's desk and the oxygen bottle next to it. Later versions of the PBY had considerably more communications equipment than what is shown here.*

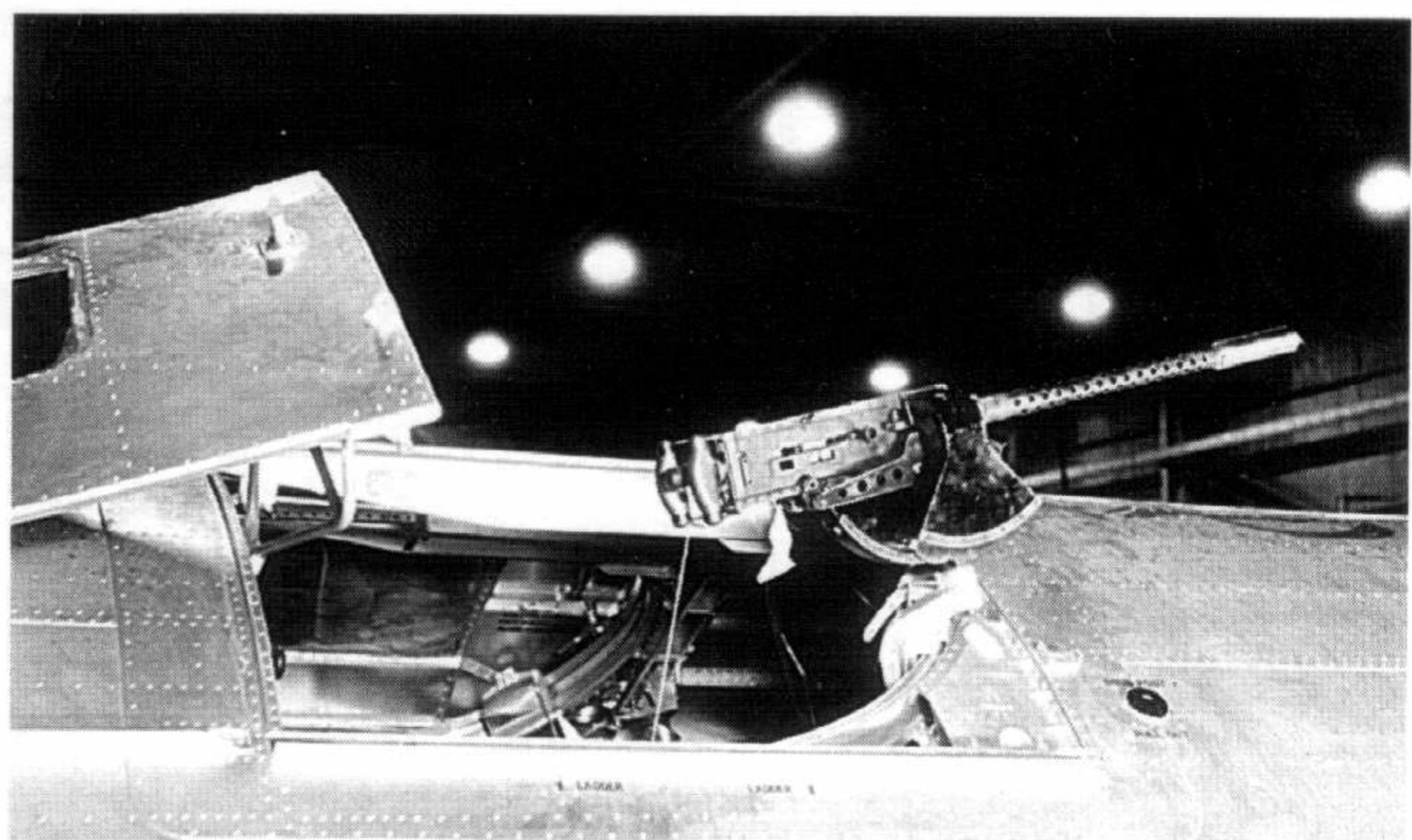
(National Archives)

## WAIST GUN DETAILS



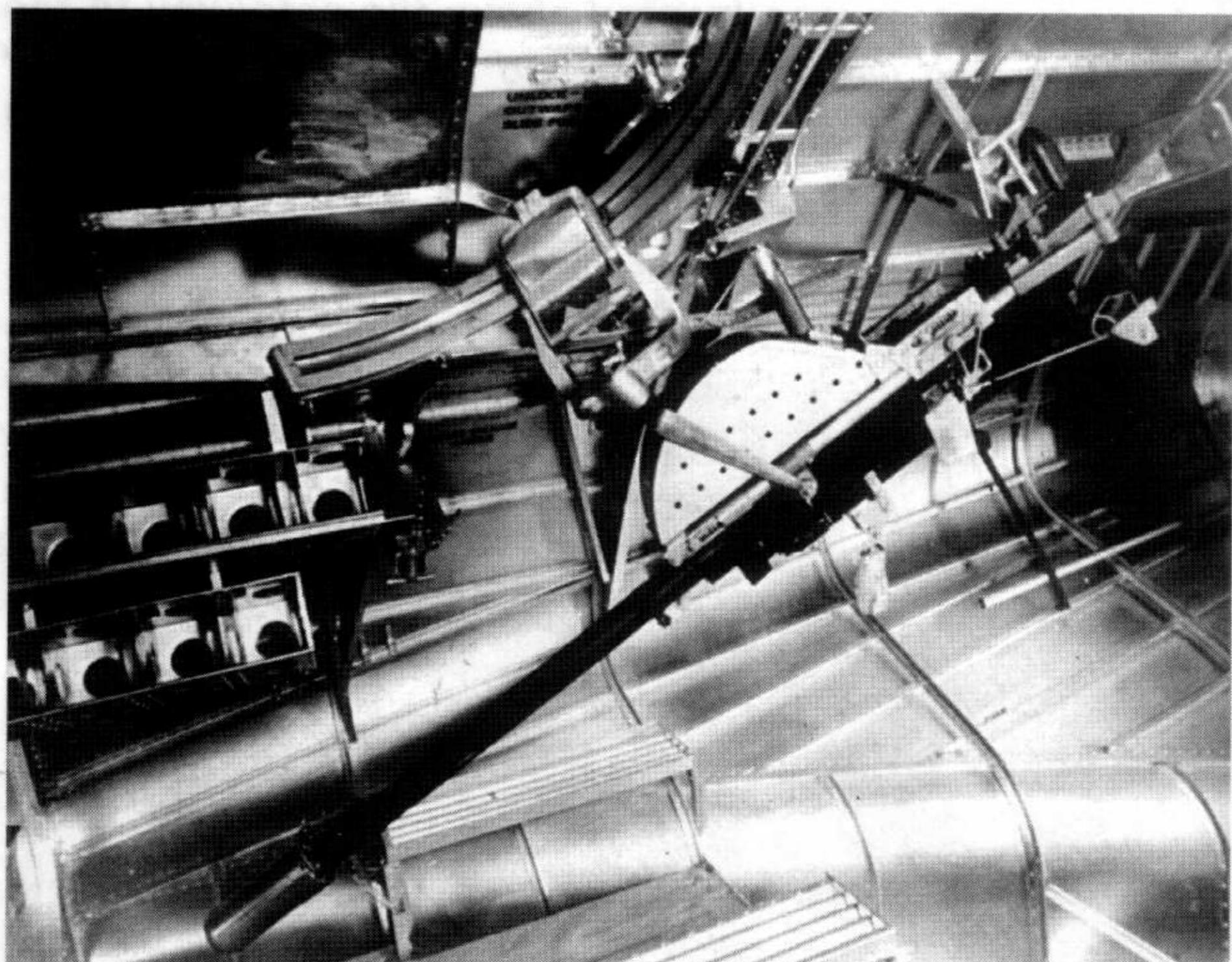
*Initially, a .30-caliber machine gun was mounted in each of the windows on the sides of the aft fuselage. The .30-caliber guns were soon replaced with .50-caliber weapons in these waist positions. This is the gun on the left side.*

(National Archives)



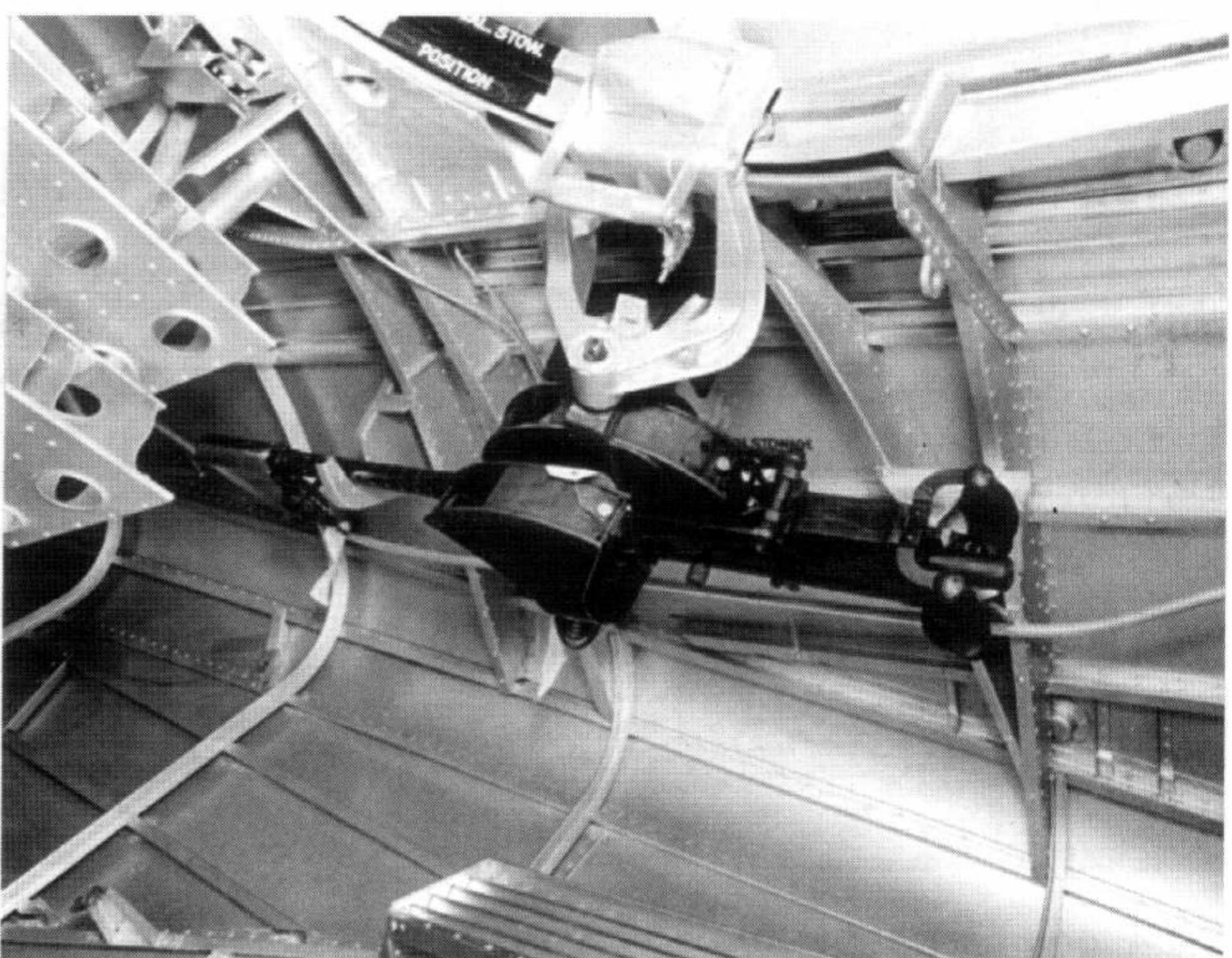
*The right .30-caliber machine gun is shown here. When open, the sliding cover for the window angled outward at the rear so it could deflect the airflow as it passed over the gun mount. This made it easier to aim the weapon.*

(National Archives)



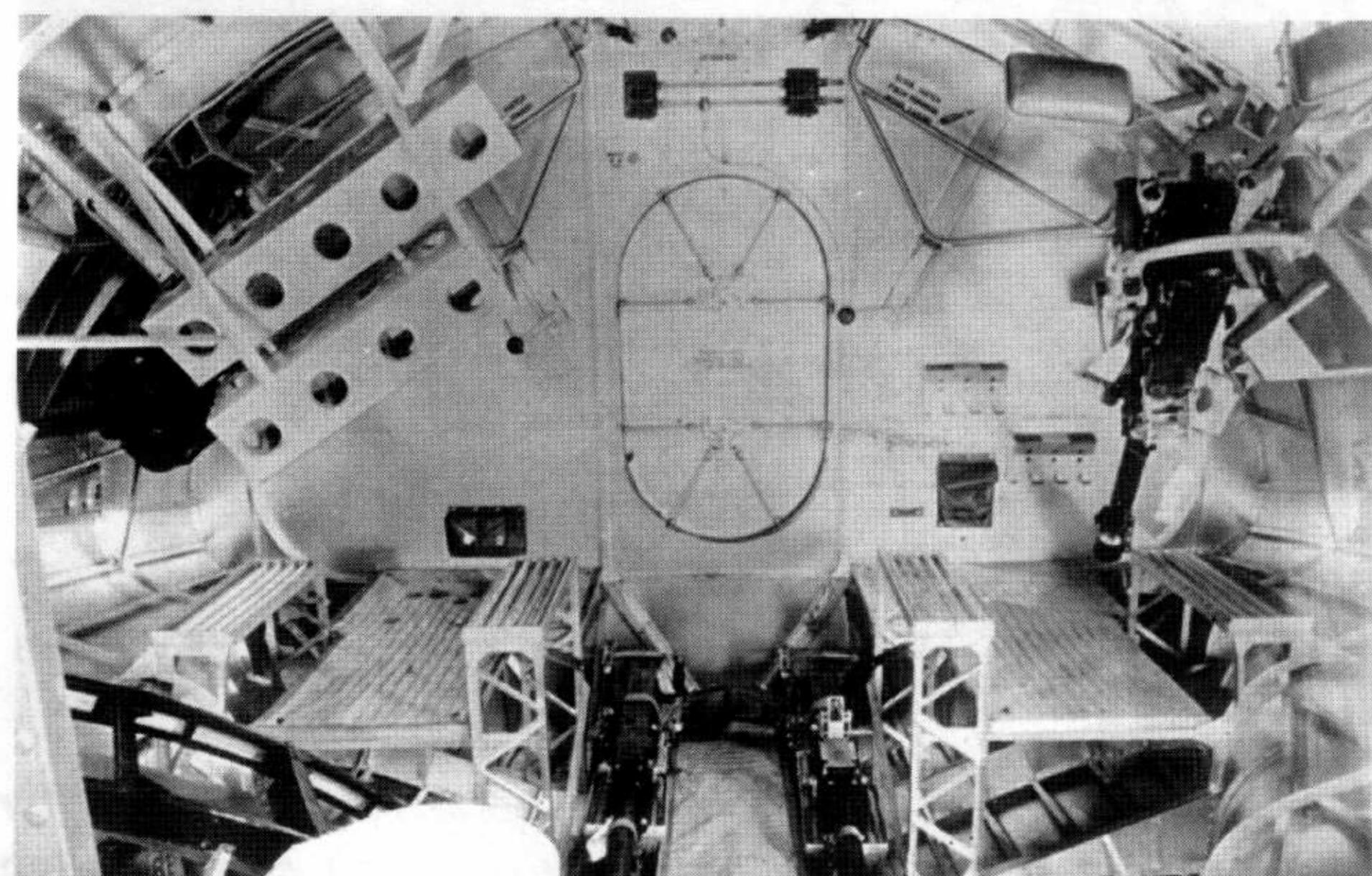
*When not in use, each gun could be moved to a stowed position behind and slightly below the window. Note the racks for ammunition boxes below the window. This is the gun on the right side.*

(National Archives)



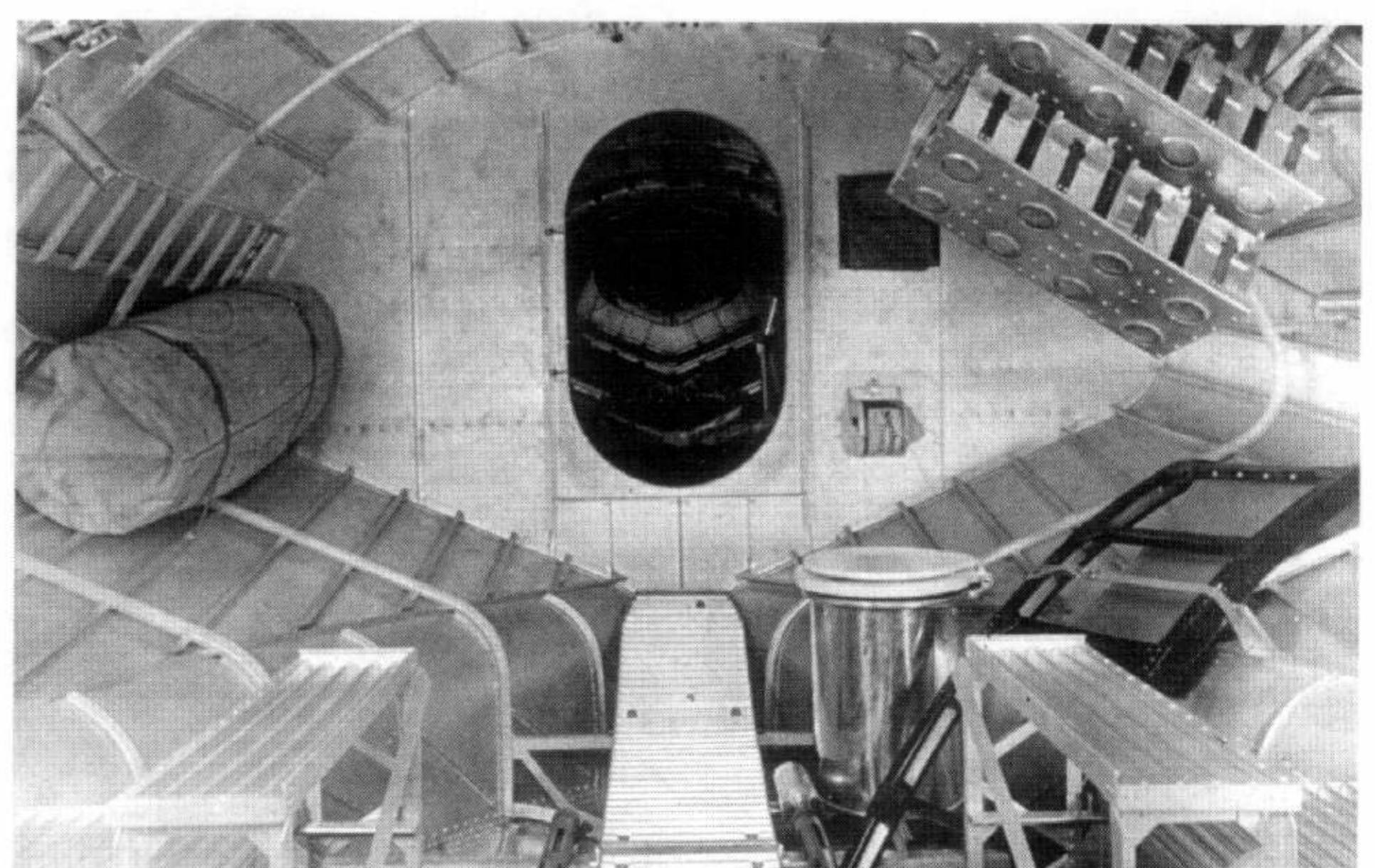
*The left side gun is shown here in its stowed position. Moving the guns out of the way allowed the gunners to position themselves for better observation and scanning from the windows.*

(National Archives)



*This view looks forward into the waist gunners' compartment. Note the two spare machine guns stowed on either side of the walkway.*

(National Archives)

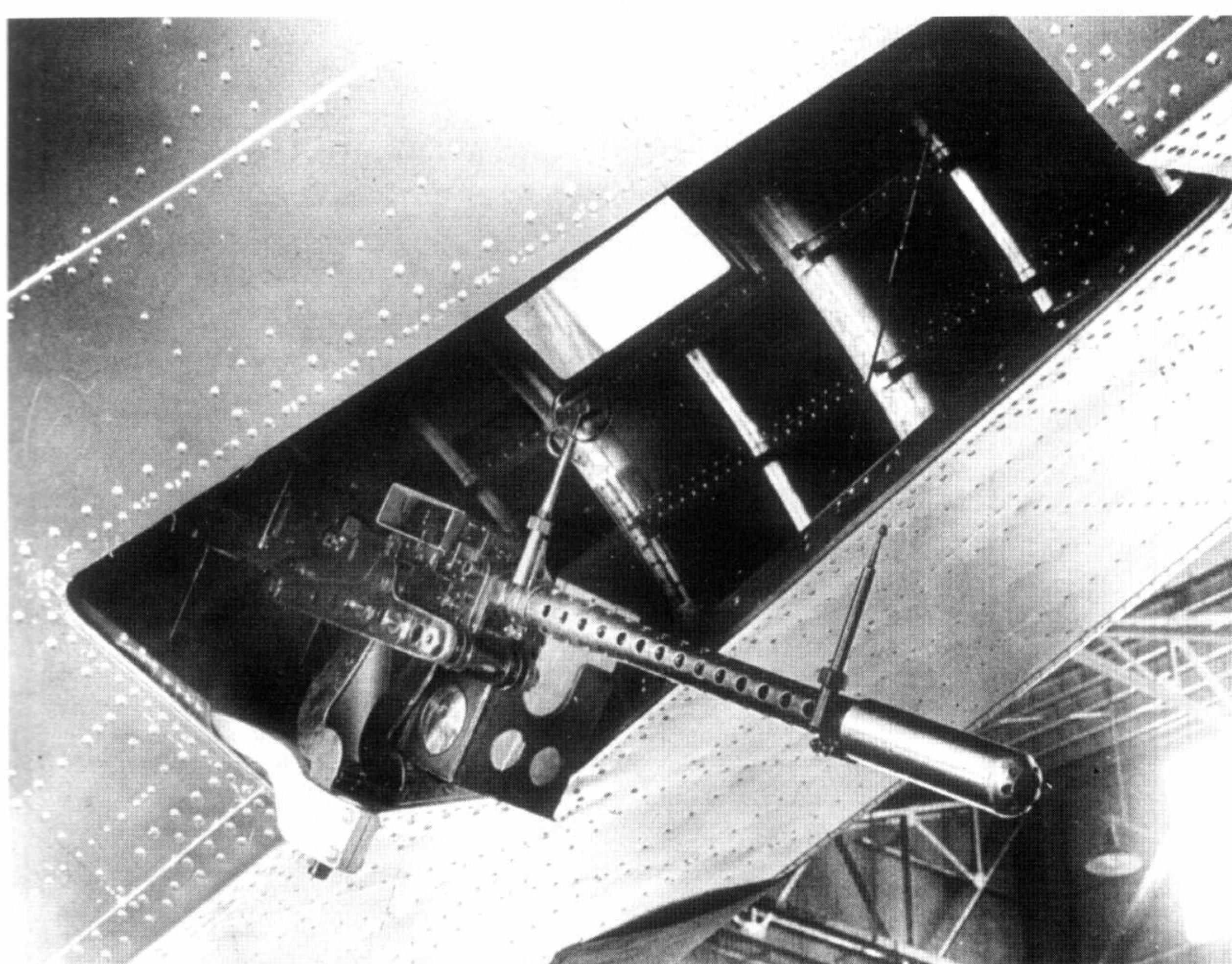
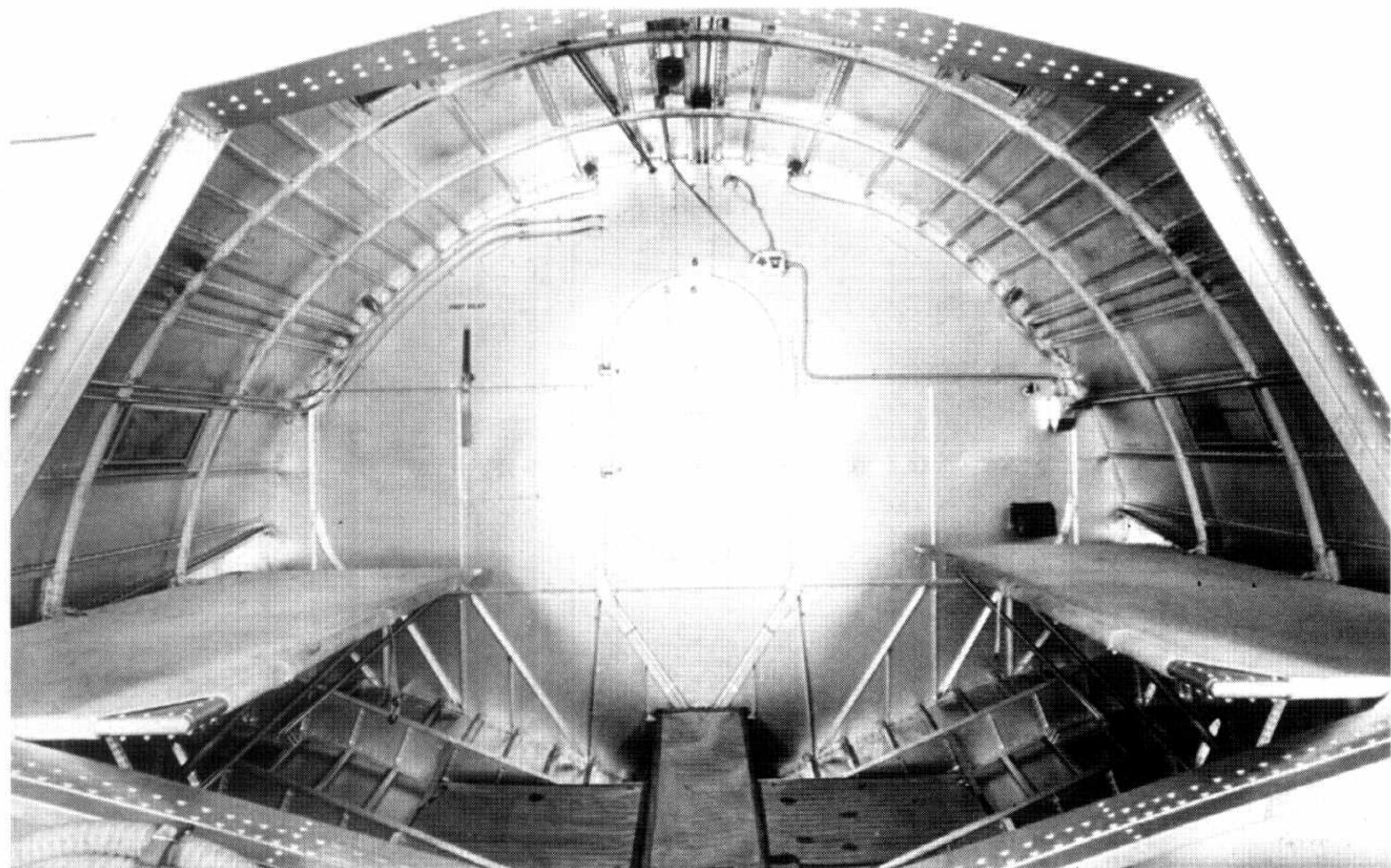


*The chemical toilet and the stowed life raft are visible in this view that looks aft into the waist gunners' compartment.*

(National Archives)

## LIVING QUARTERS & TUNNEL GUN

All versions of the PBY had living quarters located between the mechanic's compartment and the waist gun compartment. Metal framed cots with stretched canvas covers were installed in the living quarters, and blankets and pillows were usually provided. The number of cots varied from one version of the PBY to another, and in some cases two cots were installed on the same side, one above the other. Most aircraft had a coffee maker, small stove, and other items for preparing food and drinks for the crew and passengers. Special furnishings and equipment were installed in some PBYs that were used as transports for high ranking officers or other VIPs. (National Archives)

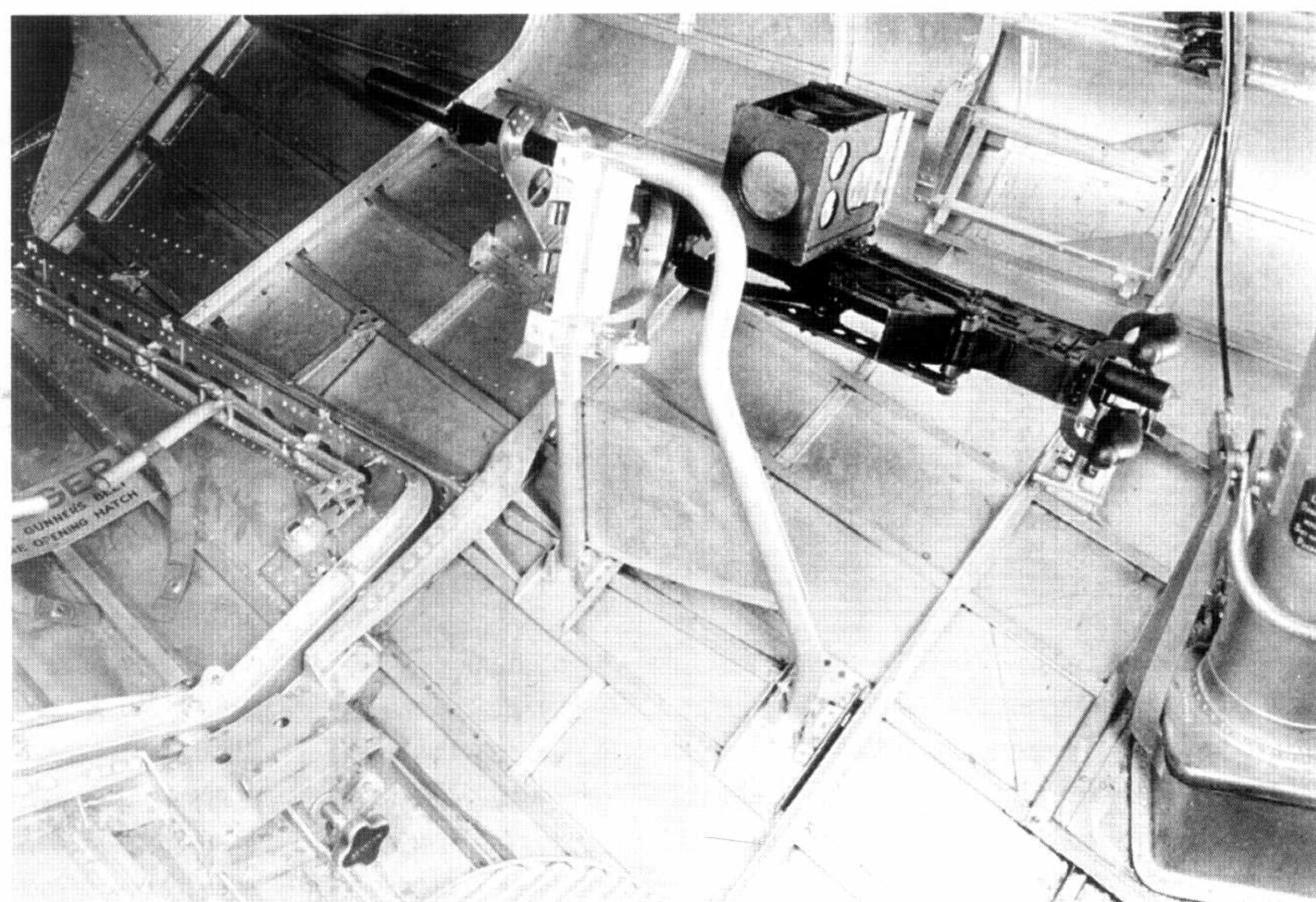


All versions of the PBY had a single .30-caliber machine gun that could be mounted in the underside of the aft fuselage to provide defensive fire to the rear of the aircraft. This was known as the tunnel gun, and it is shown here in the firing position on a PBY-1. The tunnel gun was a standard feature on all production versions beginning with the PBY-1, rather than being an item that was added later on subsequent versions as reported elsewhere. It was aimed through the use of basic ring and bead sights. This weapon could also be fired back at an enemy position or a ship to suppress anti-aircraft fire as the PBY passed over the target it was attacking. Unfortunately, the .30-caliber weapon was too light and did not have a sufficient field of fire to be very effective against attacking aircraft.

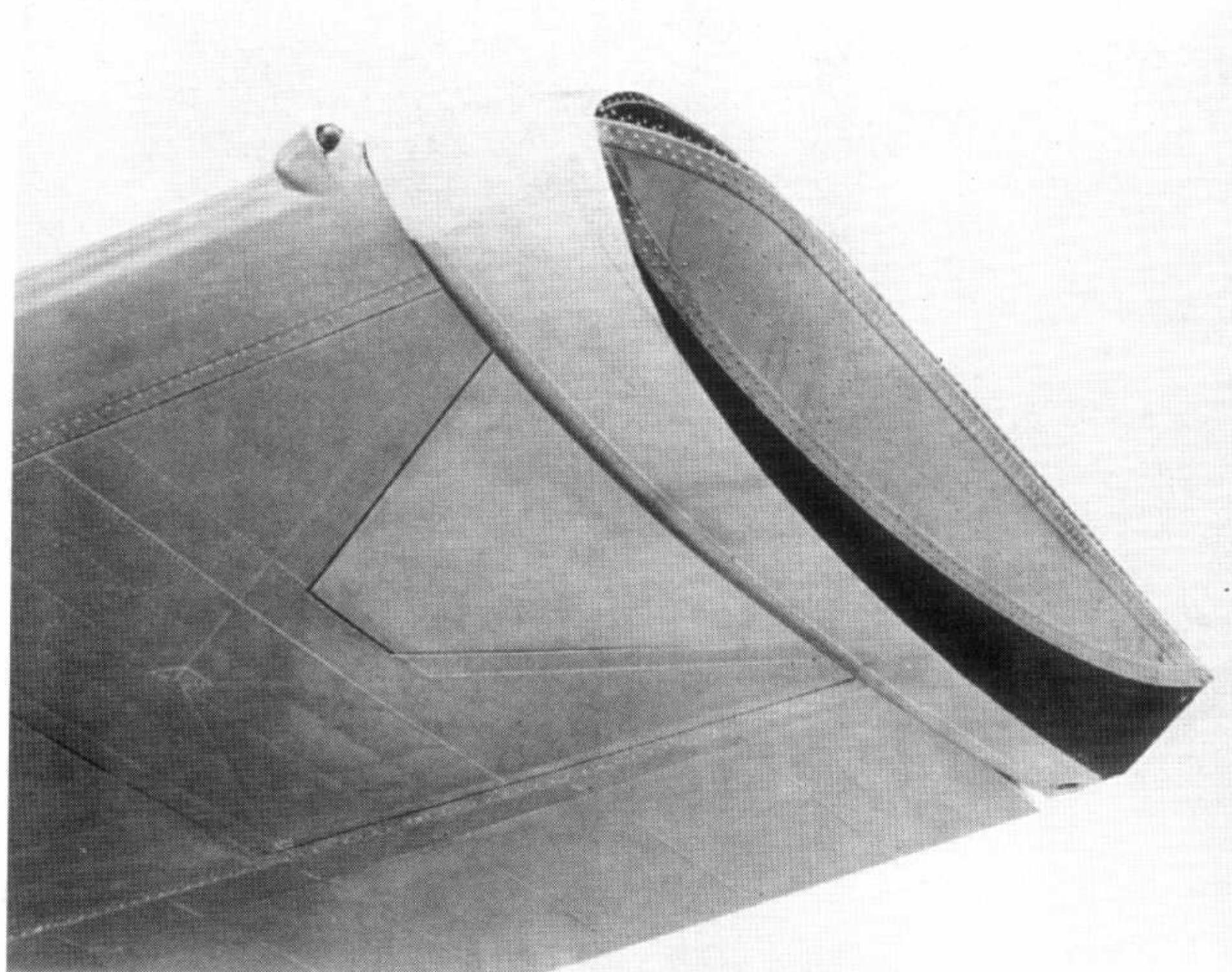
(National Archives)

When not in use, the mounting frame for the tunnel gun swung up toward the left side of the aircraft about ninety degrees, and a tapered hatch covered the opening through which it was fired. On late production PBY-5As and subsequent Catalinas, a ball mount was installed in a small blistered window on each side of the fuselage, and the tunnel gun could be quickly installed through the ball to augment defensive fire to either side of the aircraft. But in all versions up through the PBY-5 and most PBY-5As, the tunnel gun could only be fired through the opening seen above. Firing the weapon required the gunner to assume a prone position on the walkway just forward of the opening.

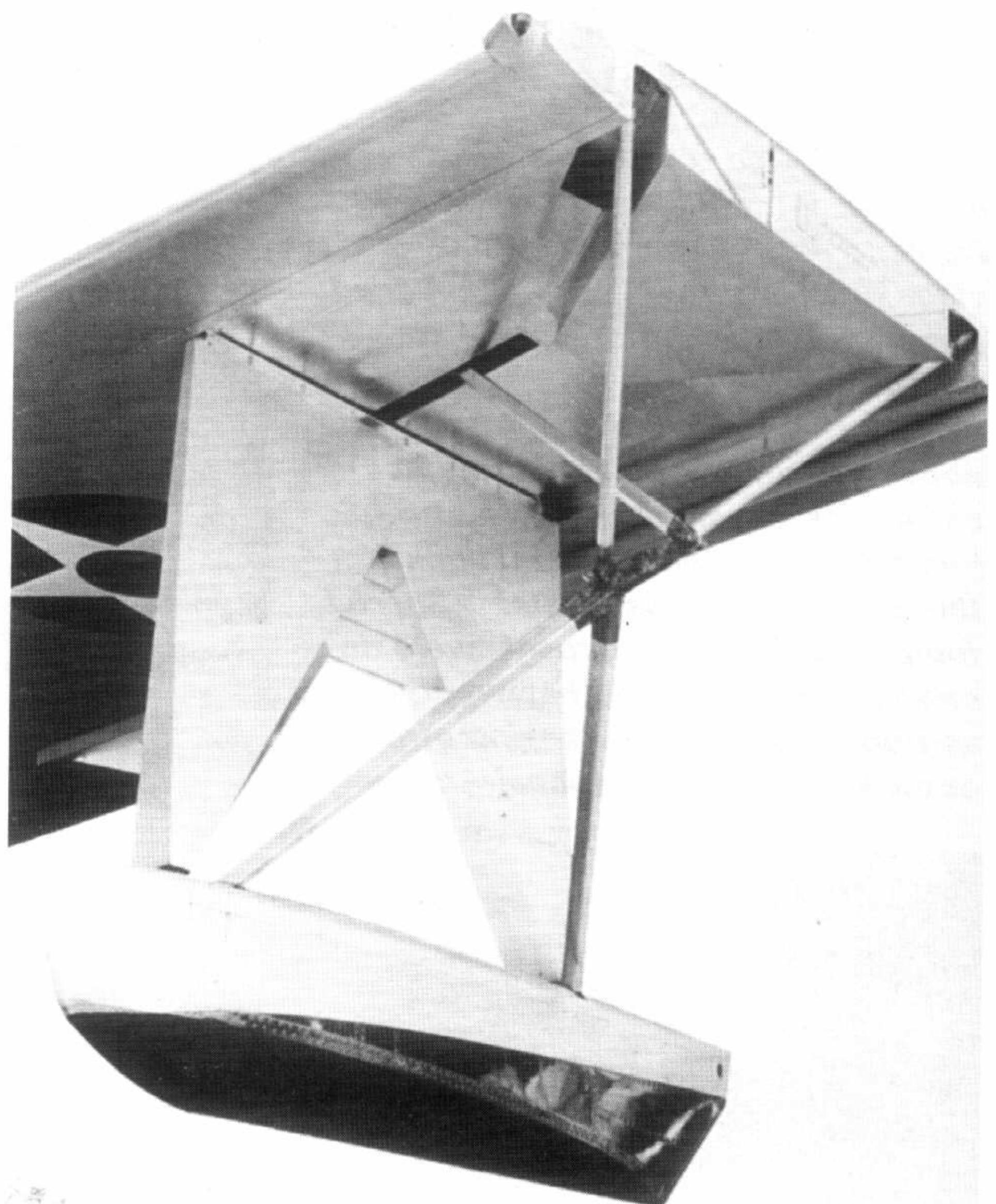
(National Archives)



## WING TIP FLOATS & BEACHING GEAR

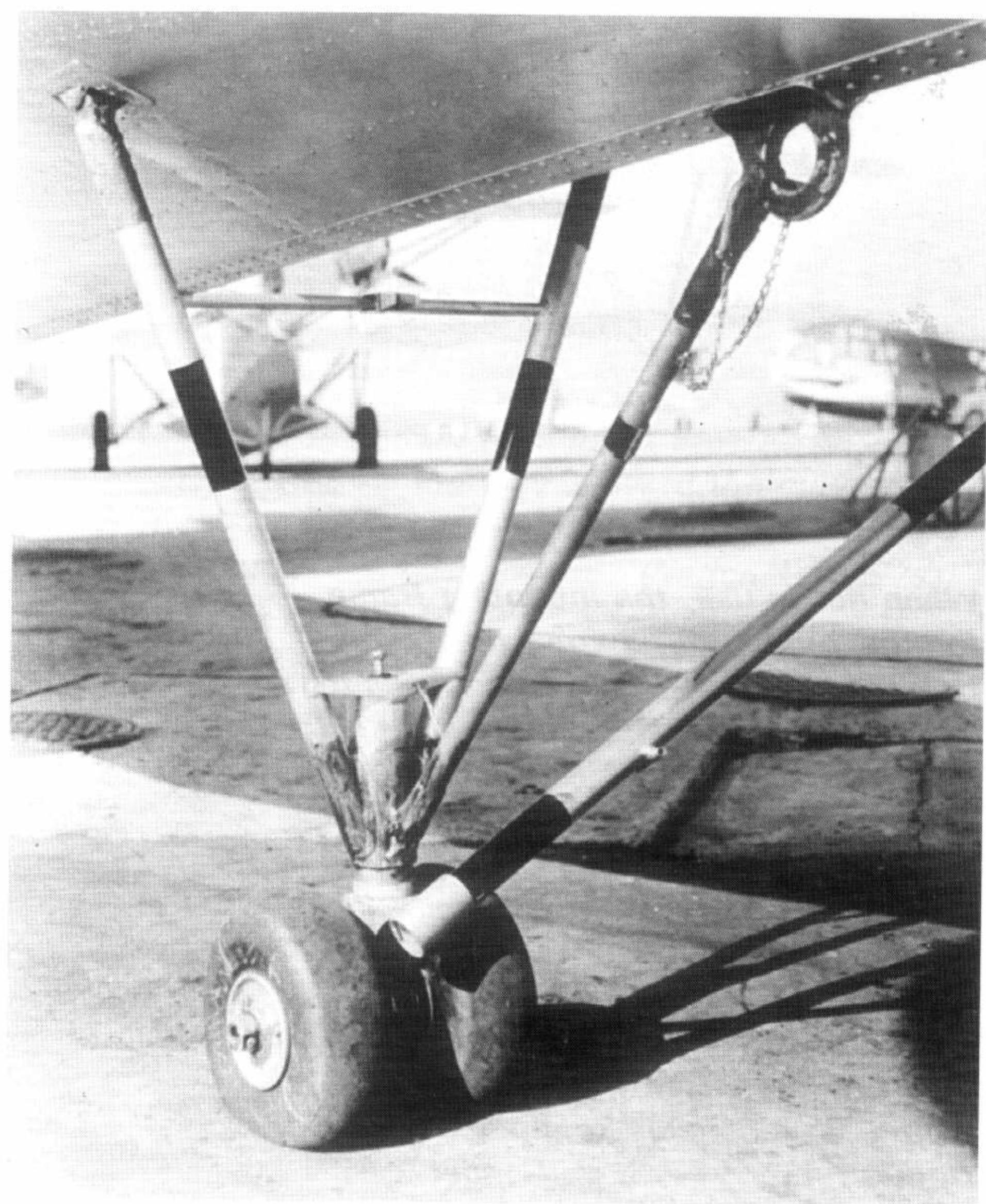


*Above left and right: Consolidated designed the outrigger floats on the PBY to retract upward and become the wingtips when the aircraft was in flight. This ingenious feature eliminated the drag caused by the numerous struts associated with fixed outrigger floats used on previous designs. In the photograph above, the float is shown in the fully retracted position, and it is evident how it became the tip of the wing with its aerodynamic design. Also note the navigation light on the leading edge of the wing. At right, the float is in the extended position.*



*All of the flying boat versions of the PBY series could be moved ashore on beaching gear, and it could even be used with the amphibians as well. The forward gear was attached to each side of the hull just below the forward wing strut.*

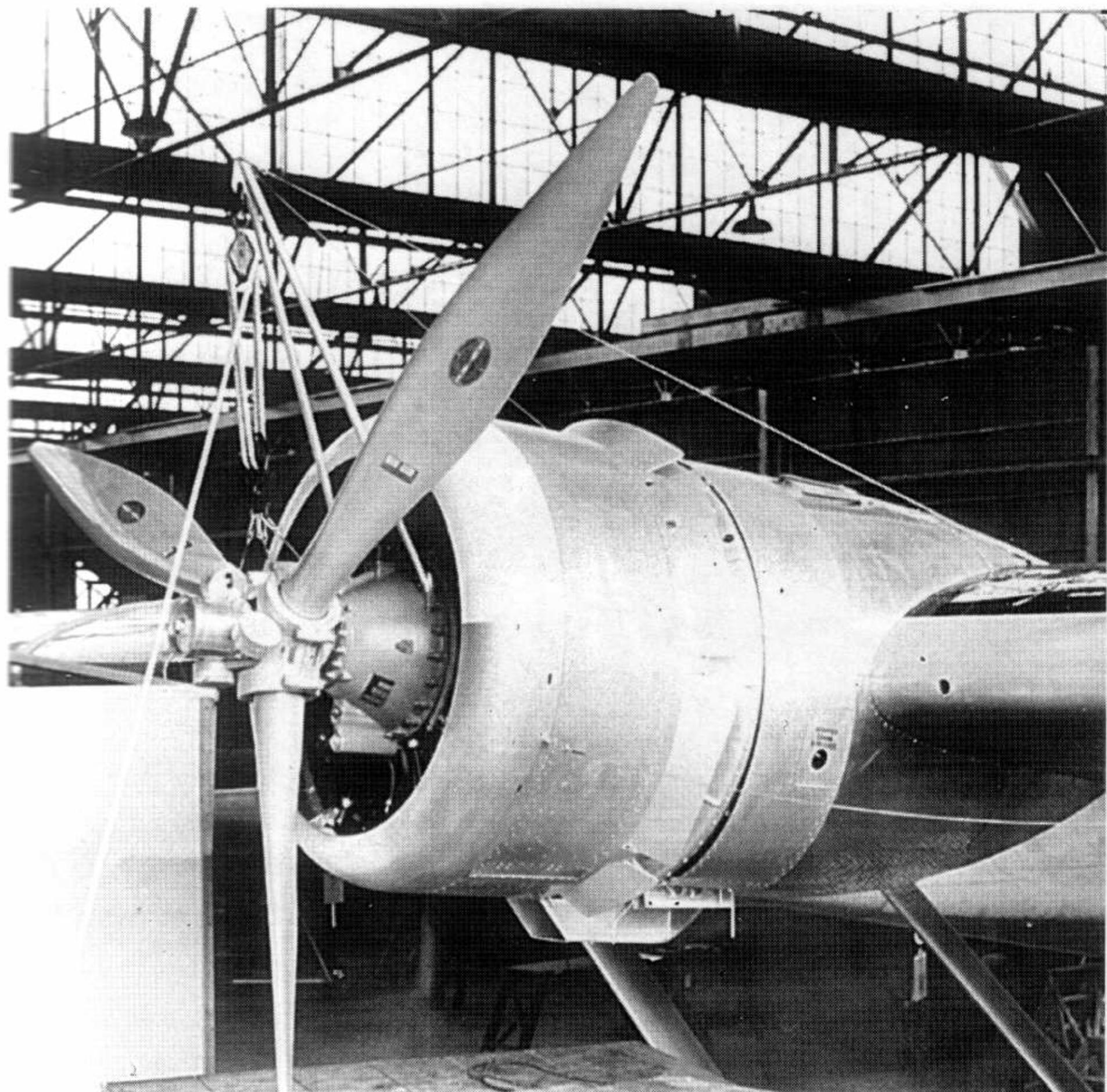
*(National Archives)*



*The rear beaching gear mounted underneath the tail section. The aft of the three supports fit onto the rear tie down eye, and a tow bar was attached to the pivoting wheel assembly so that the aircraft could be maneuvered on land by a tractor.*

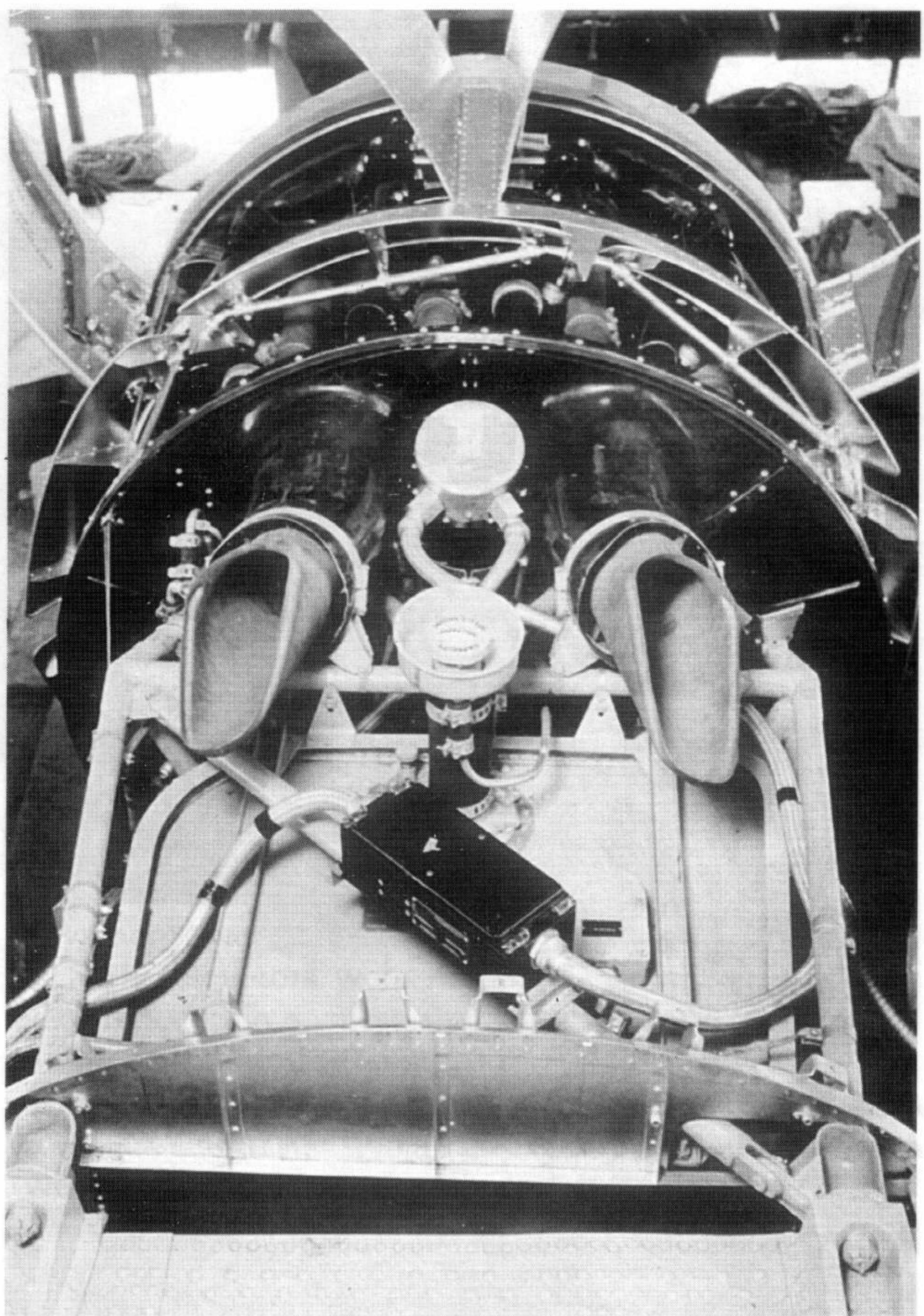
*(National Archives)*

## ENGINE DETAILS

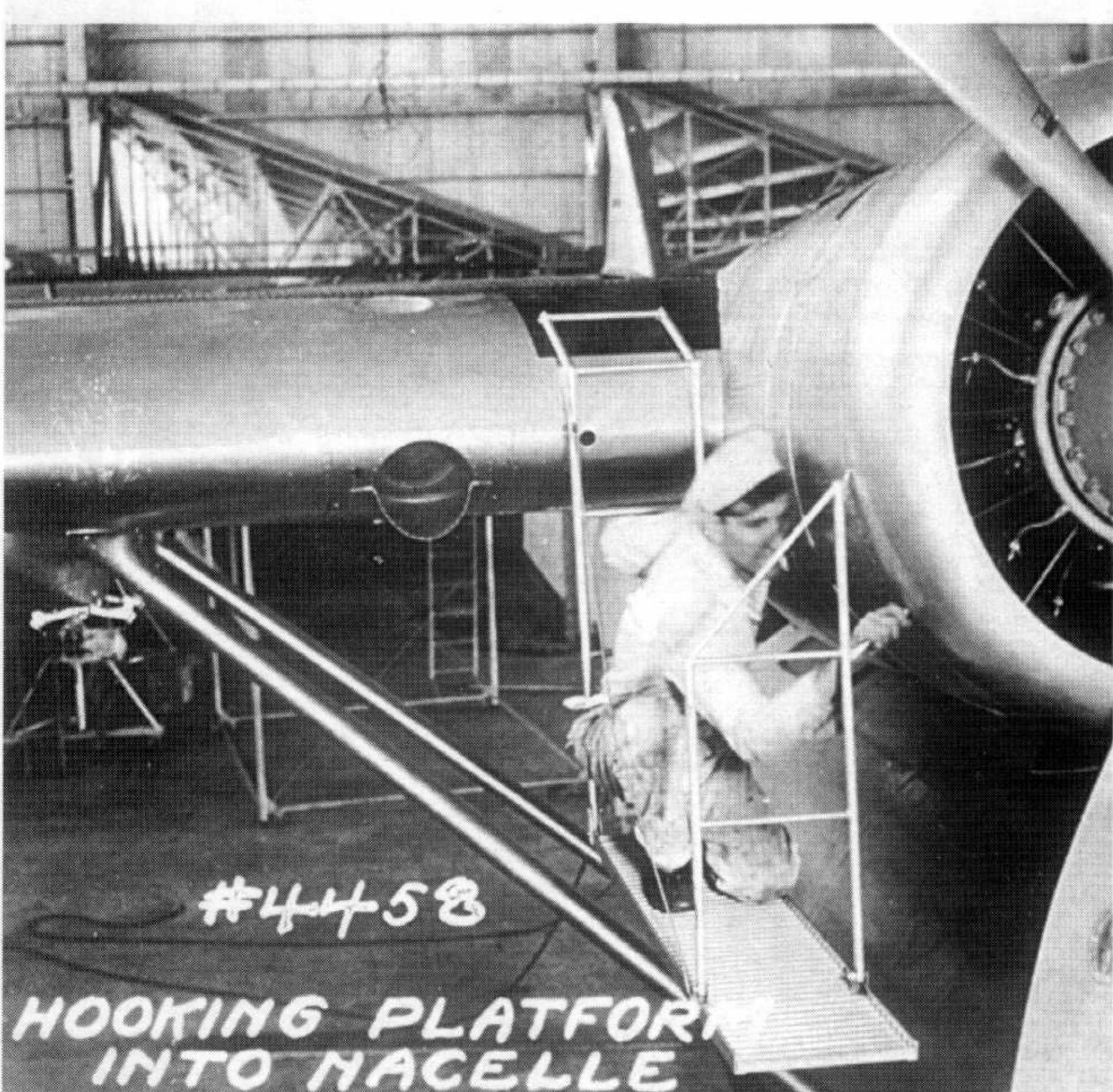


Above left: Two Pratt & Whitney R-1830-64 engines were used for the PBY-1 as well as the PBY-2 that followed. This version of the R-1830 was characterized by a carburetor air scoop beneath the cowling.

Above right: The two exhaust stubs were on top of the engine, and the exhaust was expended over the top of the wing. This view is of the top of the right engine, and it looks forward.  
(National Archives)

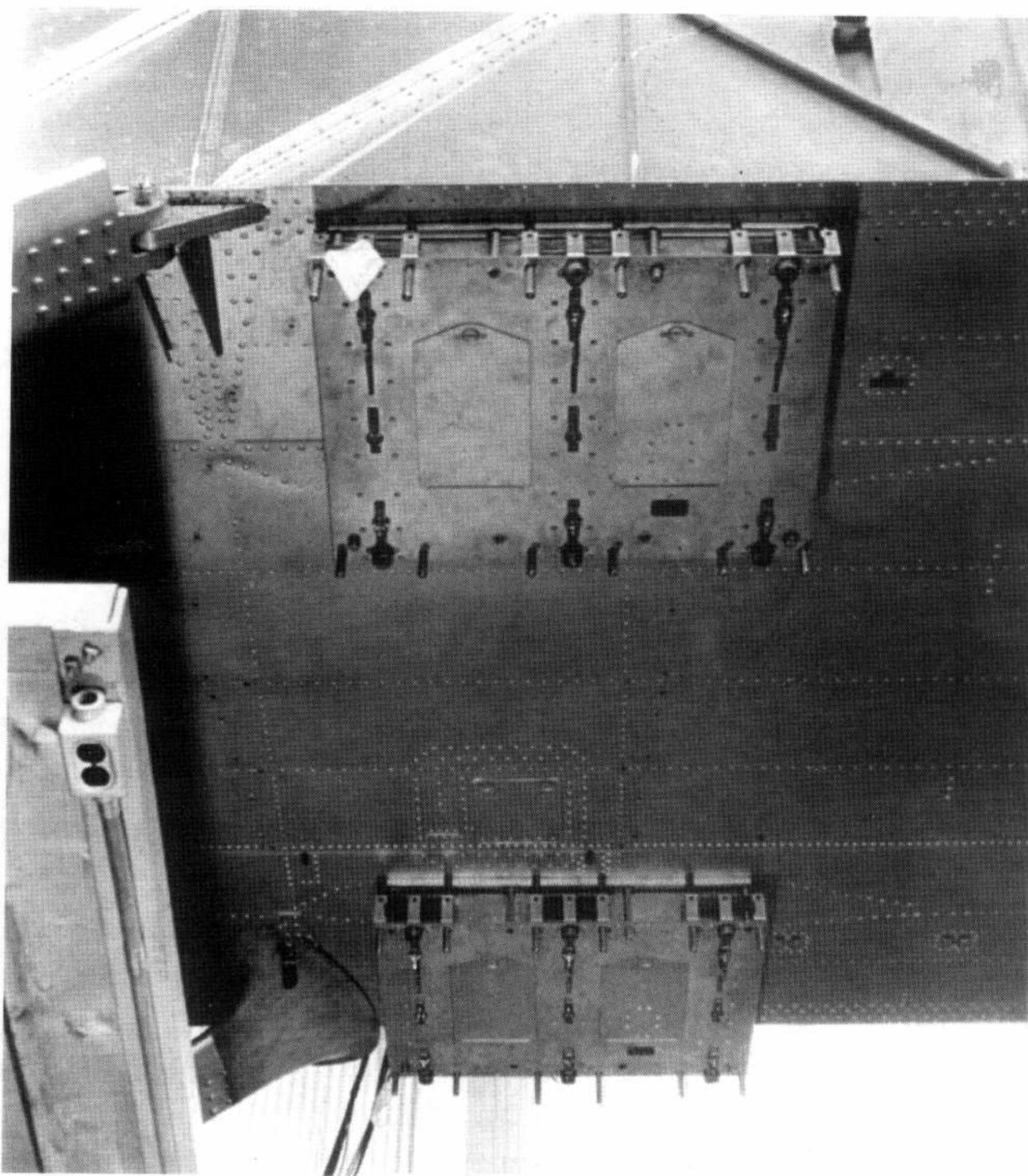


To allow easy access to the engines, platforms were carried inside each PBY. These could be attached to the leading edge of the wing and the side of the nacelle so maintenance could be performed regardless of whether the aircraft was on land or in the water. In this view, the aft framework has been attached to the top of the wing, and the base of the stand is being lowered along the outboard side of the nacelle.  
(National Archives)

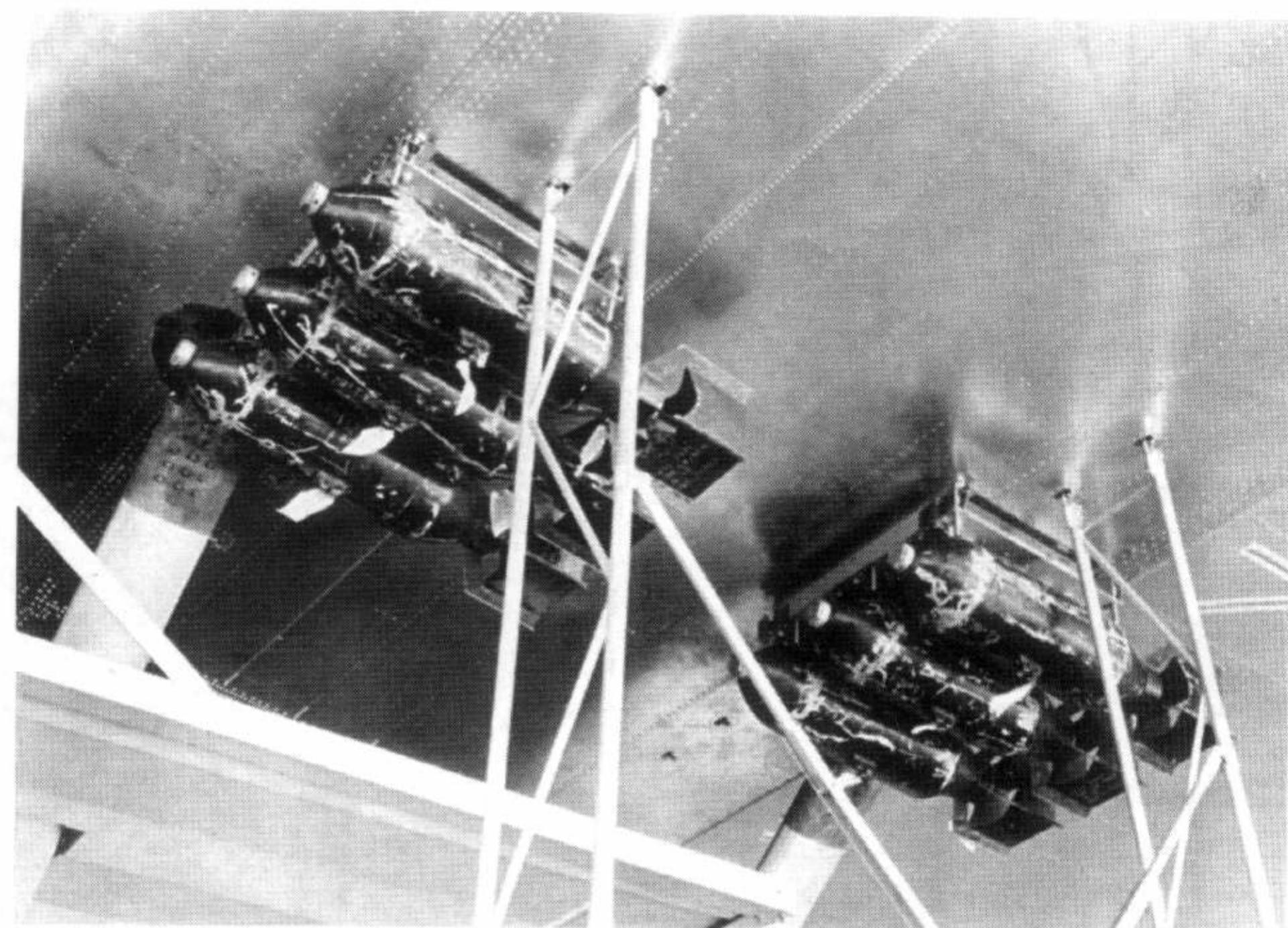


In this view, the work platform has been attached to the wing, and the final brace is being connected to the nacelle. Note that the oil cooler scoop is in the leading edge of the wing just outboard of the work stand. The oil coolers would remain buried in the wing like this through the PBY-4 variant. Beginning with the PBY-5, the oil cooler radiators were in scoops mounted under the right side of the nacelles.  
(National Archives)

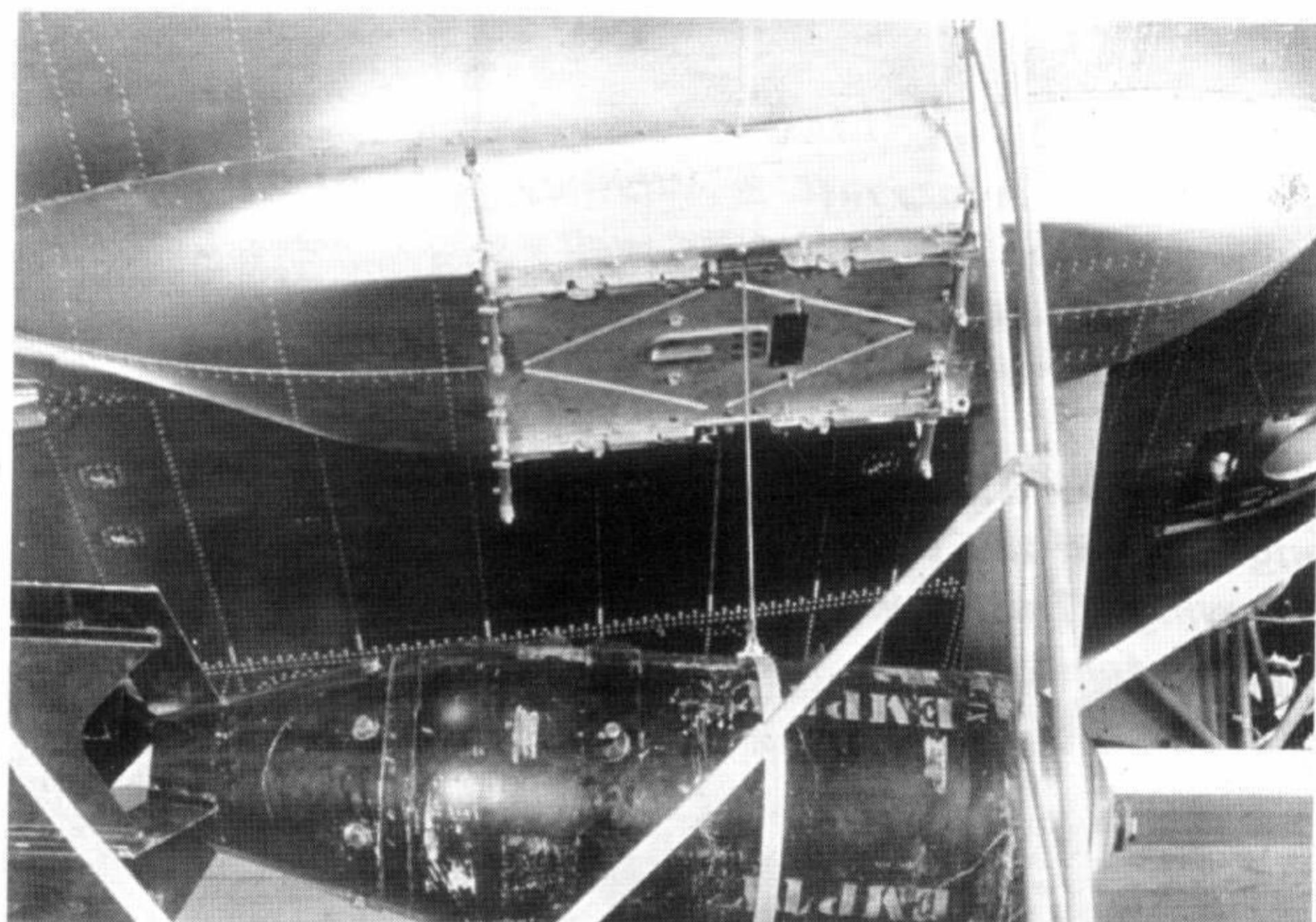
## OFFENSIVE ARMAMENT



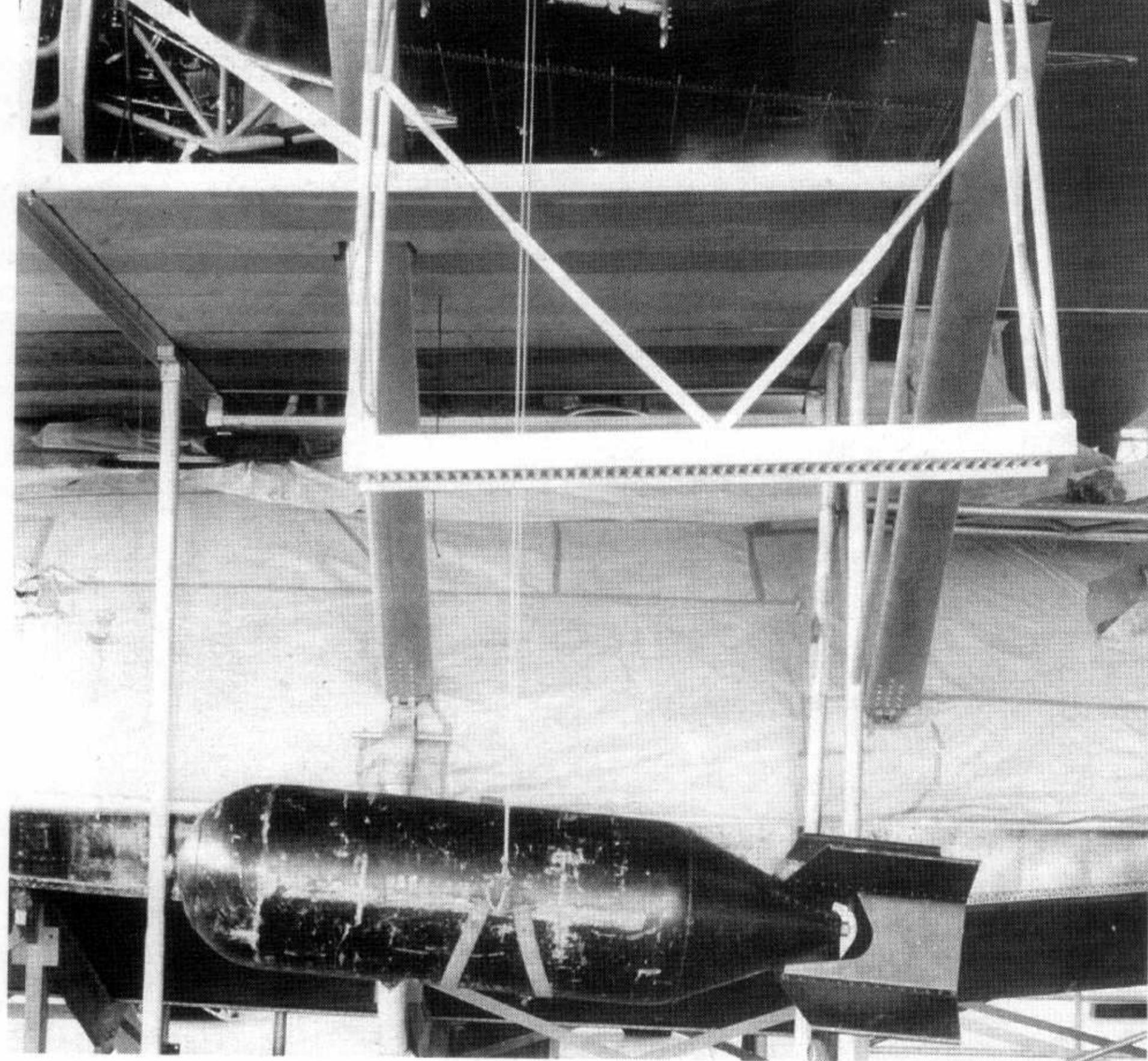
*Mark XLII racks could be installed under the wings for use with smaller bombs.*  
*(National Archives)*



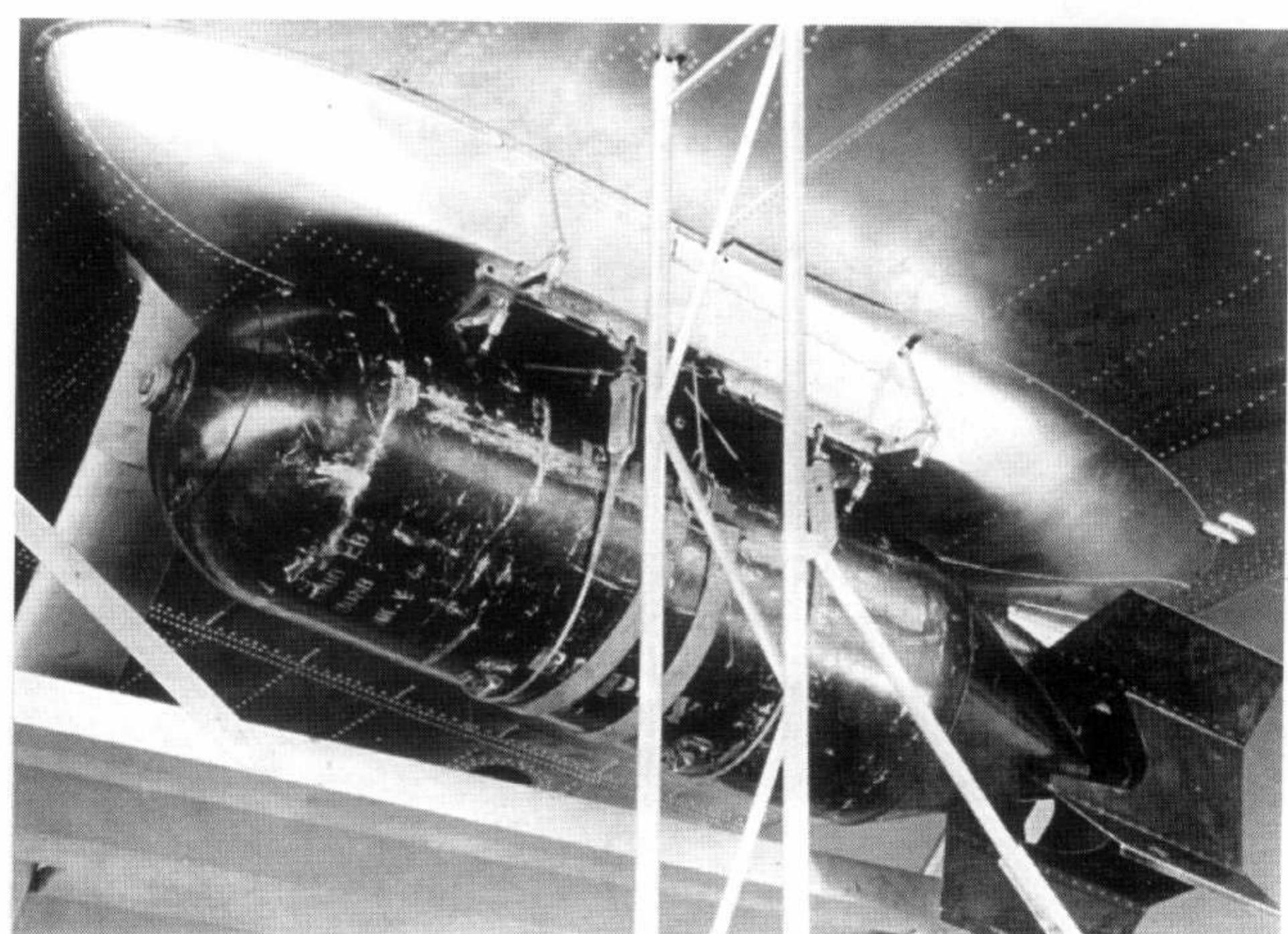
*Six 100-pound bombs could be carried under each wing using the Mark XLII racks.*  
*(National Archives)*



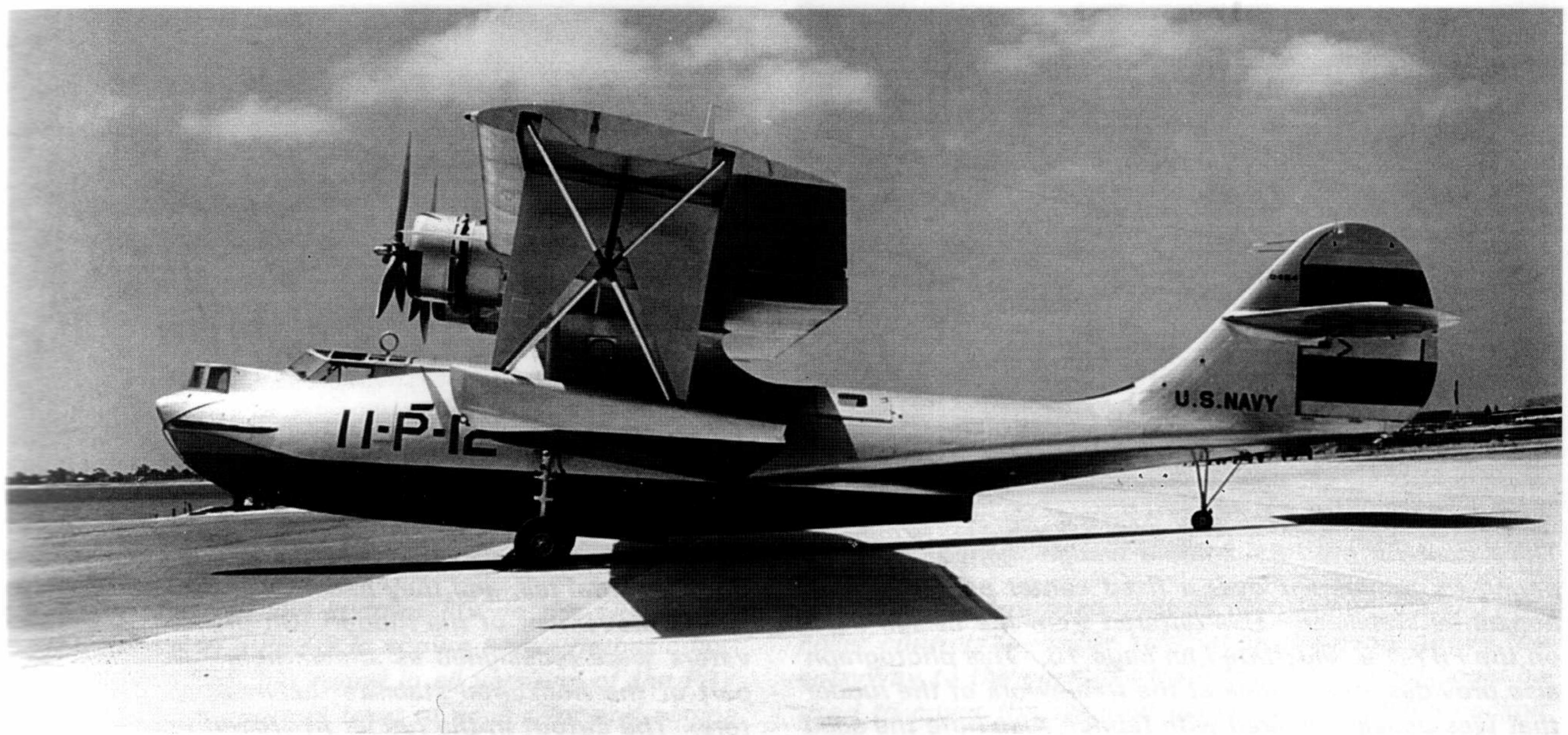
*A 500-pound bomb has been lifted to a position just beneath the bomb rack under the right wing.*  
*(National Archives)*



*A larger rack mounted on an aerodynamic fairing could be used for heavier bombs. Hoists on top of the wing lifted the bombs with cables that passed through holes in the wing and fairing. Platforms were attached under the wing so that men could secure the bombs to the racks.*  
*(National Archives)*



*A 1000-pound bomb is shown in place on a rack under the left wing. The lifting cables and strap harness remain in place, but they will be removed later to complete the loading process. The capability to carry bombs and torpedoes greatly increased the value of the U. S. Navy's flying boats.*  
*(National Archives)*



*Except for a relatively small design change made to the horizontal stabilizer and rudder, the PBY-2 was essentially the same as the PBY-1. This PBY-2 was assigned to VP-11. A color profile of this aircraft appears on page 33.*

*(National Archives)*

A contract for fifty PBY-2s was issued on July 25, 1936, less than a month after the contract had been placed for the sixty PBY-1s. They were assigned BuNos. 0454 through 0503.

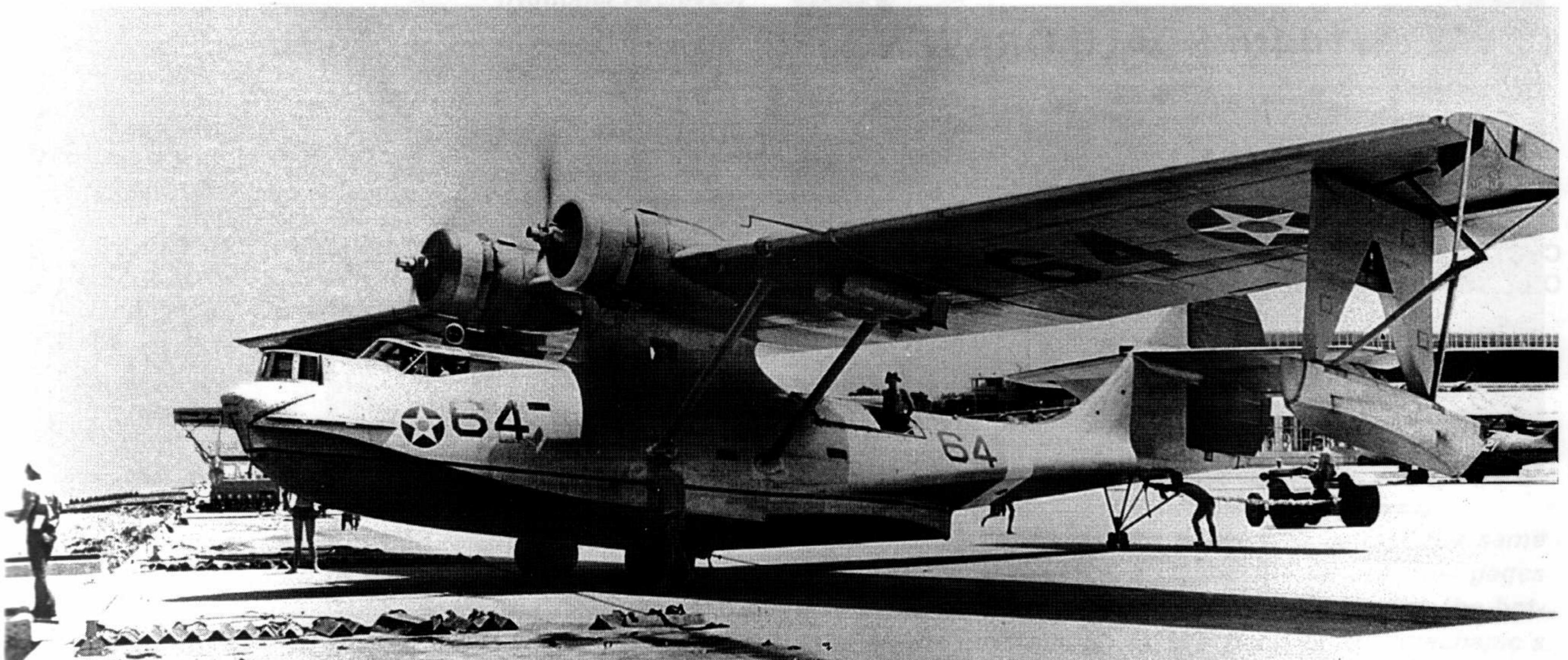
In almost every respect, the PBY-2s were identical to the previous PBY-1s including being powered by the same R-1830-64 engine. The only really noticeable difference was a change in the design of the tail. To allow movement of the rudder, the inboard edges on the elevators of the PBY-1 had been angled, and the elevators themselves extended across the full span of the horizontal tail as illustrated on page 16. On the PBY-2, a wedge shaped cutout was added in the rudder to permit its

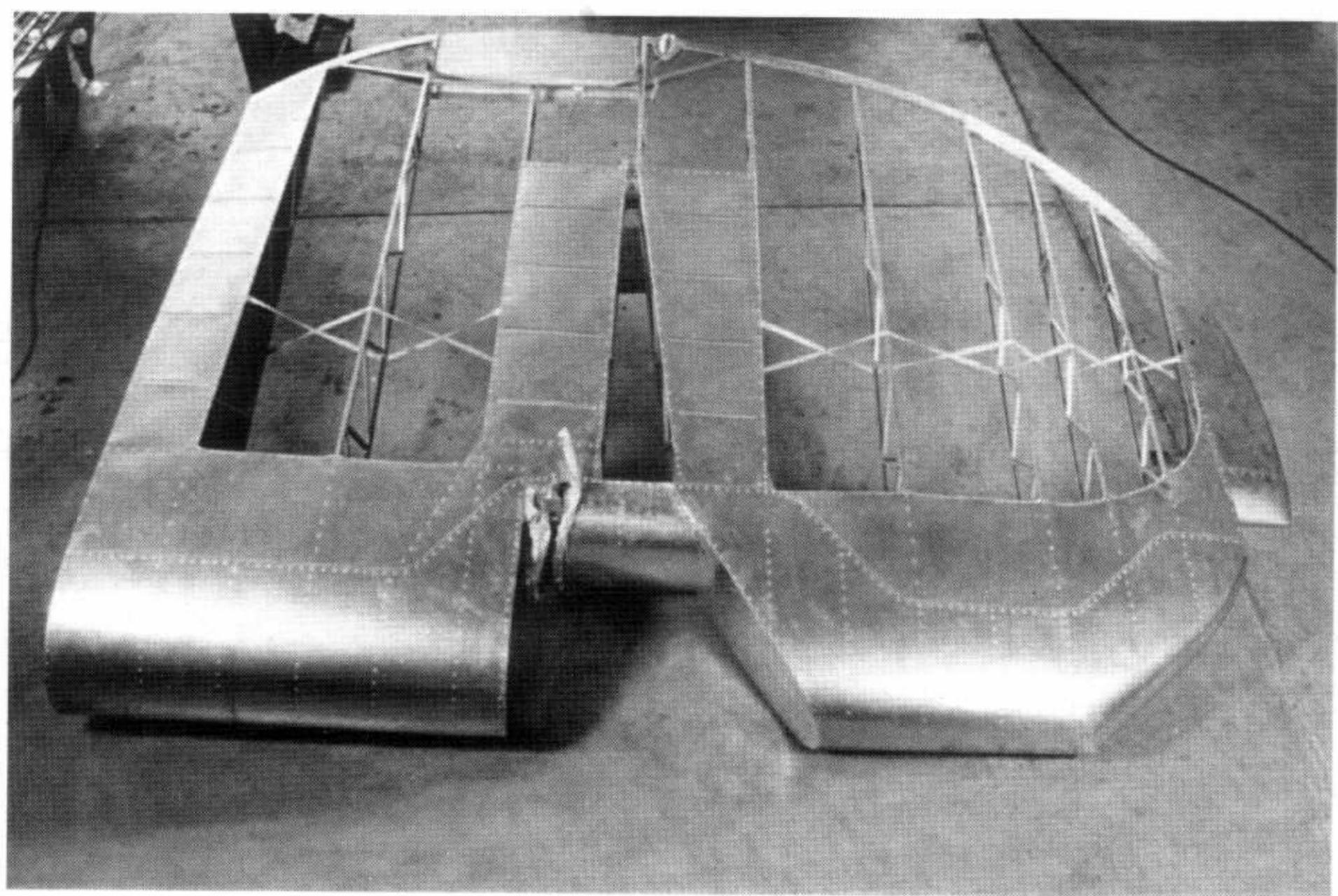
movement over a fixed center section of the horizontal tail. The elevators were rectangular in shape, and they were reduced in span so that they did not extend out to the tip of the horizontal stabilizer.

The waist positions on the PBY-2 were fitted with .50-caliber machine guns from the beginning. The first twelve, and the forty-fourth and forty-fifth PBY-2 had Curtiss Electric propellers, but the remainder were equipped with Hamilton Standard propellers. Otherwise, the only difference between the PBY-2 and the PBY-1 was that the bomb racks under the wings had an increased load capacity. The PBY-2 had a gross weight of 21,780 pounds, over 1,100 pounds heavier than the PBY-1. As a result the top speed dropped to 176 miles-per-hour, and the ceiling decreased to 20,900 feet.

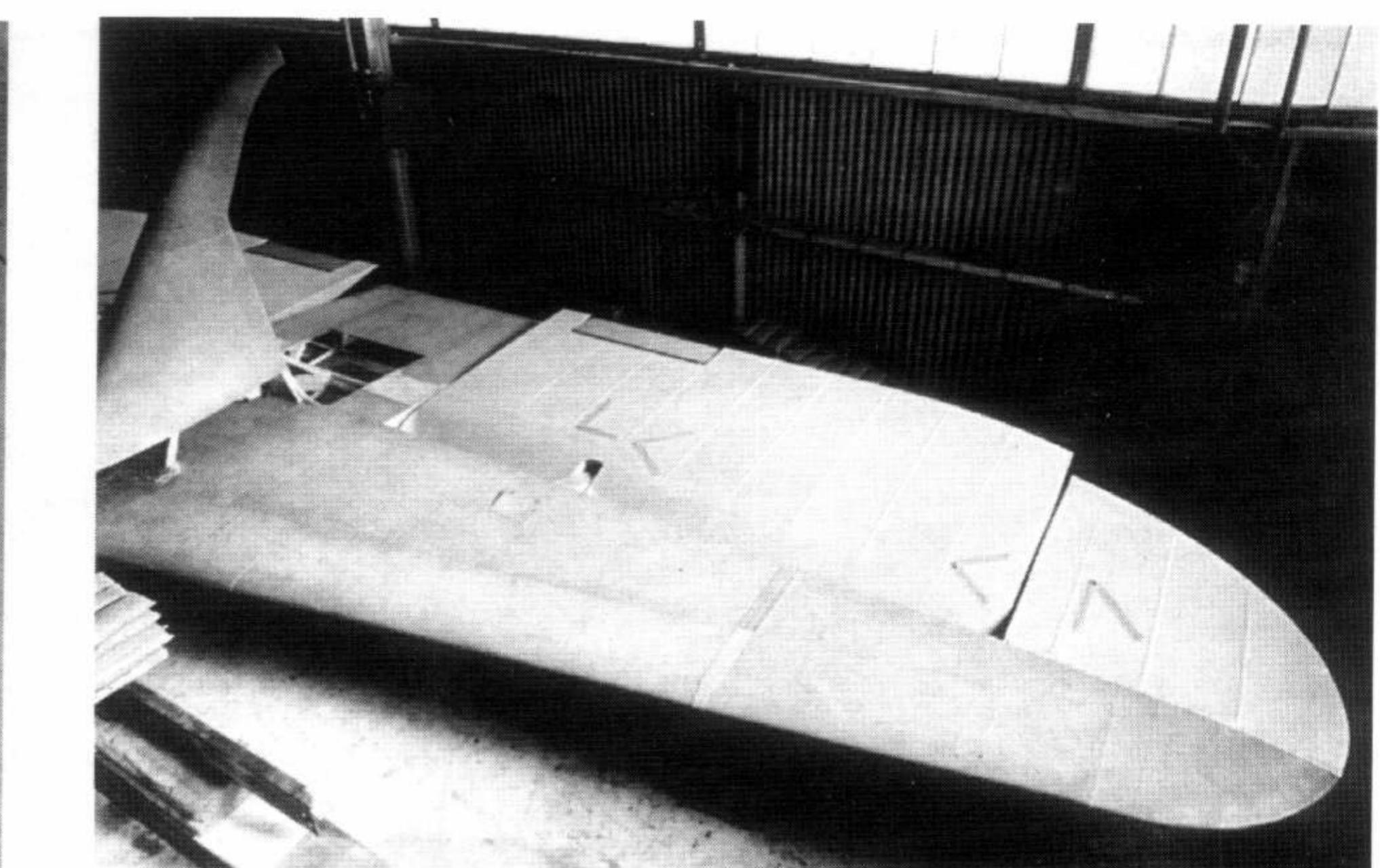
*This PBY-2 was assigned to NAS Jacksonville, Florida, and it was being used for training when this photograph was taken on June 5, 1942.*

*(National Archives)*



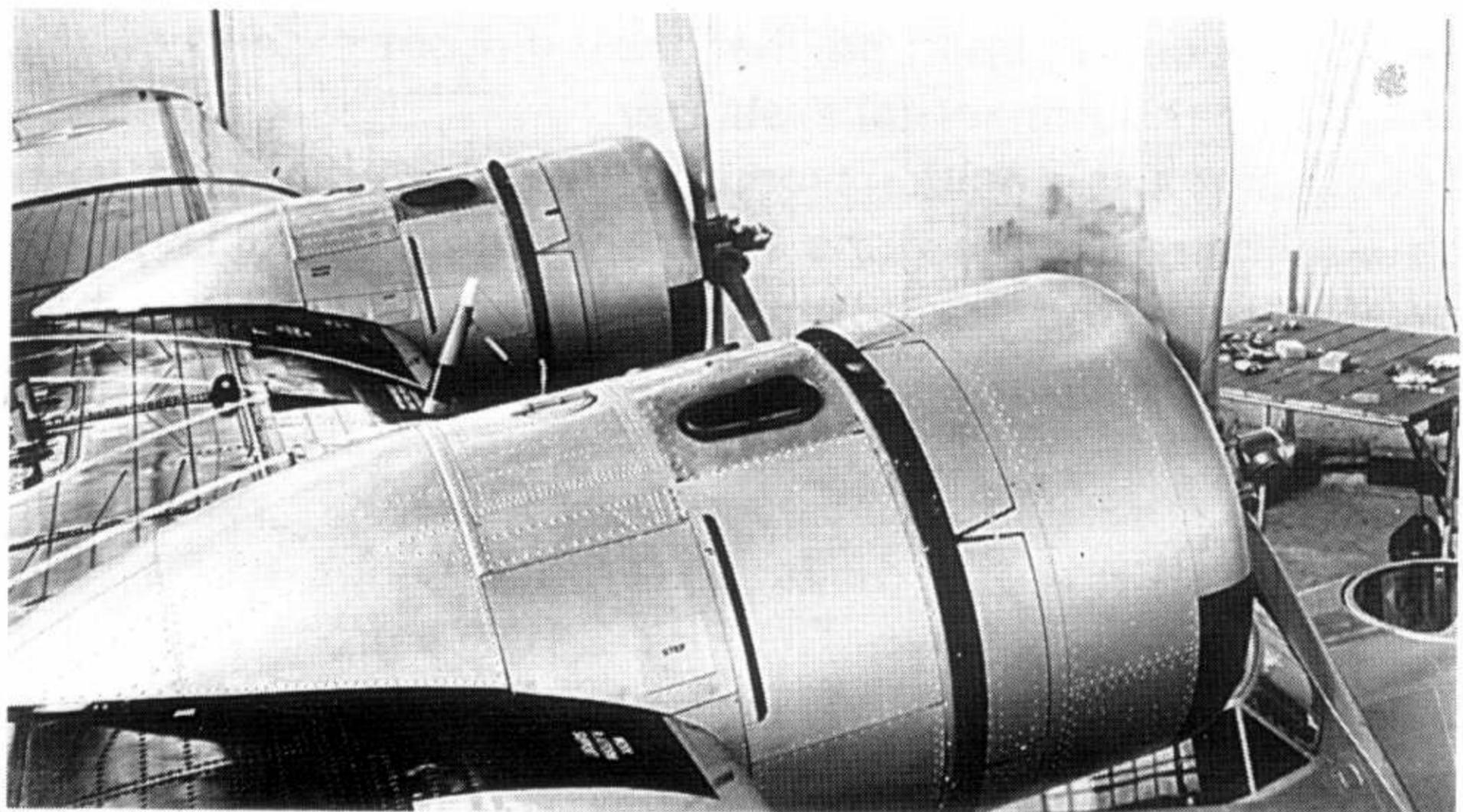


**The rudder for the PBY-2 had a wedge shaped cutout to permit its movement over a fixed center portion of the horizontal stabilizer. This differed from the design used on the PBY-1 as illustrated on page 16. This photograph also provides a good look at the framework of the rudder that was usually covered with fabric. Also note the solid trim tab.**



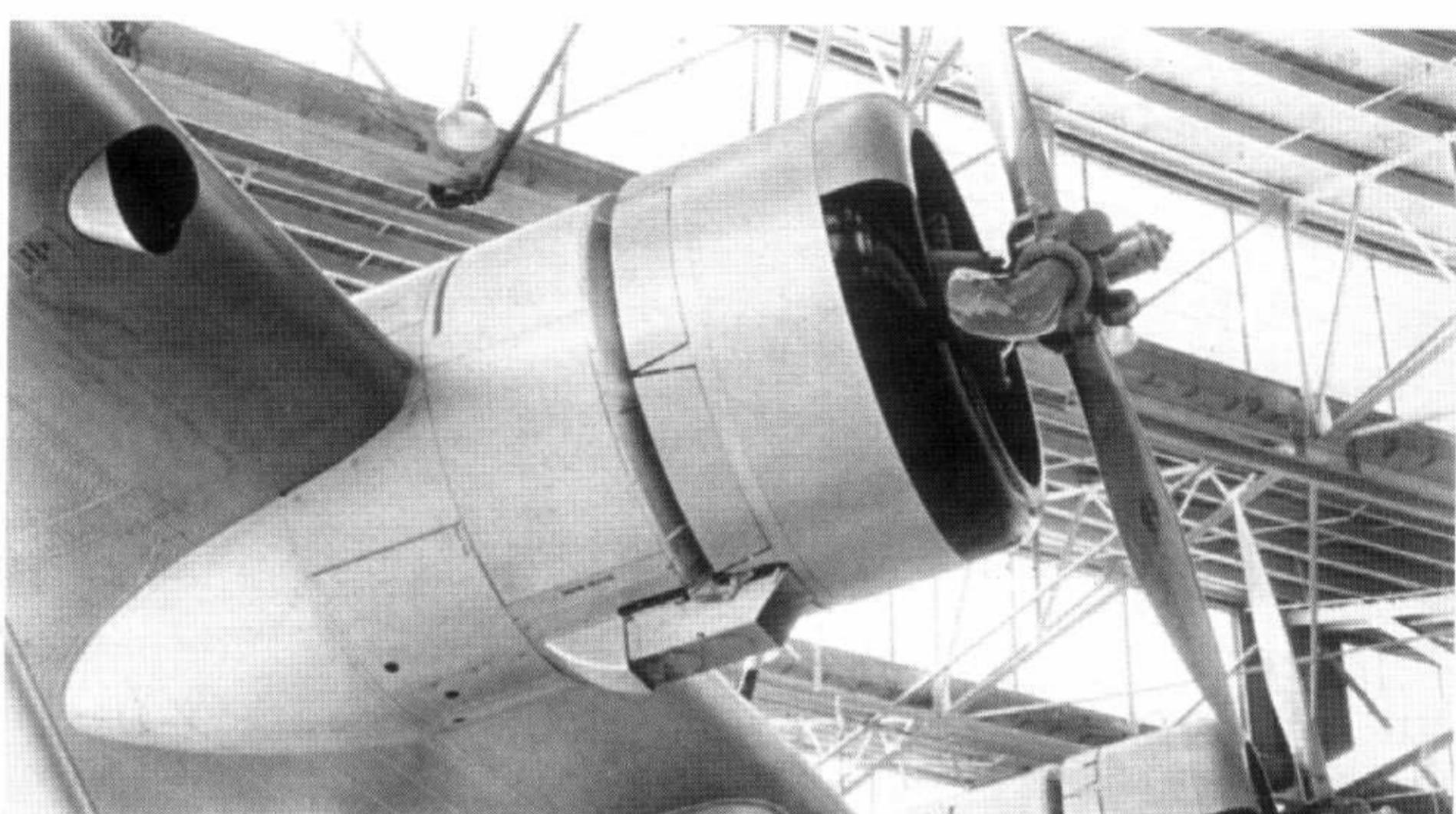
**On the PBY-1, the elevators spanned the entire length of the horizontal tail, and they had angled inboard edges to permit movement of the rudder. On the PBY-2, the elevators were redesigned as shown here. Note the fixed part of the horizontal stabilizer between the two elevators. The cutout in the rudder fit around this fixed area.**

(National Archives)



**The PBY-2 used the same Pratt & Whitney R-1830-64 engines as the PBY-1. The right side exhaust stub on each engine can be seen here. Note the large cooling flaps on the cowlings.**

(National Archives)

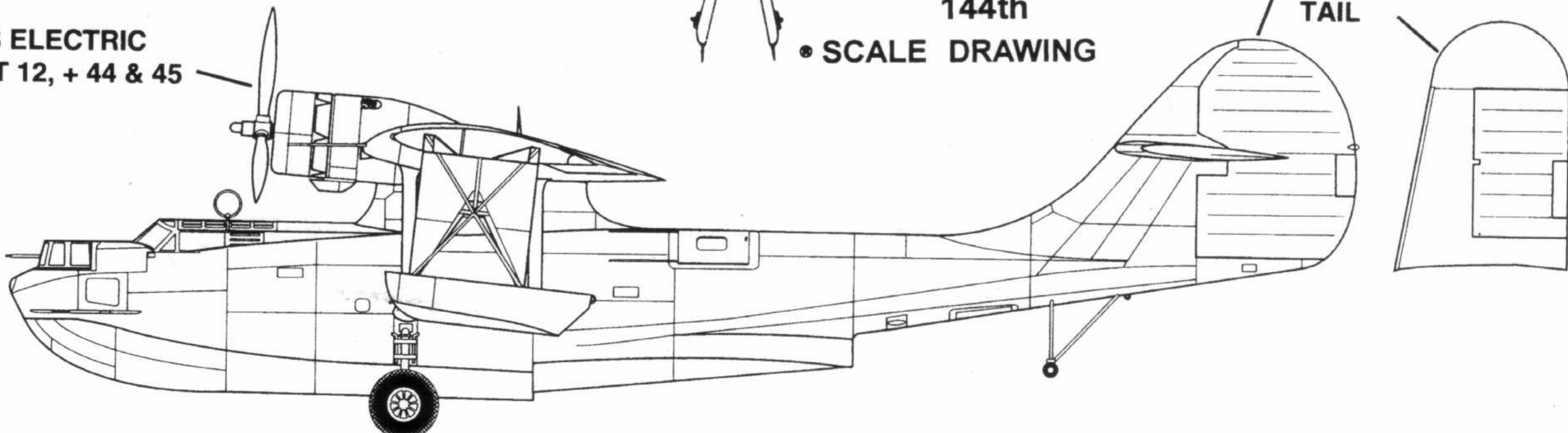


**An underside view of the starboard engine shows the intake for the updraft carburetor beneath the nacelle. The scoop for the oil cooler is visible on the leading edge of the wing.**

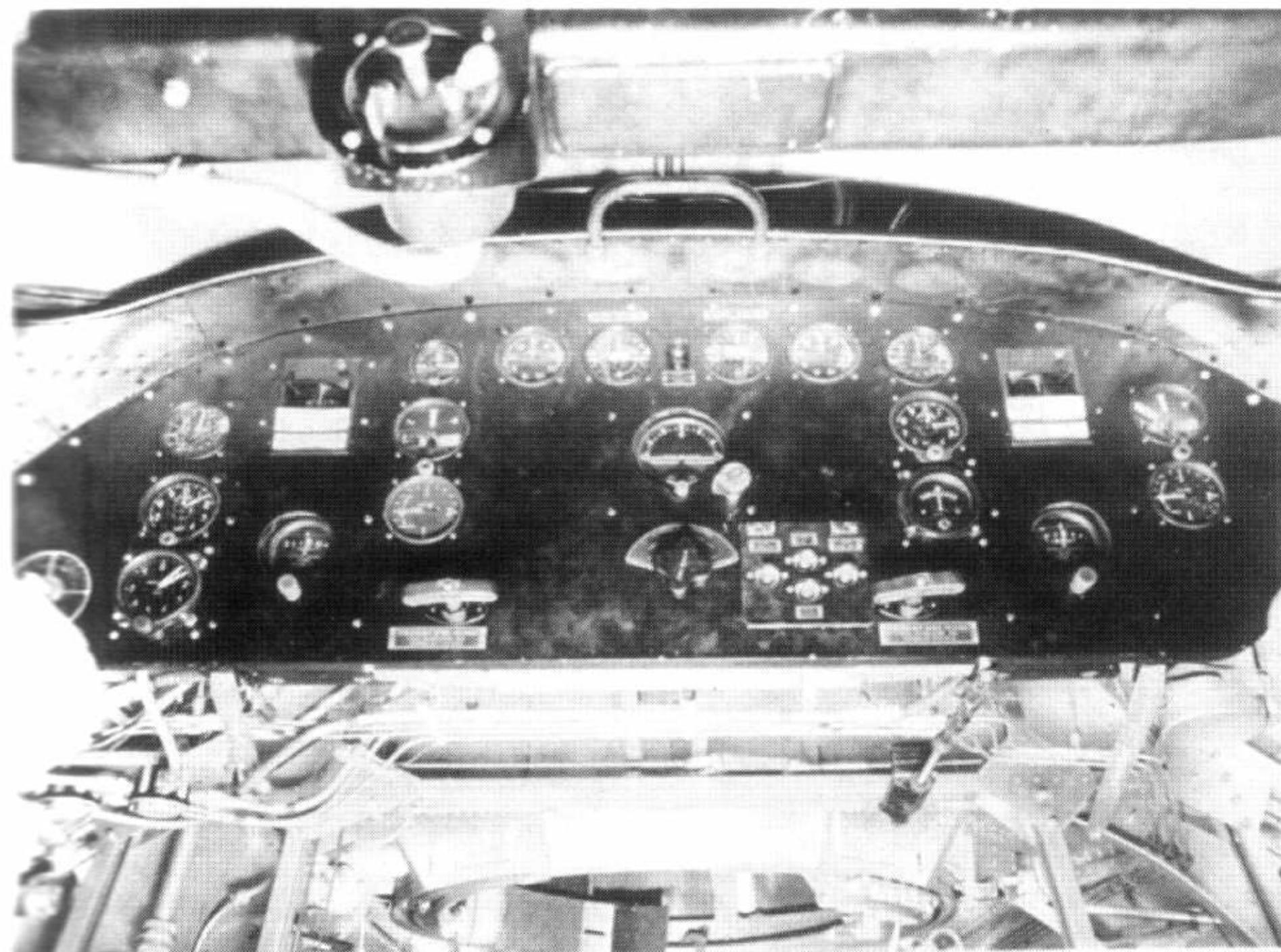
(National Archives)

## PBY-2 1/144th SCALE DRAWING

CURTISS ELECTRIC  
ON FIRST 12, + 44 & 45

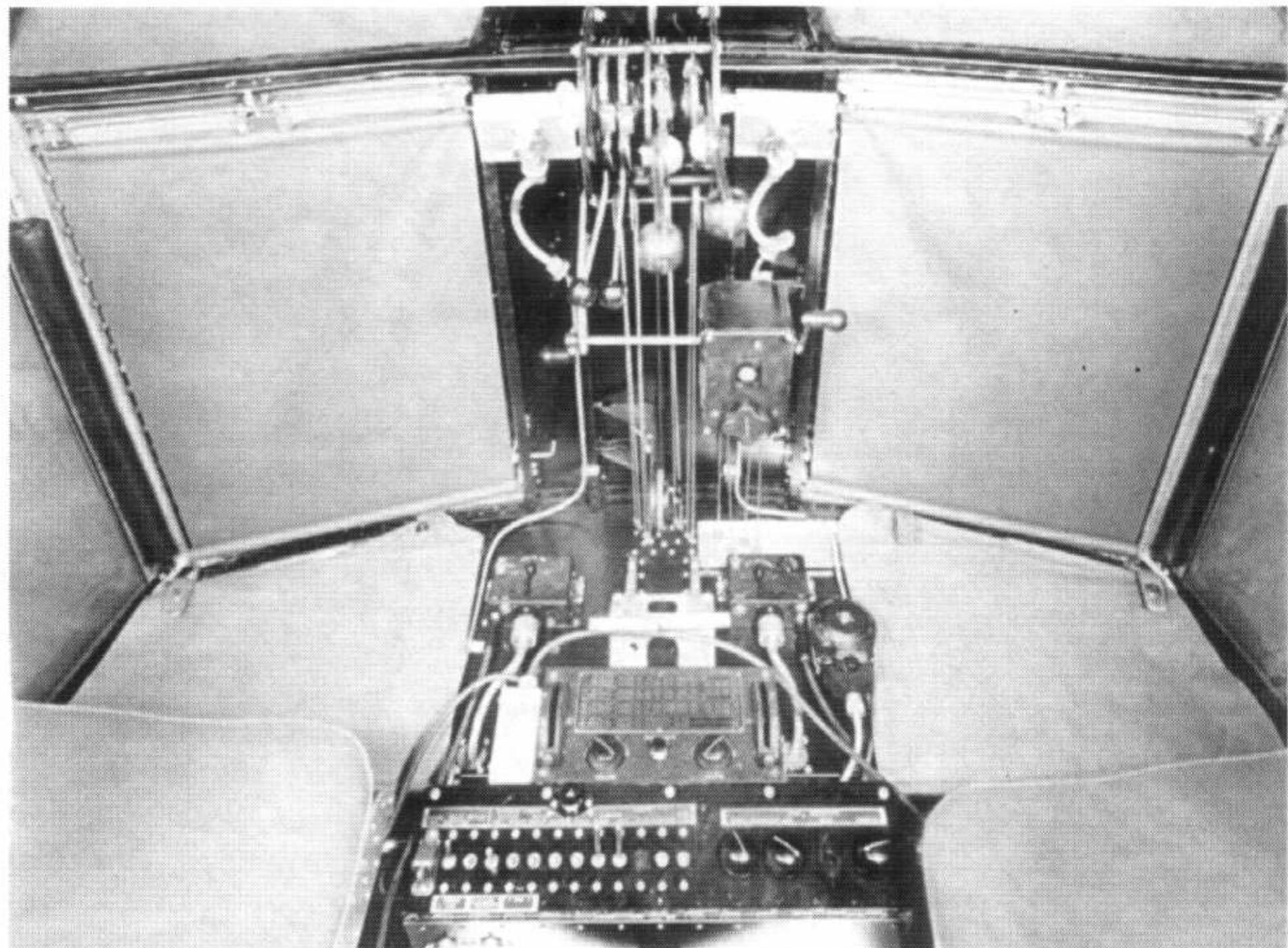


# PBY-2 INTERIOR DETAILS



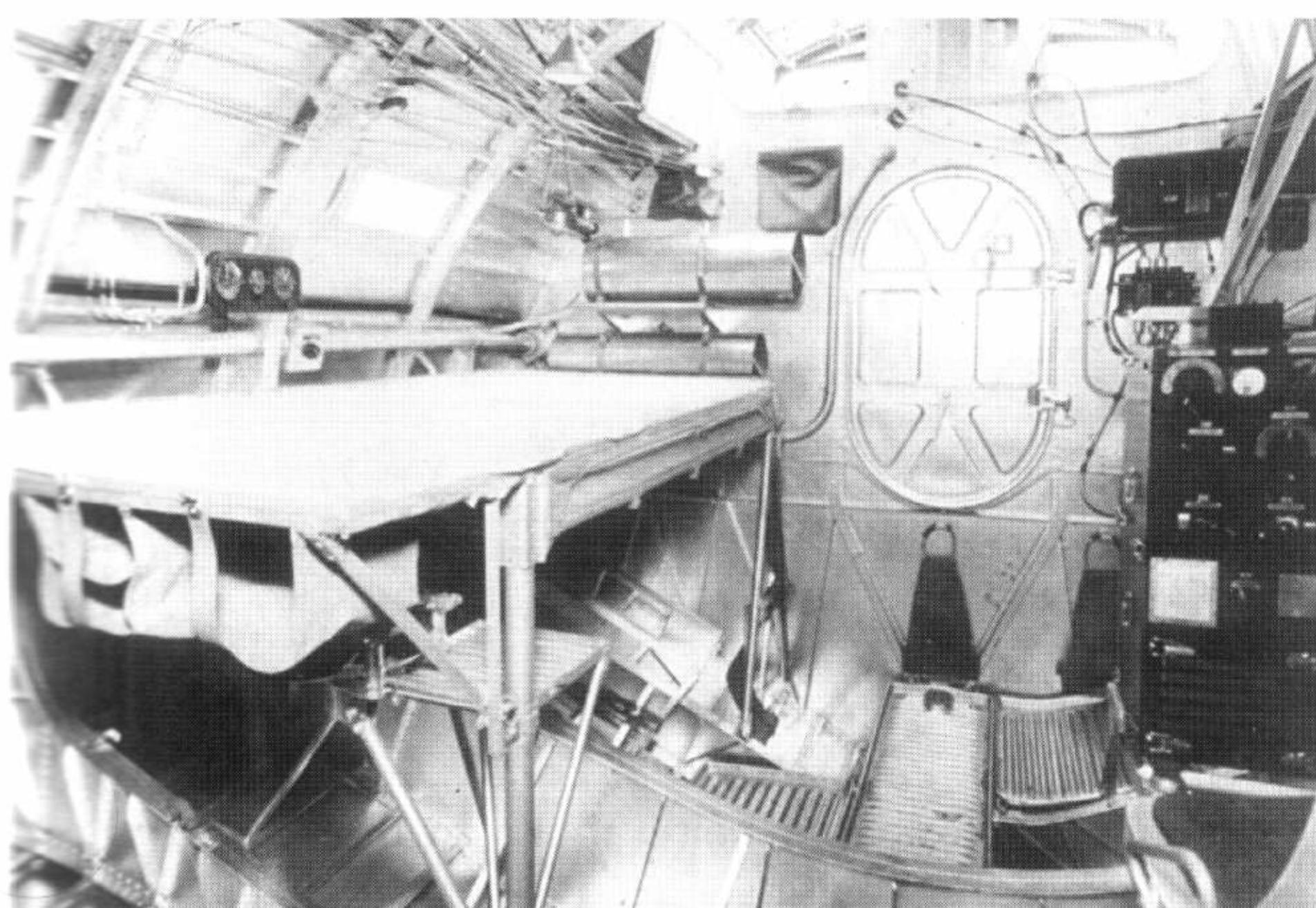
The arrangement of the instruments on the pilot's and co-pilot's panel in a PBY-2 is shown here. Its basic layout was typical of that found in all versions of the PBY with flying instruments in front of each pilot and engine gages at the center.

(National Archives)



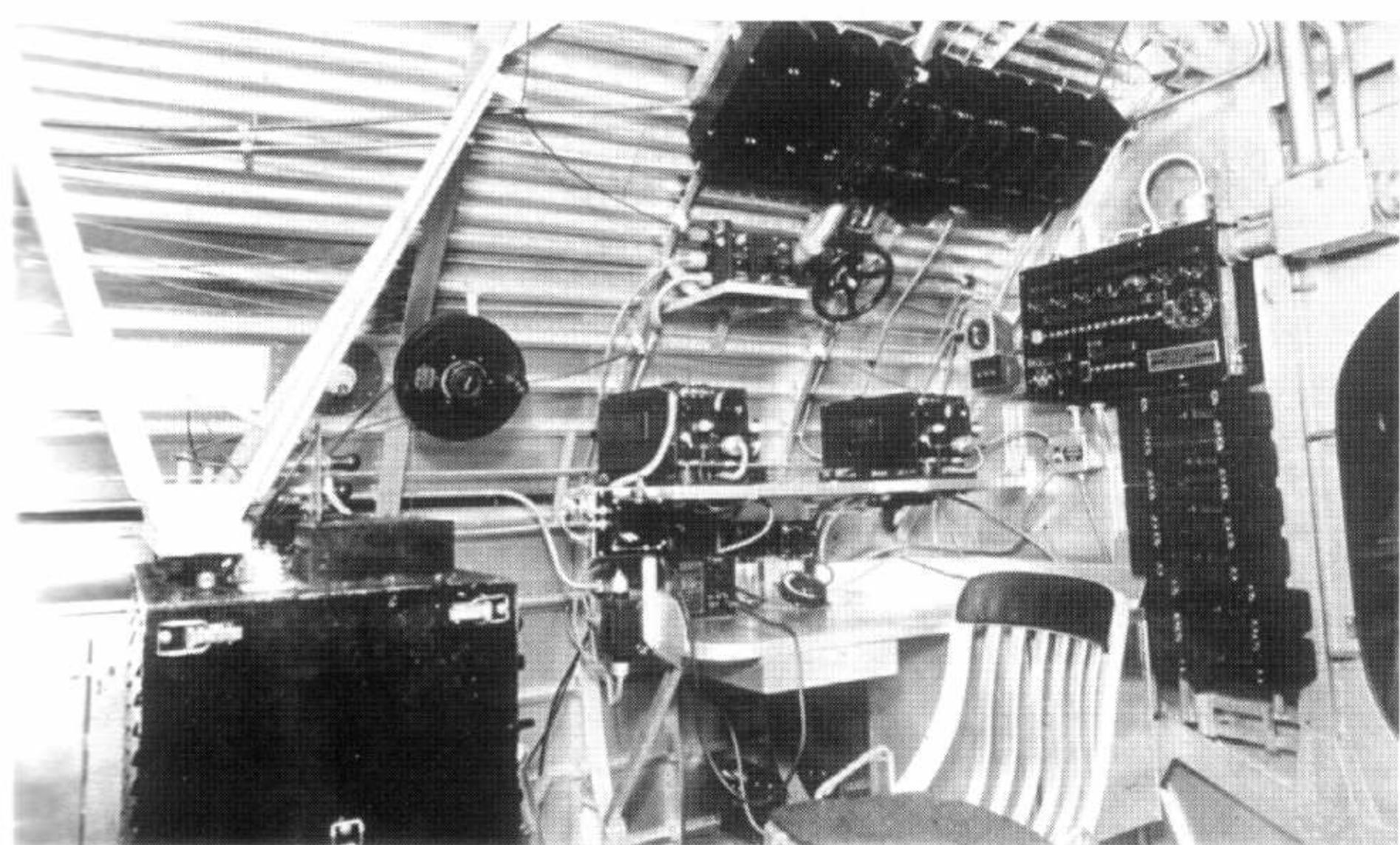
Details of the overhead console with the engine and propeller controls is visible here, as is the panel above the entryway to the cockpit. Note the shades that could be used to cover the window panels on top of the cockpit enclosure.

(National Archives)



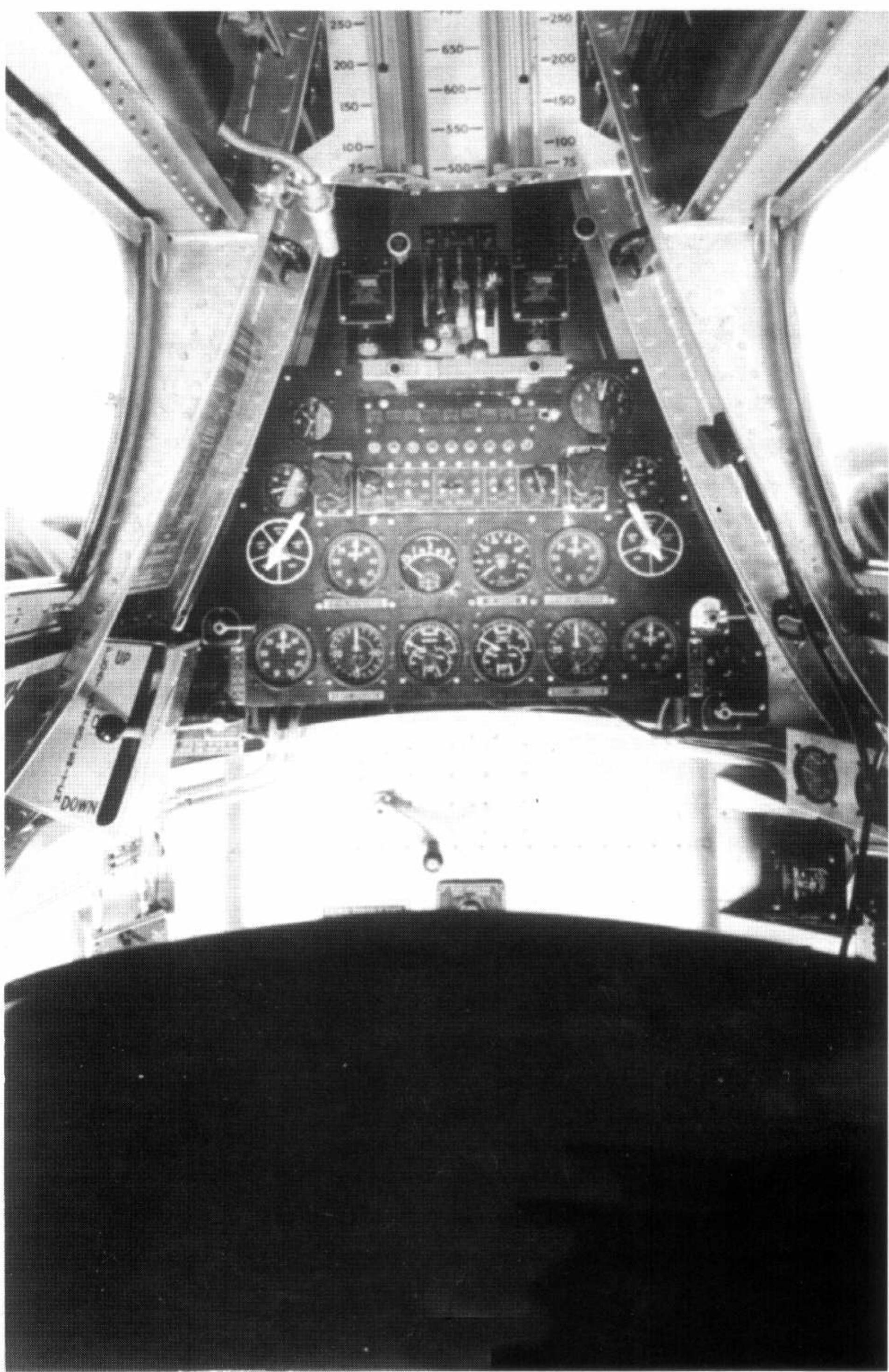
The navigator's table and seat in the PBY-2 were basically the same as that installed in the PBY-1. In this view, the seat has been moved to its stowed position beneath the large table.

(National Archives)



Note the different chair provided for the radio operator in the PBY-2 as compared to the PBY-1 illustrated on page 19. The equipment remains basically the same, but extra tuning units are carried on the aft bulkhead and on the overhead of the compartment.

(National Archives)



The mechanic's instrument panel was almost the same as that used in the PBY-1. Note the vertical fuel gages above the instrument panel. The black area at the bottom of the photograph is the back of the mechanic's metal seat.

(National Archives)

# PBY-3



**Sixty-six PBY-3s were built, and they differed from the PBY-2 in that they had more powerful Pratt & Whitney R-1830-66 engines. This version of the powerplant had a downdraft carburetor, so the air scoop for it was moved to the top of the nacelle.**

(NMNA)

Sixty-six PBY-3s were ordered on November 27, 1936, and they were assigned BuNos. 0842 through 0907. These aircraft were powered by R-1830-66 engines which produced 900 horsepower. The R-1830-64, as used in the PBY-1 and PBY-2, had an updraft carburetor, so its air scoop had been located on the bottom of the engine nacelle. But the R-1830-66 had a downdraft carburetor, and this meant that the scoop had to be moved from the bottom to the top of the nacelle. This was the only noticeable external change between the PBY-2 and PBY-3. The marginally more powerful engine

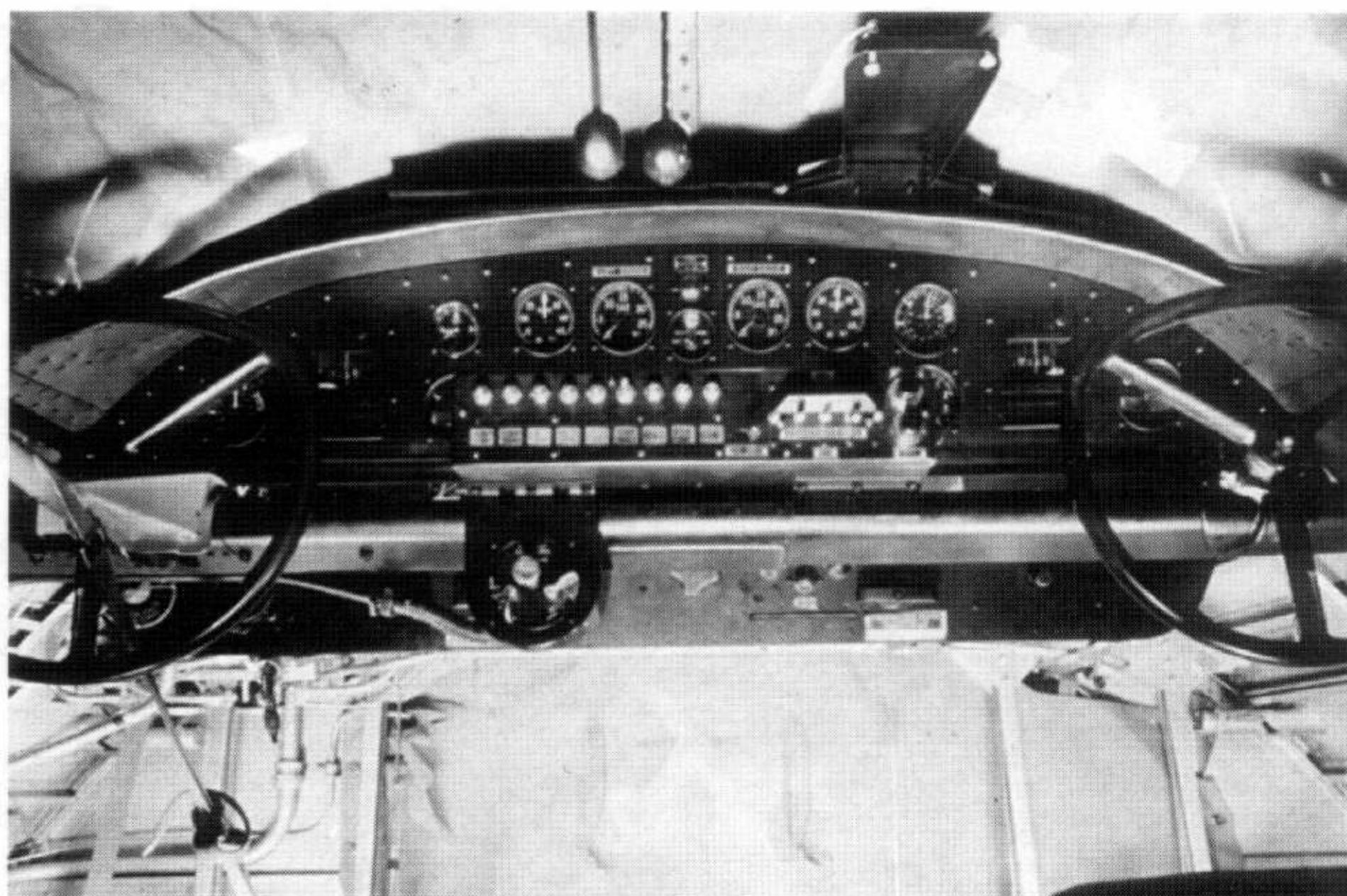
raised the top speed to 185 miles-per-hour, and the ceiling increased to 23,100 feet. The gross weight of the PBY-3 was 22,078 pounds.

Deliveries began in late 1937, and as production proceeded at San Diego, VP-4, VP-5, VP-7, VP-9, VP-16, VP-18, VP-21, VP-22, and VP-32 all took deliveries of PBY-3s. When the last one was accepted by the Navy, PBY-3s had joined the two earlier versions serving along the west coast from Seattle to San Diego as well as in Hawaii and the Panama Canal Zone. Deployments from permanent bases were being made to the Aleutians and elsewhere in the Pacific.

**A PBY-3 from utility squadron VJ-4 sits in floating ice on February 12, 1942. Most PBY-1 through PBY-4 versions were used in utility and training roles after 1941, and relatively few saw any combat.**

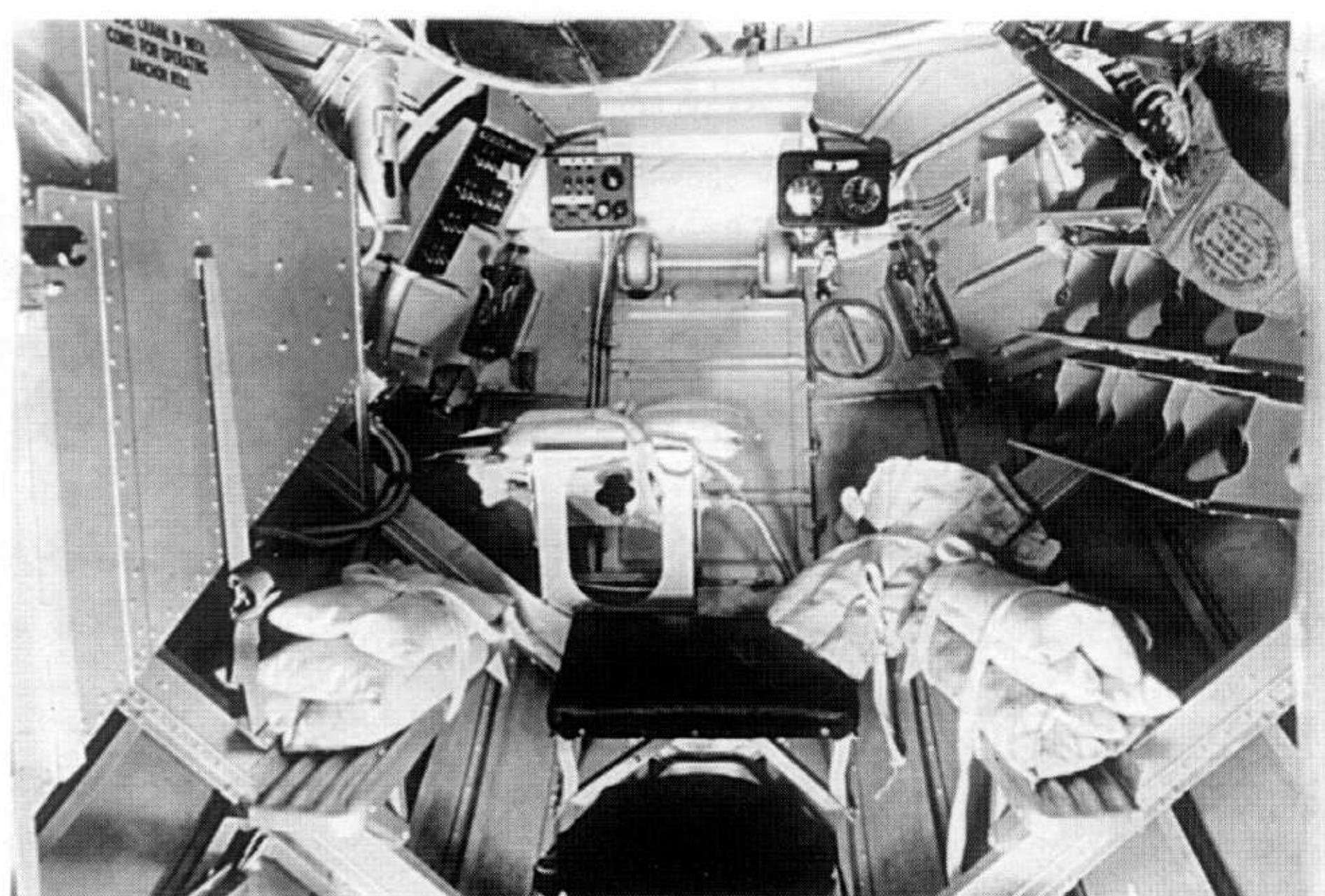
(National Archives)





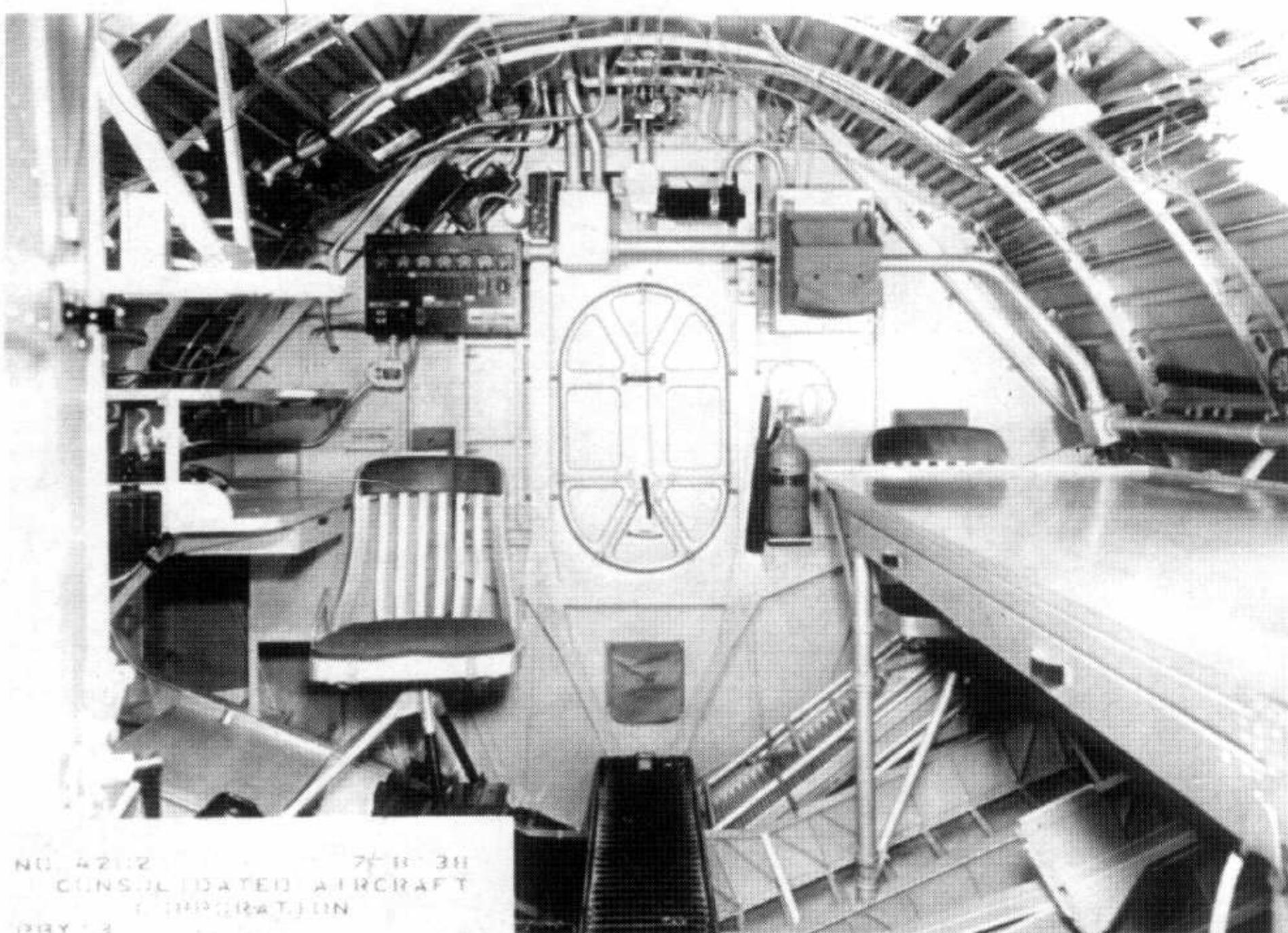
*The instrument panel in the PBY-3 was essentially the same as had been used in the previous two variants.*

(National Archives)



*The interior of the bombardier's compartment in the bow is shown here. Life vests are visible on the platforms.*

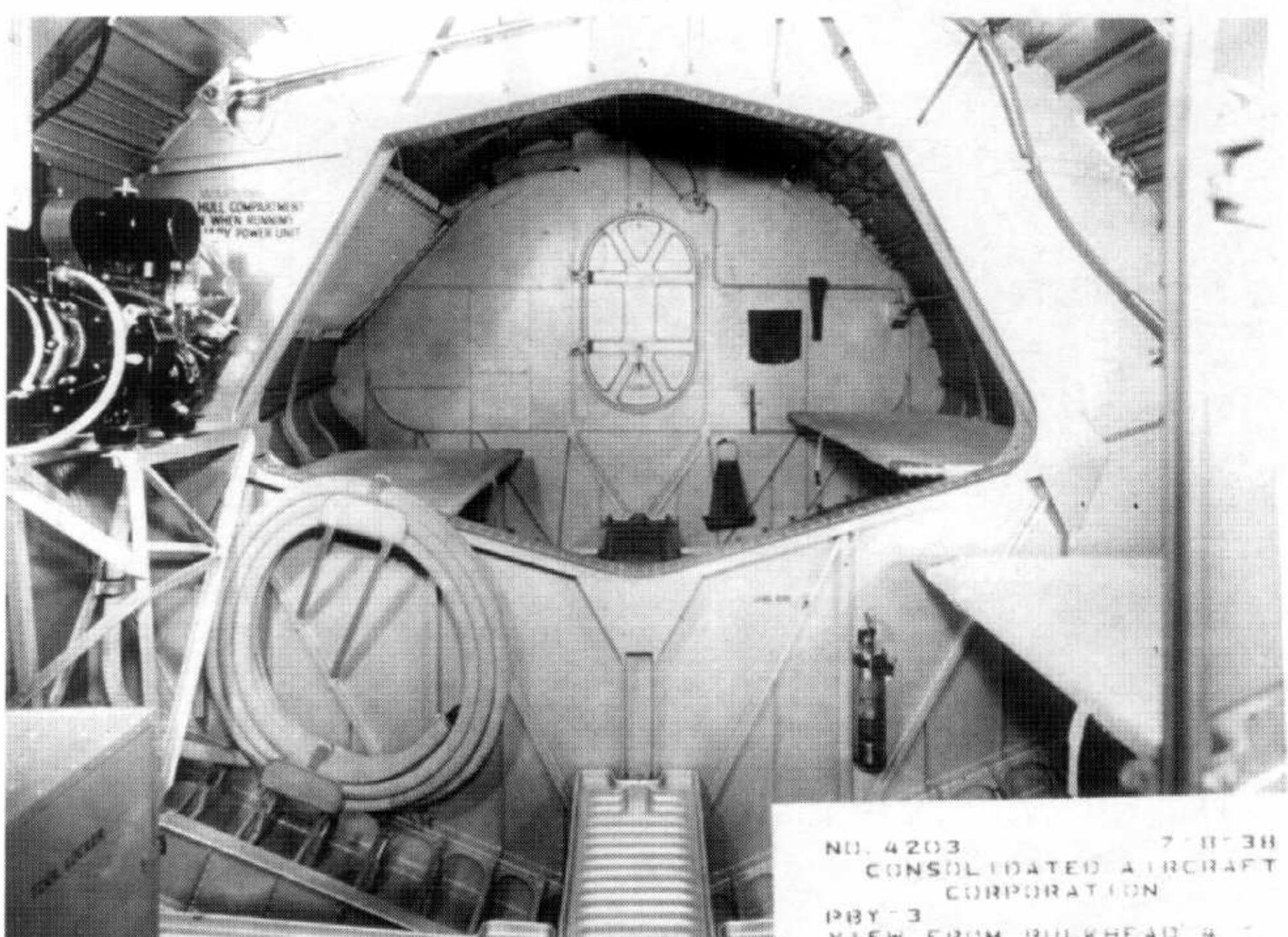
(National Archives)



NO. 42-2 7-B-3B  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-3

*Beginning with the PBY-3, both the navigator and the radio operator were provided with large wooden chairs with cushions added for comfort. Bulkhead 4 is in the background.*

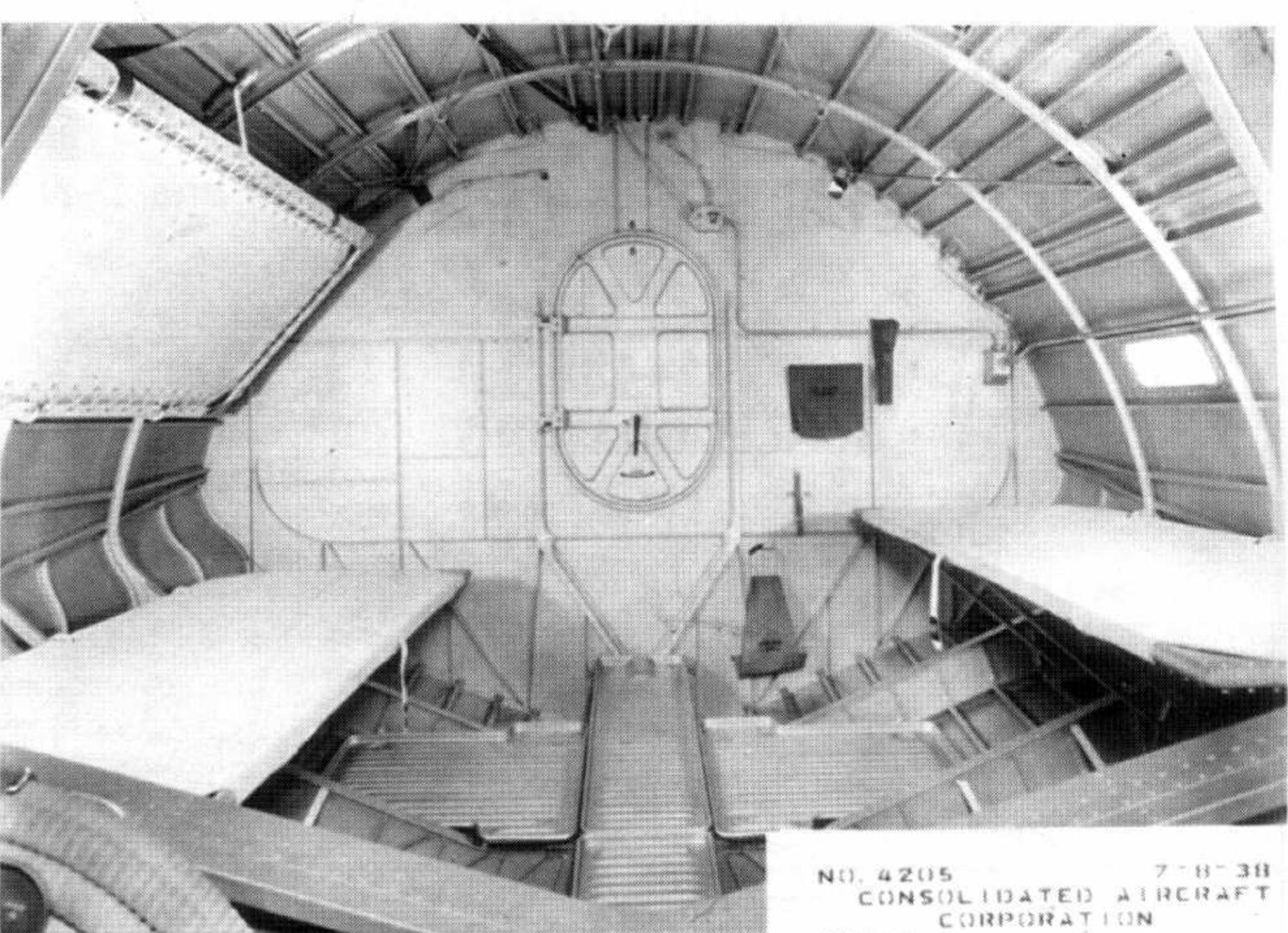
(National Archives)



NO. 4203 7-B-3B  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-3  
VIEW FROM BULKHEAD 4

*Looking aft from bulkhead 4, the auxiliary power unit can be seen on the starboard side of the aircraft. Note the large doorless opening in the next bulkhead leading aft into the living area.*

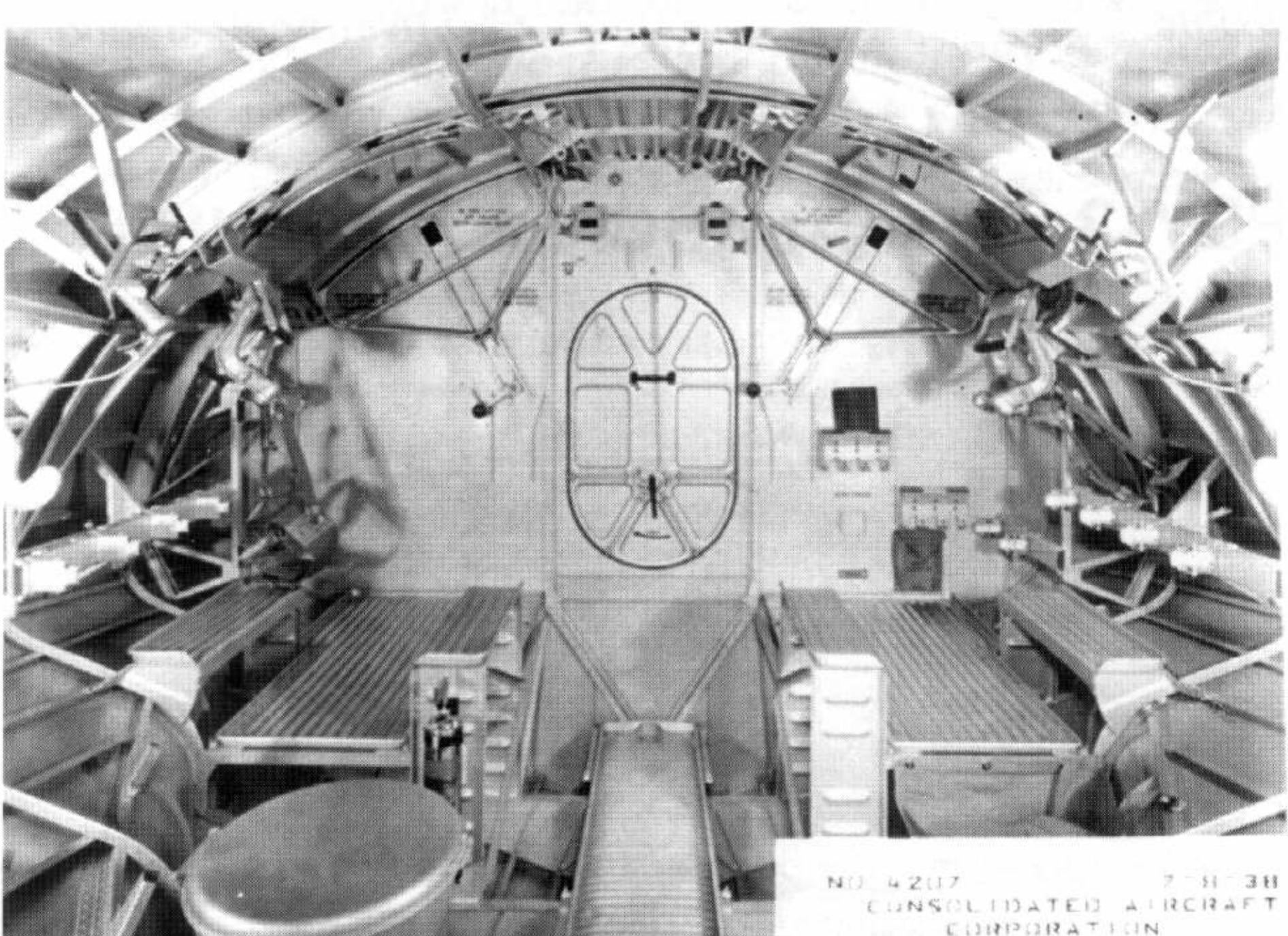
(National Archives)



NO. 4205 7-B-3B  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-3

*Cots in the living compartment were the same canvas and metal frame type used in all Catalina variants. Note how the upper cot on the starboard side folds up when not in use. The next bulkhead aft has the standard watertight door.*

(National Archives)



NO. 4217 7-B-3B  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-3

*The interior of the waist gun compartment remained essentially unchanged from the earlier versions. This view is looking forward inside the compartment from bulkhead 7 toward bulkhead 6. The top of the chemical toilet is visible in the foreground.*

(National Archives)

# PBY-4



*Only thirty-three PBY-4s were built, and they had more powerful R-1830-72 engines. This aircraft has markings indicating its assignment to VP-13. (National Archives)*

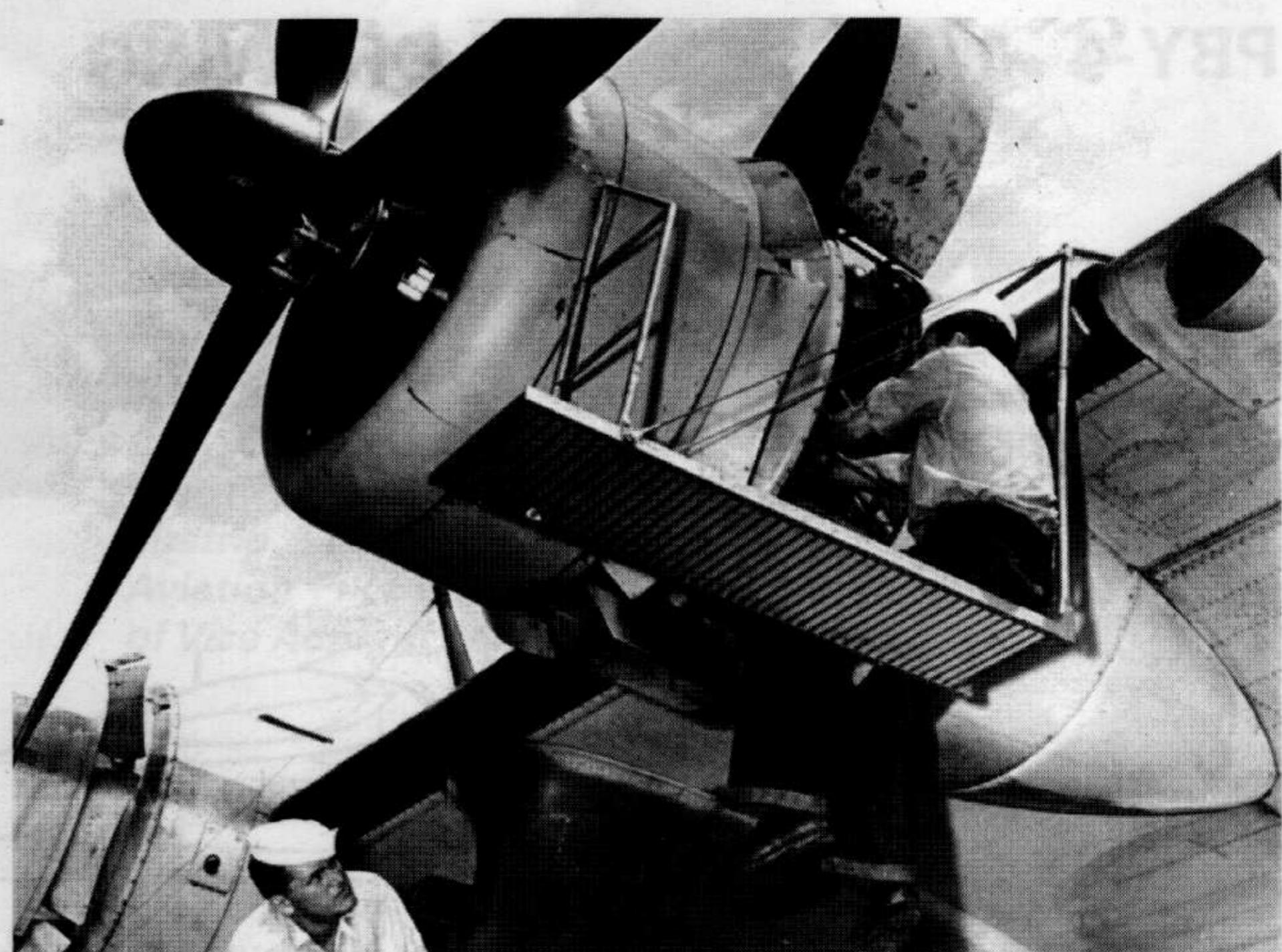
The contract for thirty-three PBY-4s was signed on December 18, 1937, and these flying boats were assigned the BuNos. 1213 through 1245. Another engine change, this time to the R-1830-72, marked the major difference between the PBY-4 and the PBY-3. The propeller hubs were fitted with spinners, and essentially this was an identifying feature of the PBY-4 version. However, there is photographic evidence that a few PBY-2s and PBY-3s had spinners fitted at least for a short period of time. The R-1830-72 produced 1,050 horsepower, and this boosted the top speed of the PBY-4 to 192 miles-per-hour. The ceiling was 25,400 feet, which was the highest of any version of the PBY. Gross weight was 22,295 pounds.

The last four PBY-4s were fitted with the large bulbous blisters over the waist positions, and these characterized all subsequent versions. The final PBY-4, BuNo. 1245, served as the prototype for the XPBY-5.

Because it was produced in fewer numbers than any other variant, only two squadrons, VP-1 and VP-18, received PBY-4s, but both of these units underwent several changes in designation. VP-1 was redesignated VP-21, but this was changed back to VP-1, and then it was changed again to VP-101. VP-18 became VP-13, then VP-26, then VP-102. This explains why some photographs of PBY-4s show markings for squadrons other than VP-1 and VP-18.

One commercial version of the PBY-4 was built, and it was assigned the registration number NC 18997. It

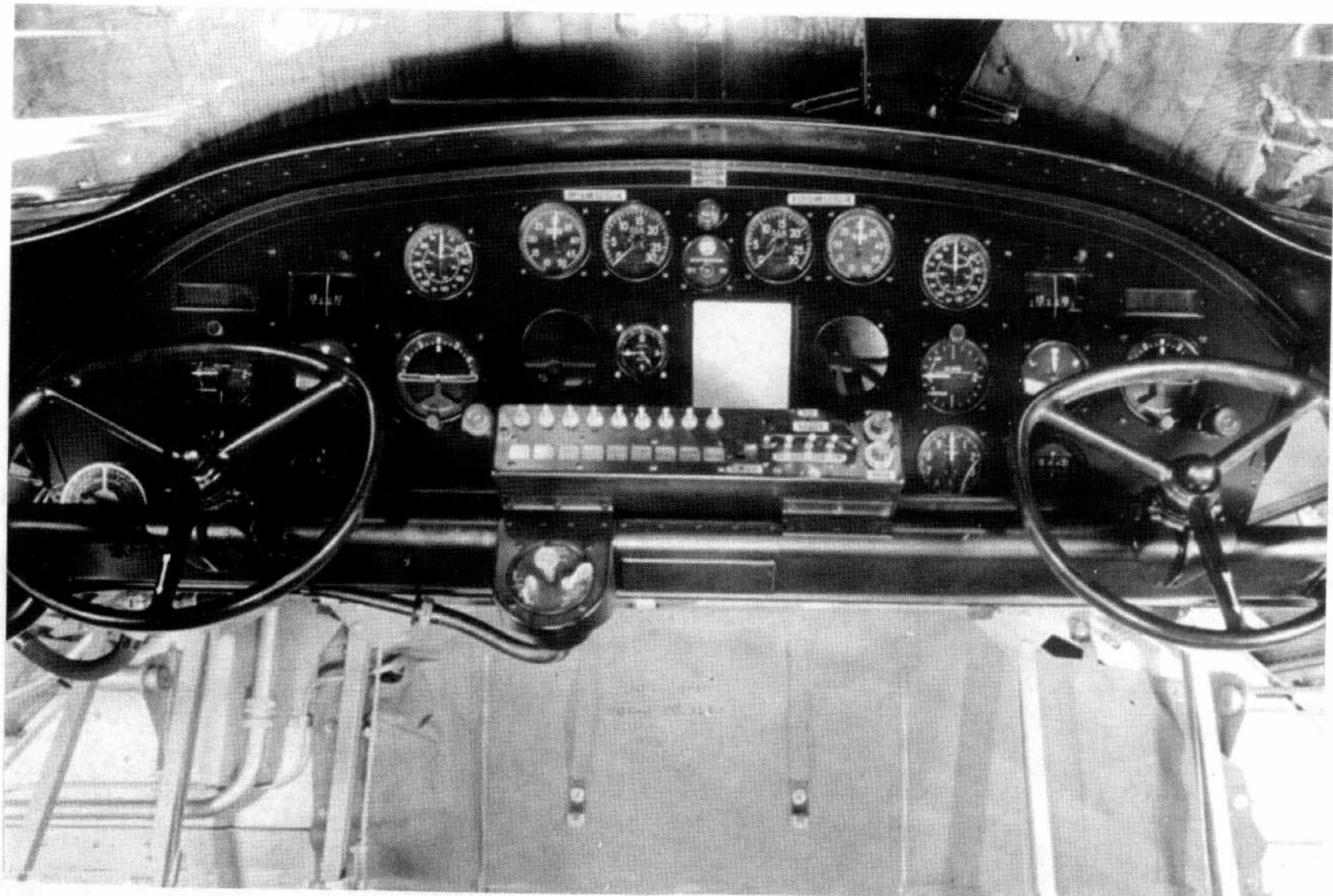
was sold to America Export Airlines and named "Transatlantic." This aircraft surveyed routes in the North Atlantic for possible use by the airline, then it was turned over to the Navy for use as a cargo aircraft. Another PBY-4 was sold to the British in July 1939, and it was assigned the British serial number P9630. This was the first delivery of a military aircraft across the Atlantic as a prelude to World War II. After evaluating this aircraft for its own use, the RAF went on to order hundreds of PBYs during the war.



*Spinners were fitted on the propeller hubs of PBY-4s, and they were an identifying feature of this variant. However, in some isolated cases, other earlier versions were fitted with spinners. Note that the intakes for the oil coolers remained in the leading edge of the wing.*

*(National Archives)*

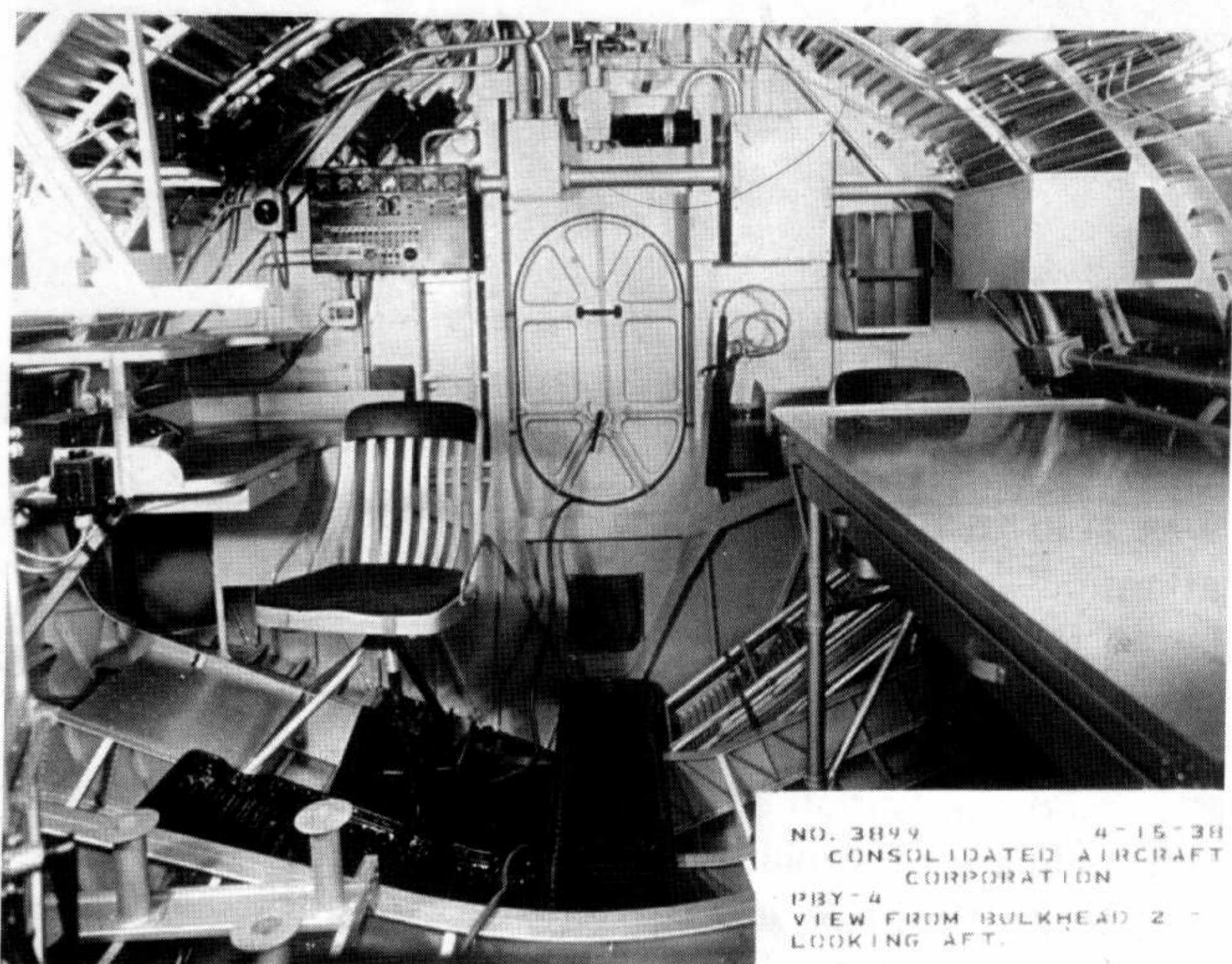
# PBY-4 DETAILS



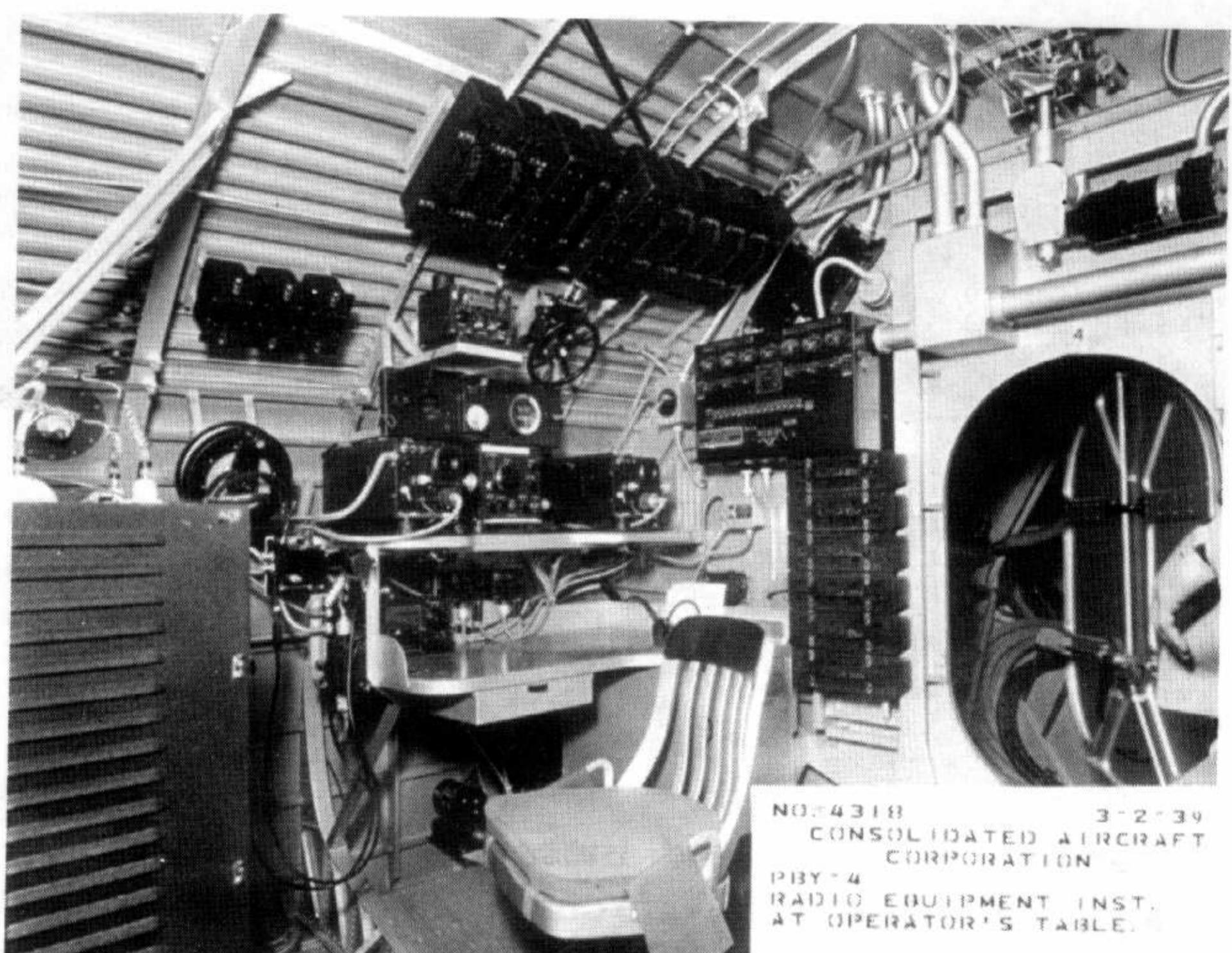
*Left: The instrument panel in the PBY-4 remained virtually unchanged from previous versions. The flattened part of the control wheels was at the top when the ailerons were in the neutral position. (National Archives)*

*Below left: A view aft from bulkhead 2 illustrates that only a few minor equipment changes were made in the radio operator's and navigator's compartment in the PBY-4. The large radio transmitter has been removed to permit a better view into the compartment. (National Archives)*

*Below right: The standard radio gear carried in PBY-4s is shown here. Note the wide lap belt on the radio operator's chair. (National Archives)*

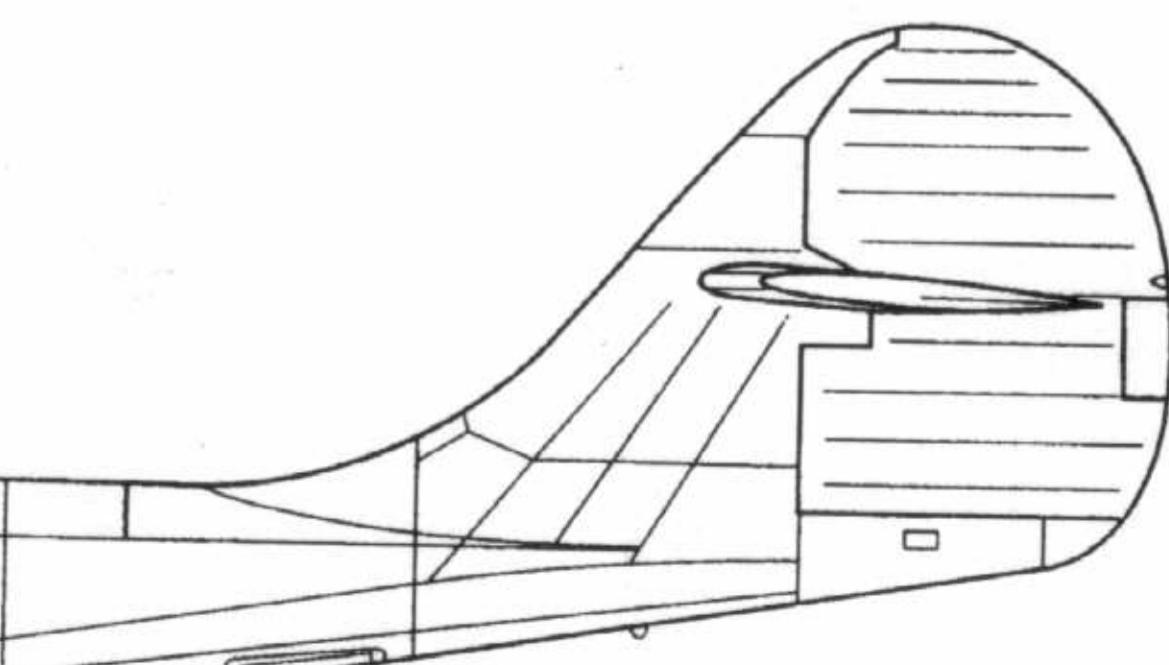
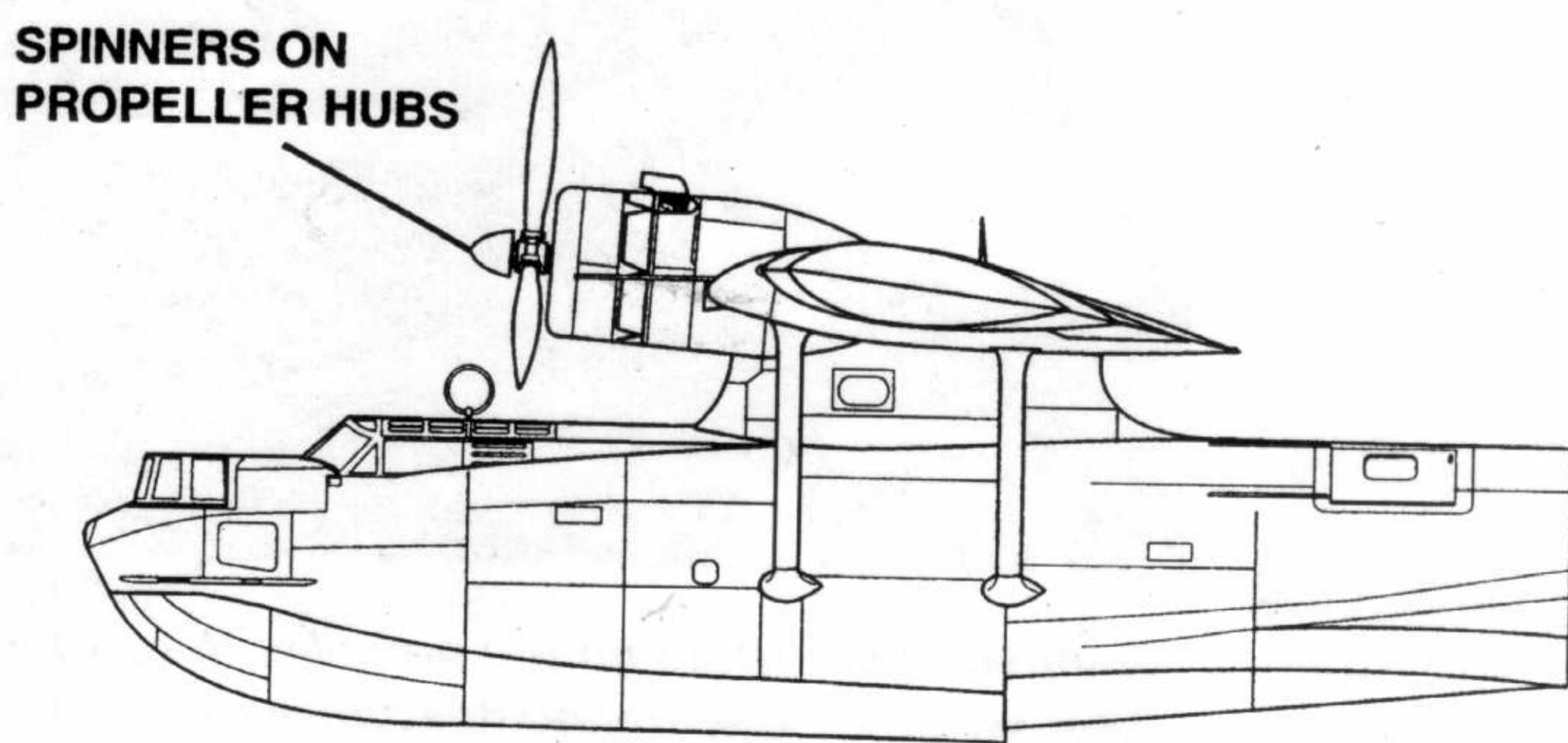
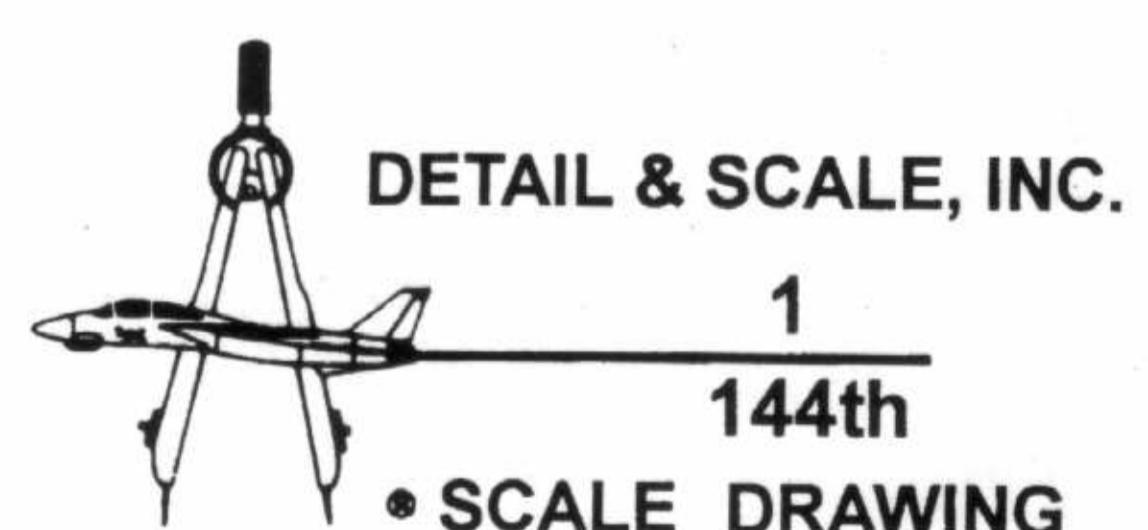


NO. 3899 4-15-38  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-4  
VIEW FROM BULKHEAD 2  
LOOKING AFT.

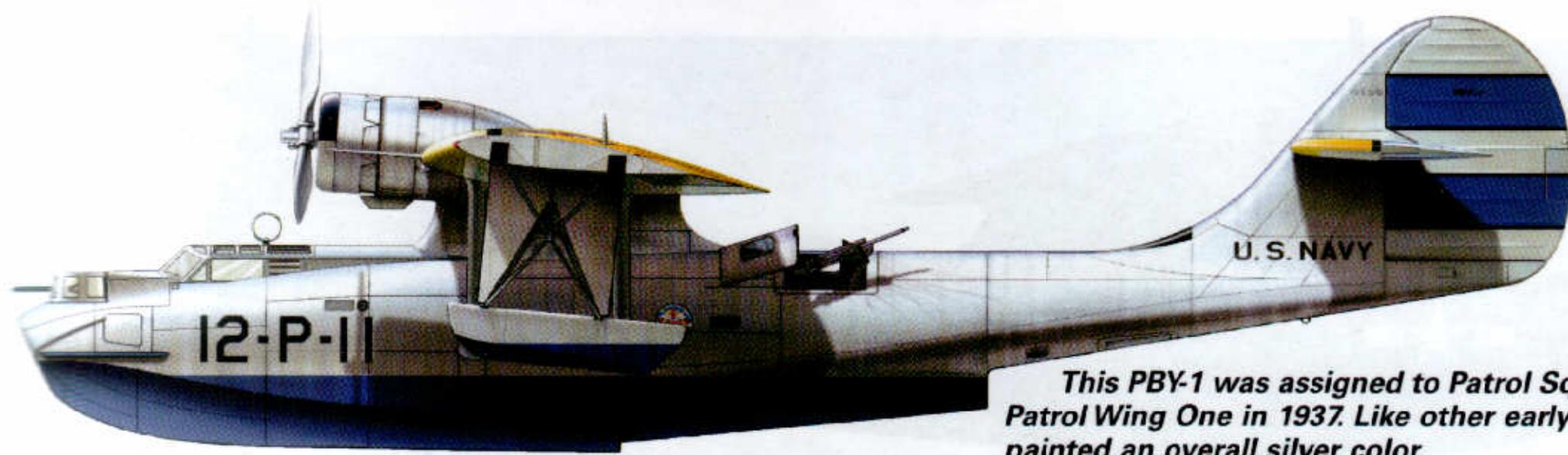


NO. 4318 3-2-39  
CONSOLIDATED AIRCRAFT  
CORPORATION  
PBY-4  
RAD. EQUIPMENT INST.  
AT OPERATOR'S TABLE.

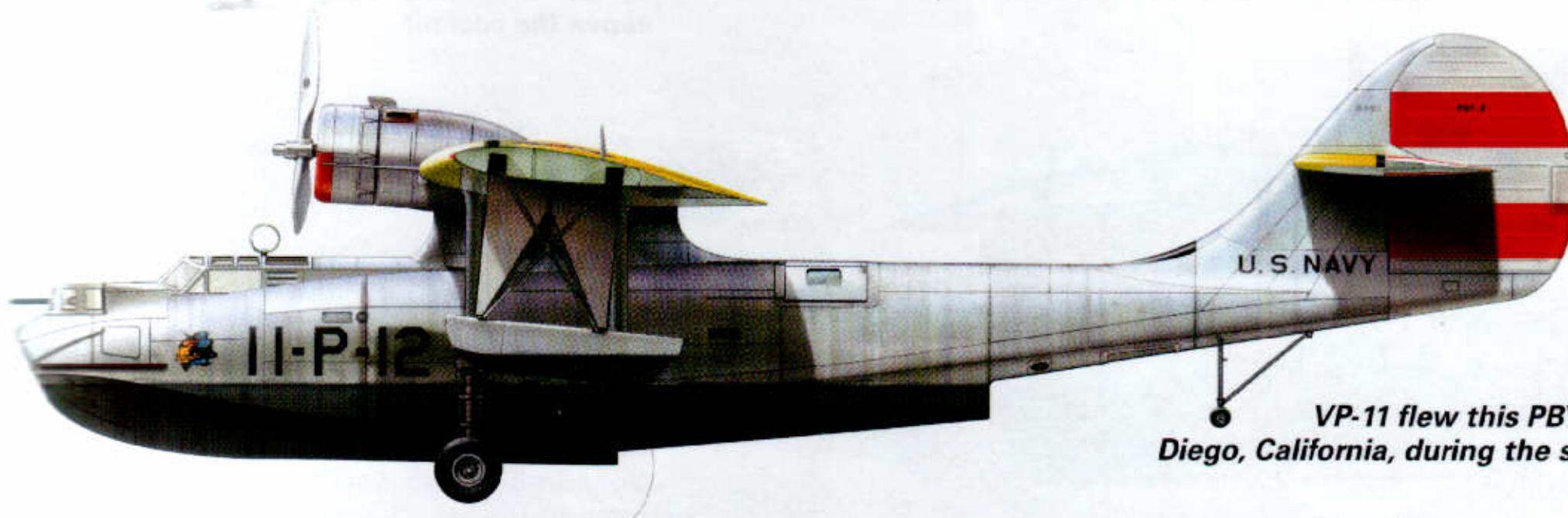
## PBY-4 1/144th SCALE DRAWING



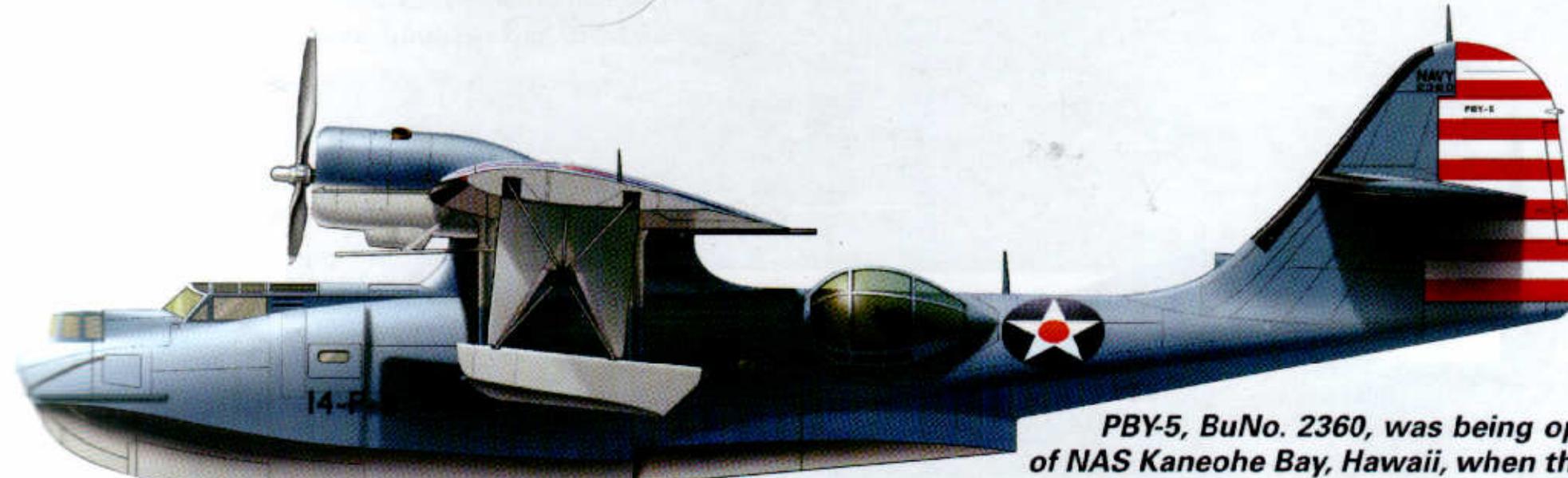
# PBY CATALINA COLORS



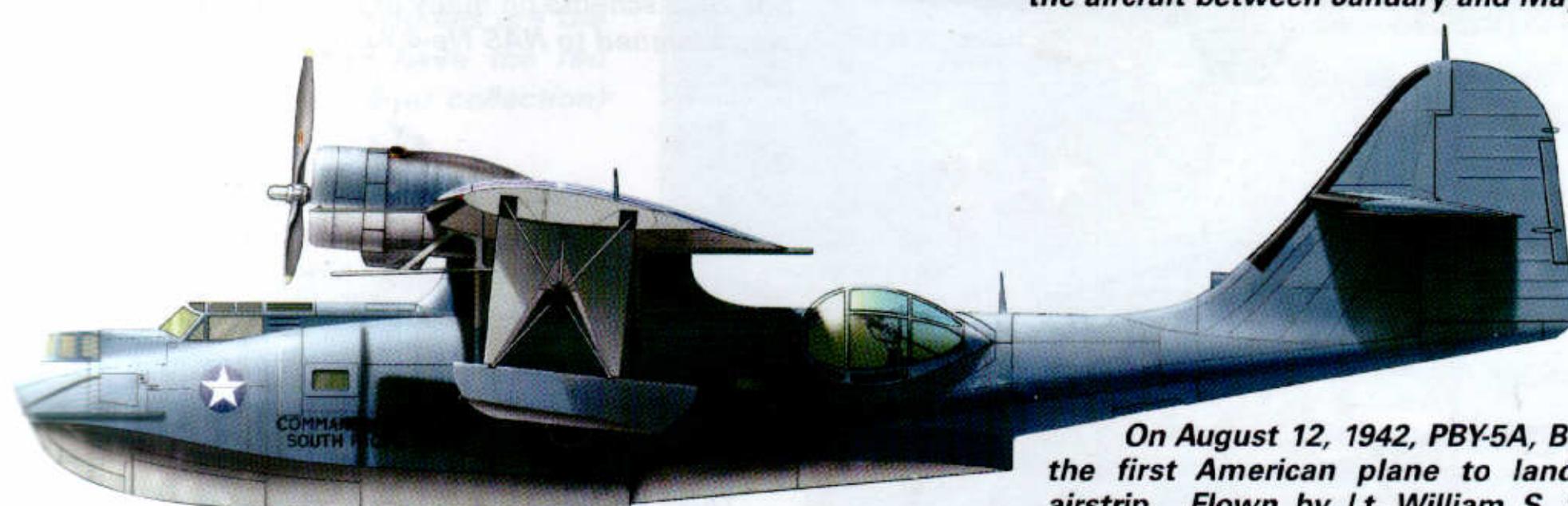
This PBY-1 was assigned to Patrol Squadron Twelve of Patrol Wing One in 1937. Like other early Catalinas, it was painted an overall silver color.



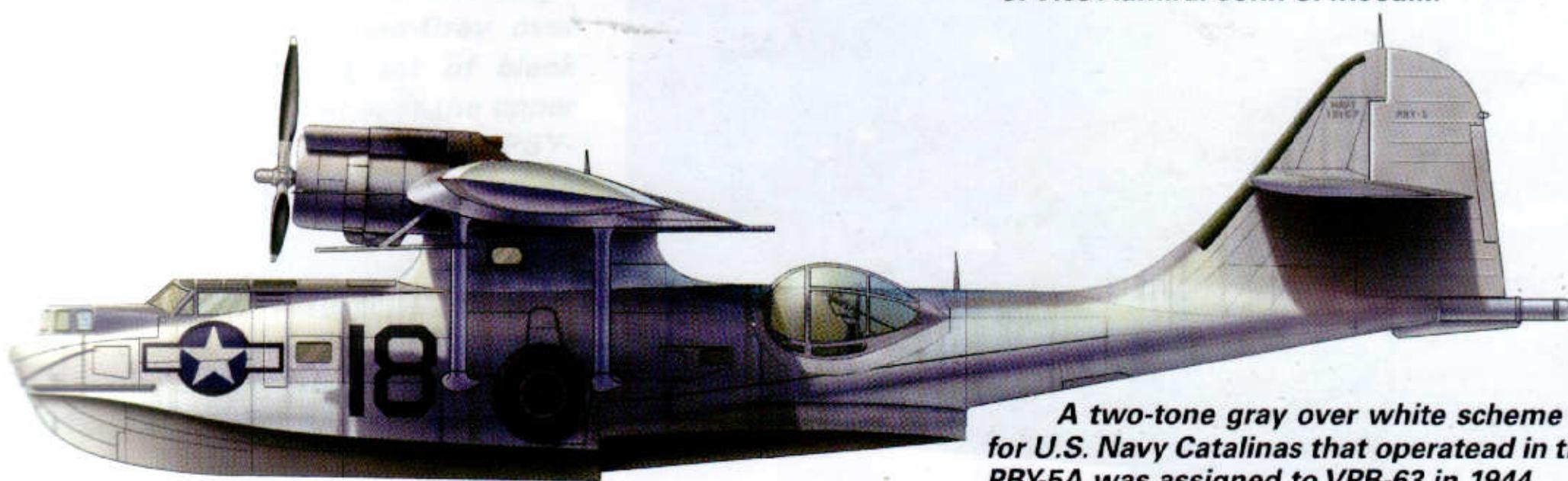
VP-11 flew this PBY-2 from NAS San Diego, California, during the summer of 1938.



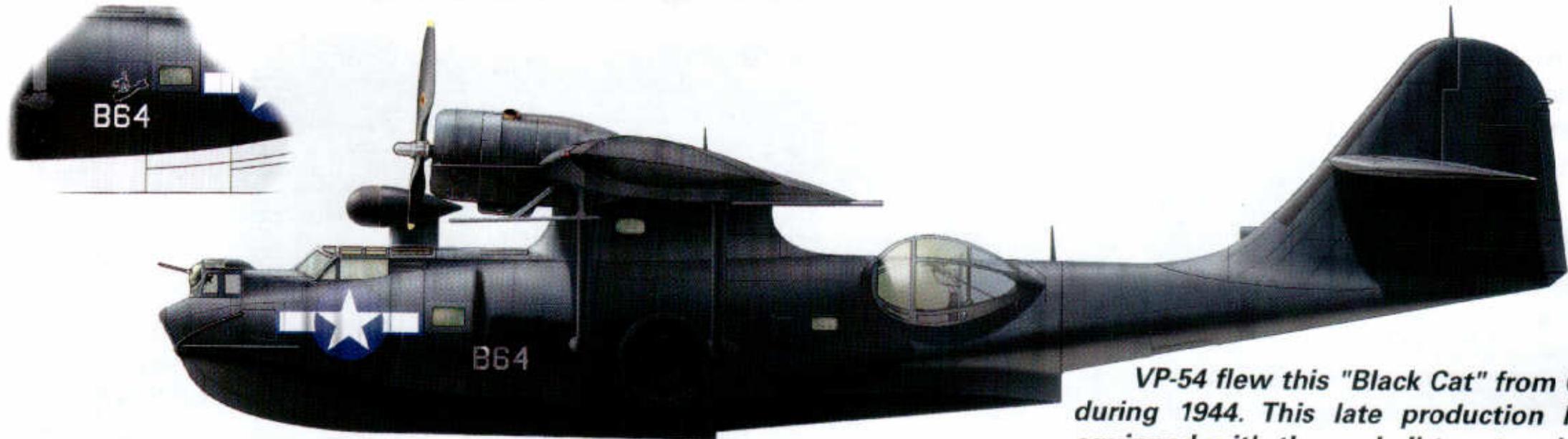
PBY-5, BuNo. 2360, was being operated by VP-14 out of NAS Kaneohe Bay, Hawaii, when the Japanese attacked on December 7, 1941. These are the markings carried on the aircraft between January and May 1942.



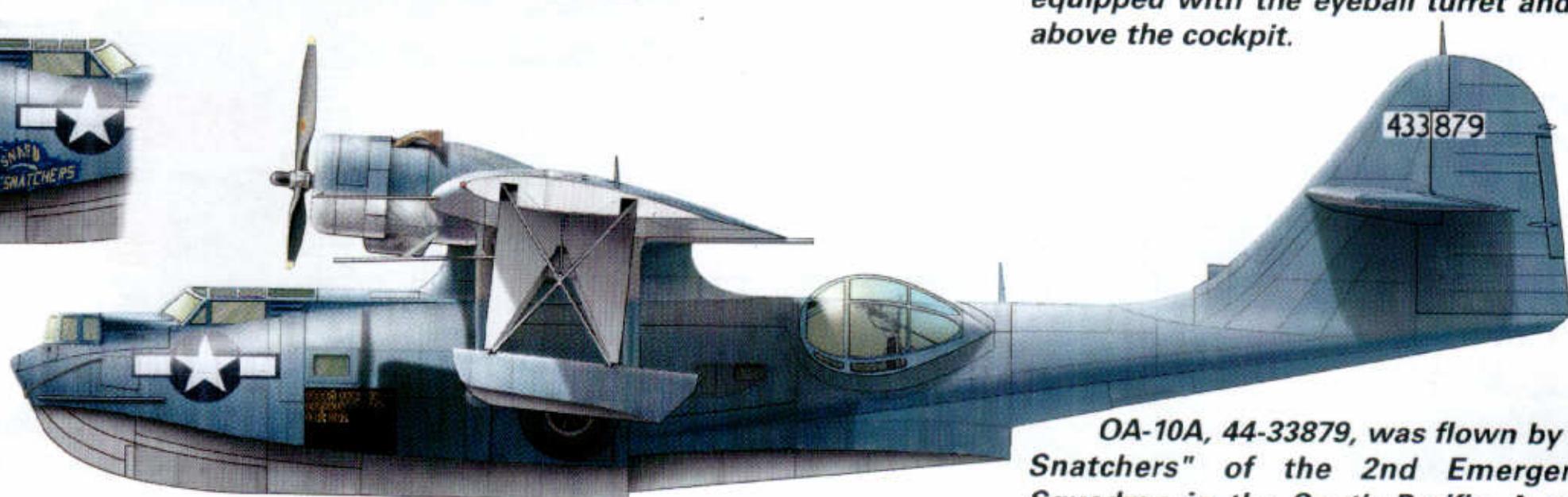
On August 12, 1942, PBY-5A, BuNo. 05045, became the first American plane to land on Guadalcanal's airstrip. Flown by Lt. William S. Sampson and Chief Aviation Pilot Walt Schauer, it was the personal aircraft of Vice Admiral John S. McCain.



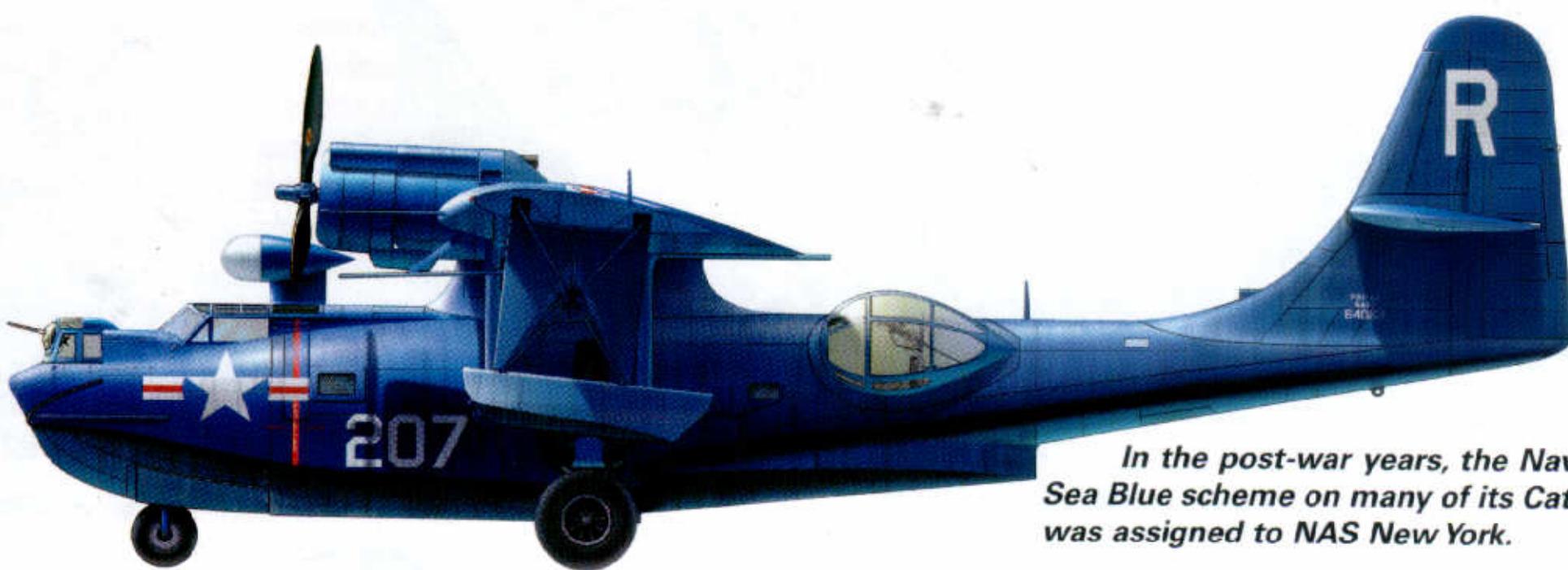
A two-tone gray over white scheme was developed for U.S. Navy Catalinas that operated in the Atlantic. This PBY-5A was assigned to VPB-63 in 1944.



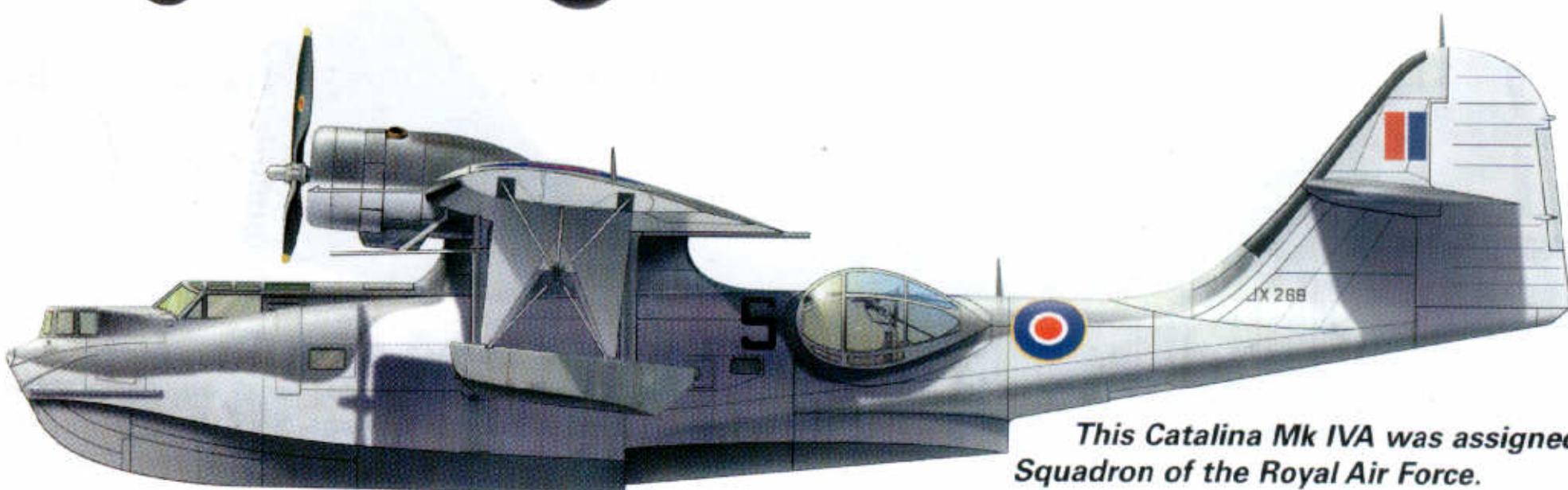
VP-54 flew this "Black Cat" from Guadalcanal during 1944. This late production PBY-5A was equipped with the eyeball turret and the radome above the cockpit.



OA-10A, 44-33879, was flown by the "SNAFU Snatchers" of the 2nd Emergency Rescue Squadron in the South Pacific. A scoreboard on the left side of the hull indicates that the aircraft had rescued over fifty downed airmen.



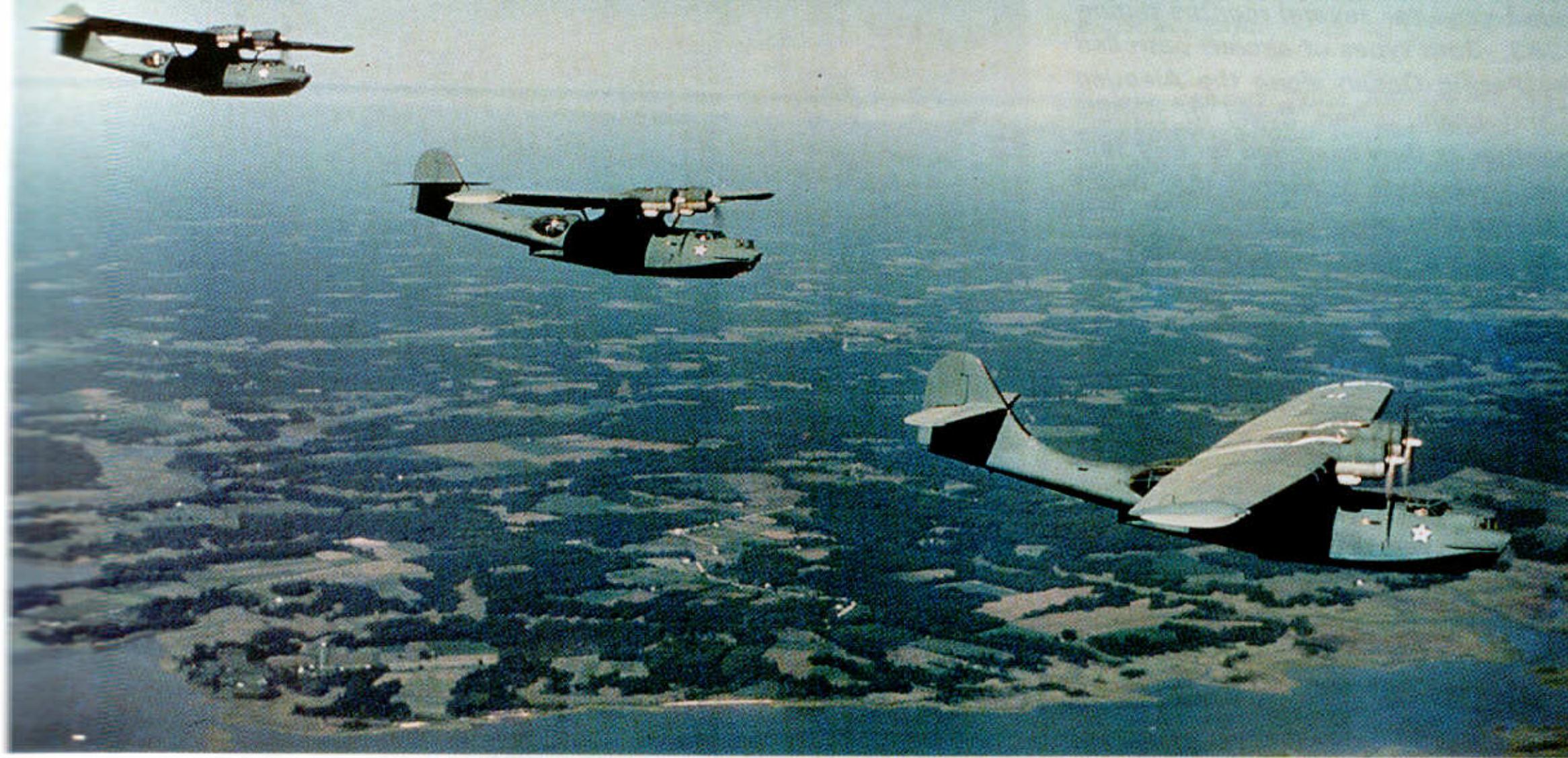
In the post-war years, the Navy used the overall Sea Blue scheme on many of its Catalinas. This PBY-6A was assigned to NAS New York.



This Catalina Mk IVA was assigned to Number 202 Squadron of the Royal Air Force.



The Royal Netherlands Navy operated this PBY-5A in the Dutch East Indies.



Above: These PBY-5s are painted in the non-specular Blue-Gray over Light Gray scheme. By the time this photograph was taken, the red and white stripes had been removed from the rudder. The national insignias are the original small size and have the red disc at their centers. (Piet collection)

Center right: Patrolling the waters around the Aleutians, this PBY-5A also displays the Blue-Gray over Light Gray paint scheme. The national insignias are much larger than those seen in the photograph above, and the red disc has been eliminated.

(Piet collection)



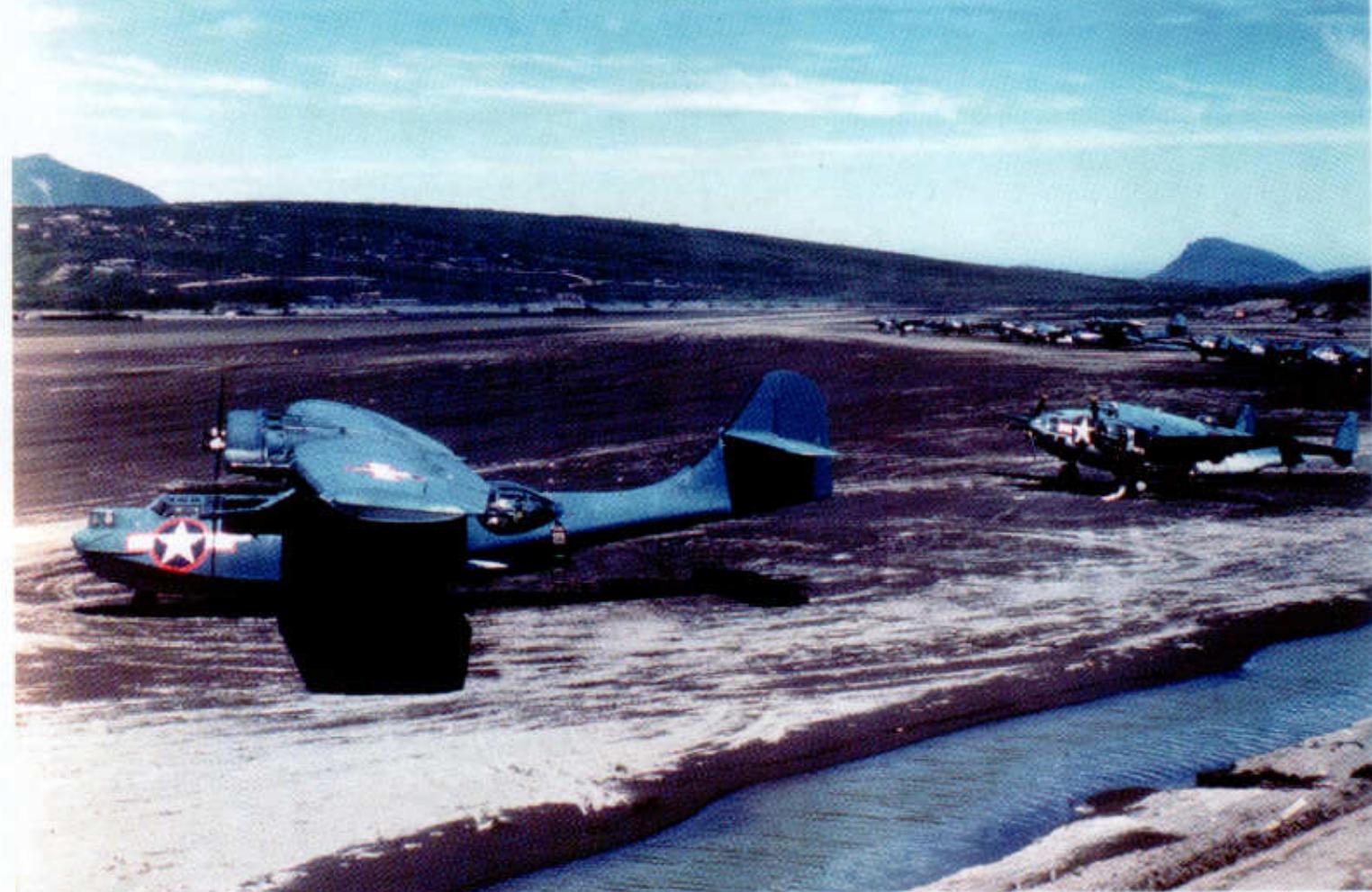
Bottom right: Although it was originally painted in the Blue-Gray over Light Gray scheme, a lot of black paint has been sprayed over the upper surfaces of this late production PBY-5A. This was a common practice on Catalinas used for night operations in the Pacific. Note that it has the later national insignia with the rectangles on each side, and the eyeball style bow turret is installed. It also has the side blister mounts for the tunnel gun.

(Piet collection)



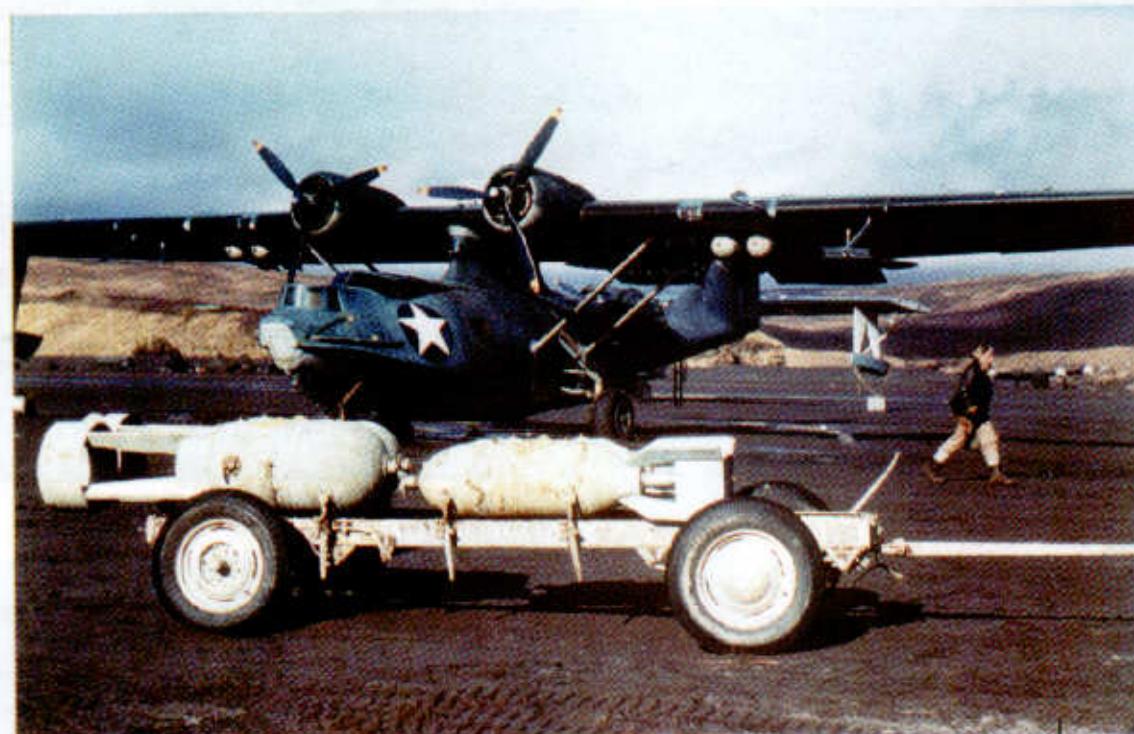
*Two PBY-5As share a field in the Aleutian Islands with a squadron of Lockheed PV-1 Venturas. The national insignias have the short-lived red surround used for several months during 1943. Both types of aircraft patrolled the Pacific Ocean along the Aleutian Island chain, often flying in terrible weather as they searched for any Japanese warships or aircraft that might threaten that area.*

*(National Archives via Piet)*



*A P-40 Warhawk is towed past a PBY-5A at a base in the Aleutian Islands. Note the mixed armament load on the Catalina. Standard bombs are loaded under the right wing, while two larger depth bombs are carried under the left wing. Carrying this mix allowed the pilot more versatility when attacking an enemy target that might be spotted. The standard bombs could be used for ships on the surface, while the depth bombs were used against submarines.*

*(National Archives via Piet)*

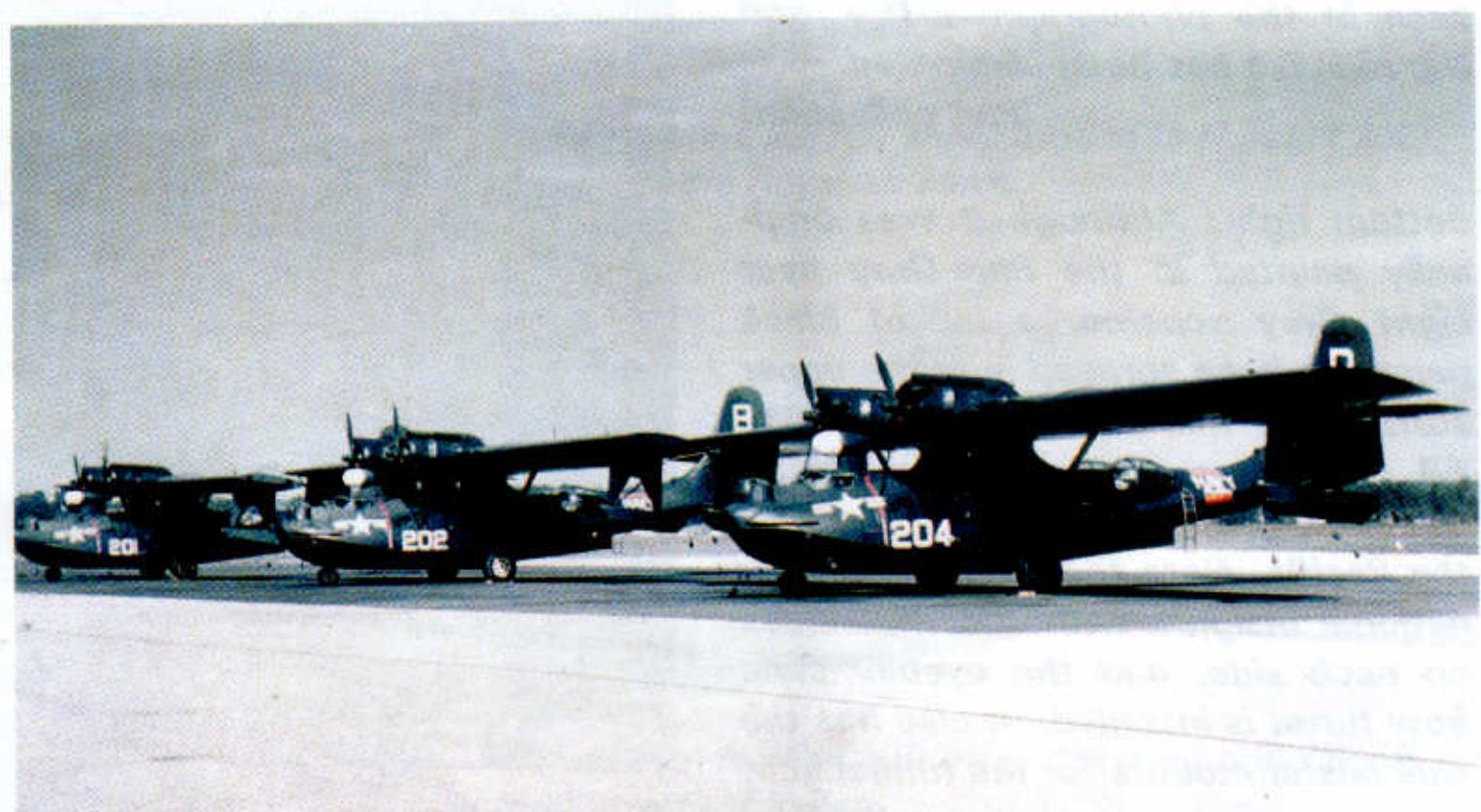


*The same mix of bombs is also loaded on this PBY-5A, and both types are seen on the cart in the foreground. Note that these Navy bombs are light gray rather than olive drab as used in most cases. Another interesting feature on this aircraft is that the propeller tips are painted with the older style red, yellow, and blue stripes, rather than having just the yellow tips that had become the standard long before this photo was taken in 1943.*

*(National Archives via Piet)*

*These PBY-6As were used by the Navy Reserve at NAS Atlanta, Georgia, in the years following World War II. They are painted in the overall Sea Blue scheme and have the national insignia with the red stripes in the rectangles as introduced in 1948. The orange fuselage band indicates assignment to the Navy Reserve.*

*(Colvin collection)*





*Left: The Army retained a considerable number of OA-10s for search and rescue duties after the war. Some were still in the inventory when the U. S. Army Air Forces became the U. S. Air Force in 1947. Several different paint schemes were applied to these aircraft, but the most colorful was this dark gray, light gray, yellow, and black scheme. (Piet collection)*

*Below center: Wide red bands were sometimes added to the wings, and the entire tail section was also painted red. Otherwise, the scheme remains basically the same as seen in the photograph at left. (Piet collection)*



*Numerous Catalinas were exported to foreign nations after the war. A ceremony marks the transfer of PBY-5As from the U. S. Navy to Brazil. Note that depth bombs are loaded on the aircraft, and the exhaust covers are present for the wing deicing system. The eyeball style turret is installed in the bow of the nearest aircraft, but there is no search radar above the cockpit. (Piet collection)*

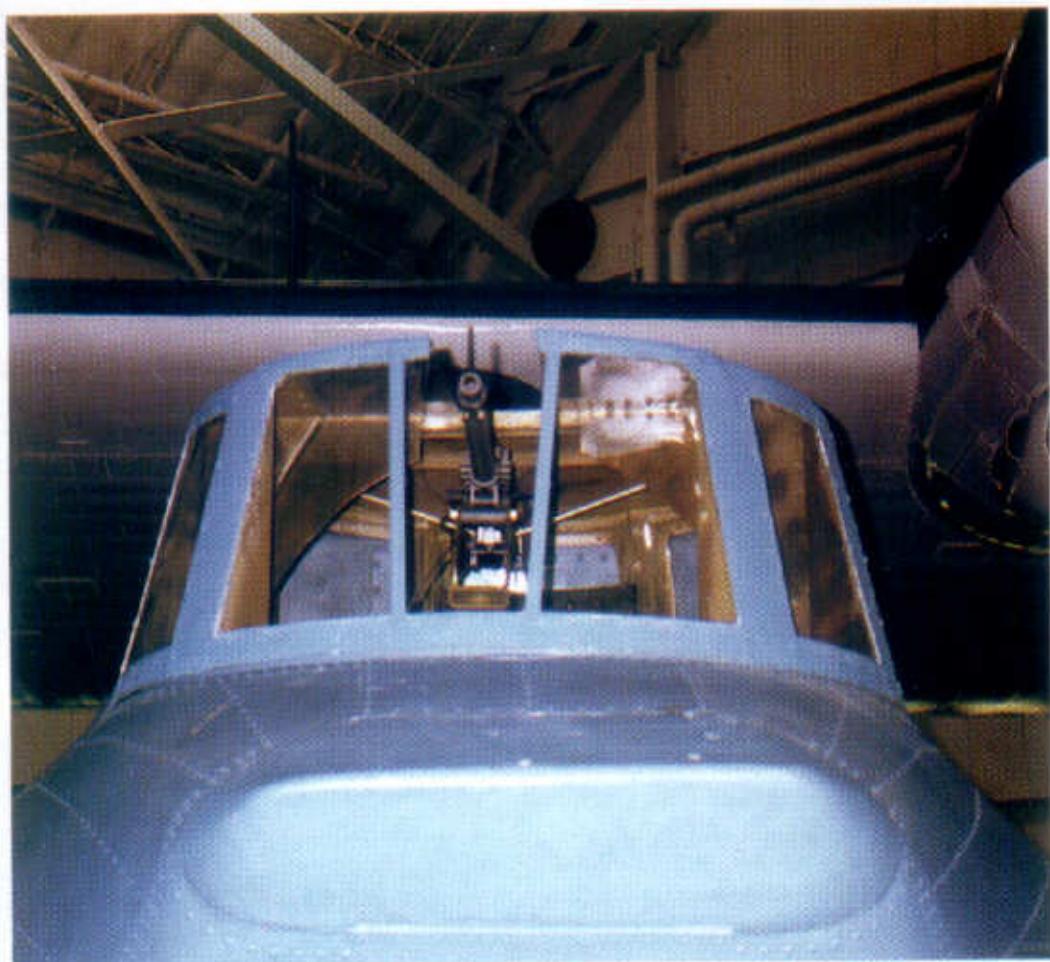


# CATALINA DETAILS IN COLOR

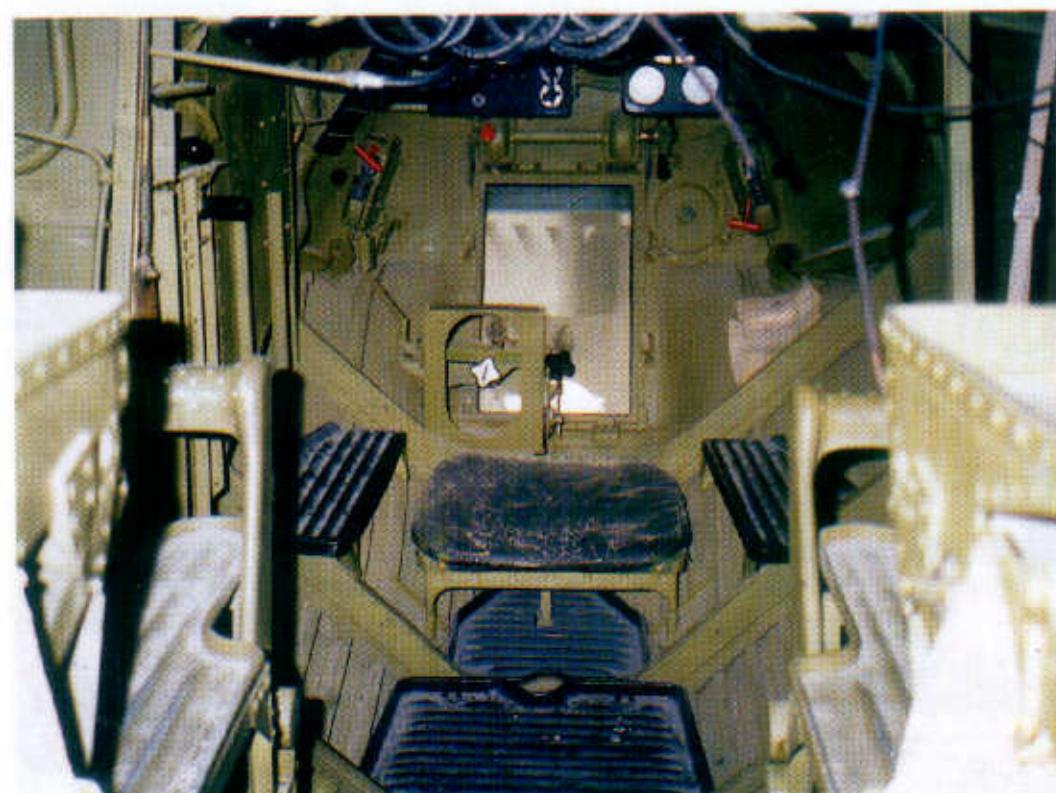
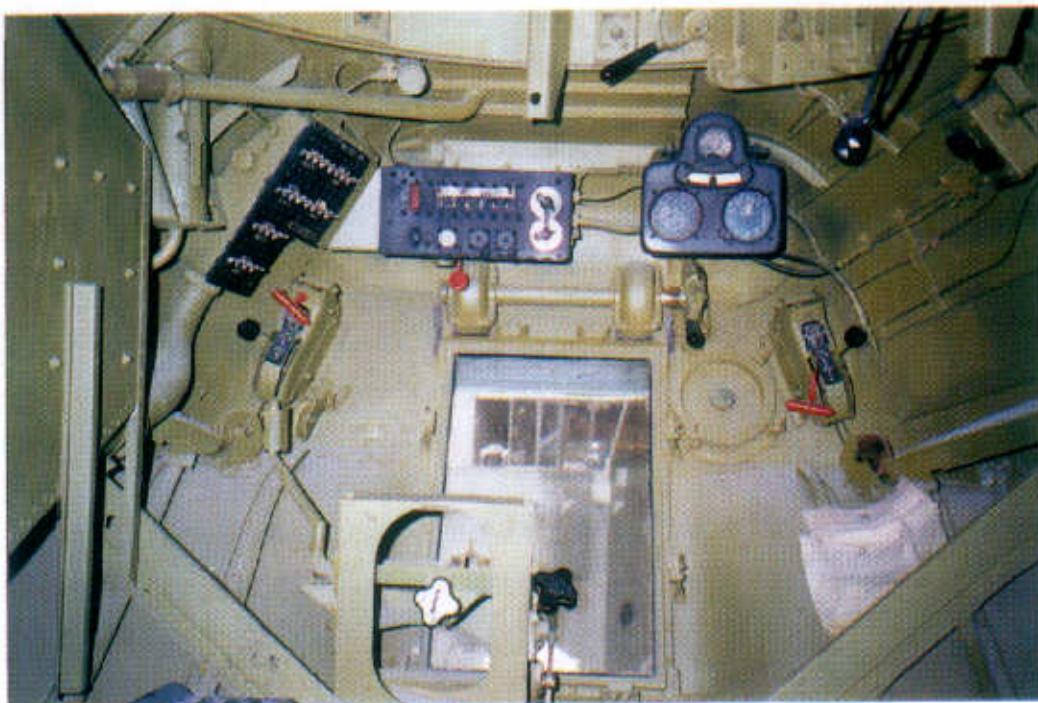
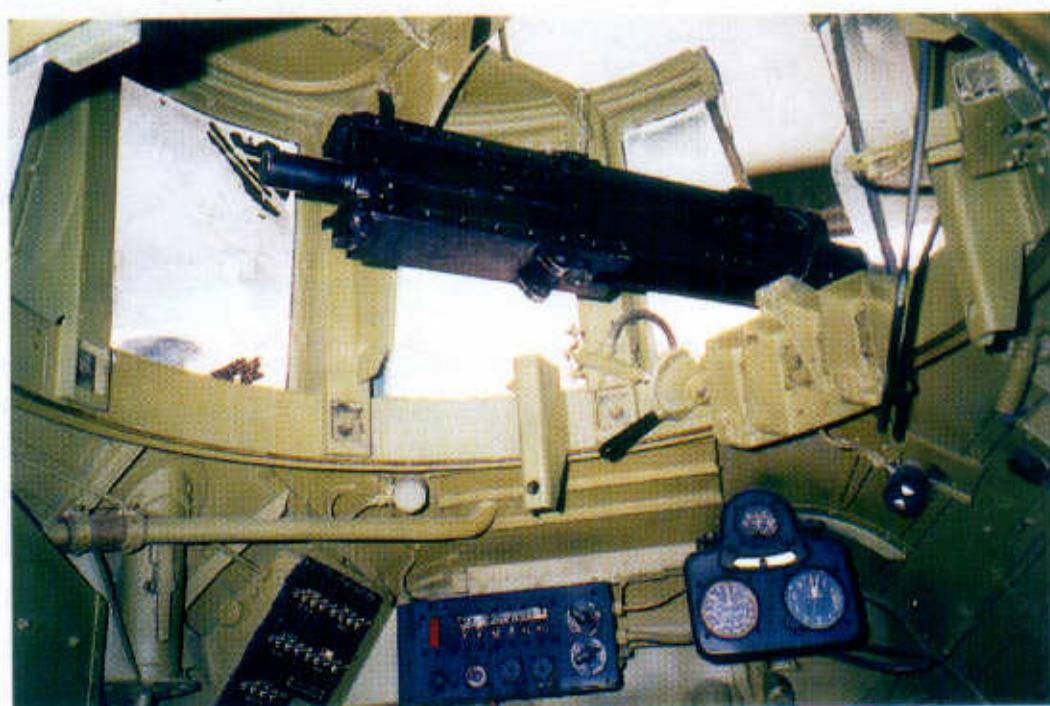
## BOW TURRET DETAILS



The standard bow turret used on most Catalinas mounted a single .30-caliber machine gun. The turret could be moved in azimuth across the entire 180-degree arc in front of the aircraft, and the gun could be moved in elevation from minus forty degrees to plus ninety degrees. It was aimed through simple ring and bead sights.



A front view shows the gun in place and the forward sighting windows on either side of it. The gunner could fire the weapon from completely inside the turret, but he could also open the top hatch and fire it from a more exposed position with his head and shoulders above the turret.



Center left: The machine gun was mounted on a Mark 9 gun mount adaptor. When not in use, the weapon was removed from the mount and stowed in a position behind and to the right of the bombardier/gunner.

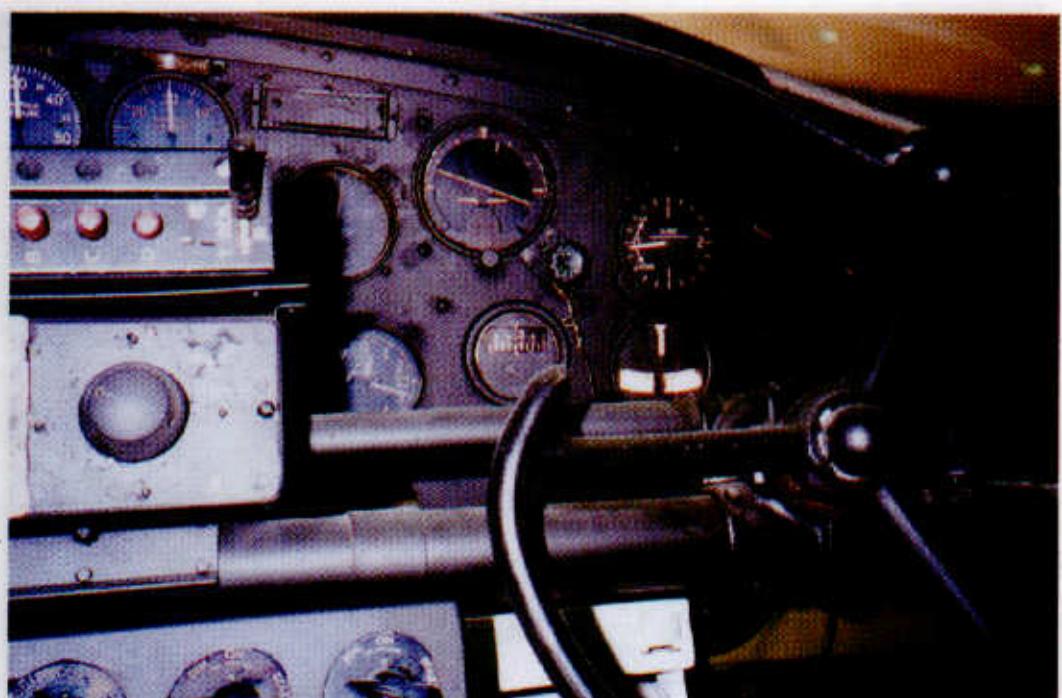
Center right: The interior of the nose compartment and turret was painted Interior Green. The panel to the right contained an outside air temperature gage at the top, an airspeed indicator to the left, and an altimeter to the right.

Left: The bombardier/gunner kneeled on a padded cushion at the center of the bow compartment, or he could stand on any of four black non-skid areas. This photograph, and the two at the center of this page, were taken inside the bow of the PBY-5 on display at the National Museum of Naval Aviation at Pensacola, Florida.

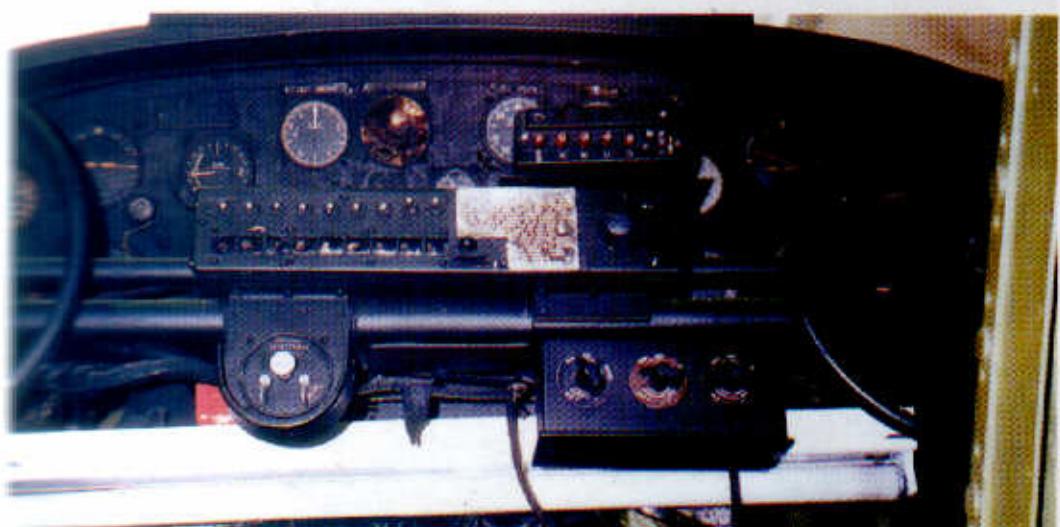
# PBY-5 COCKPIT DETAILS & COLORS



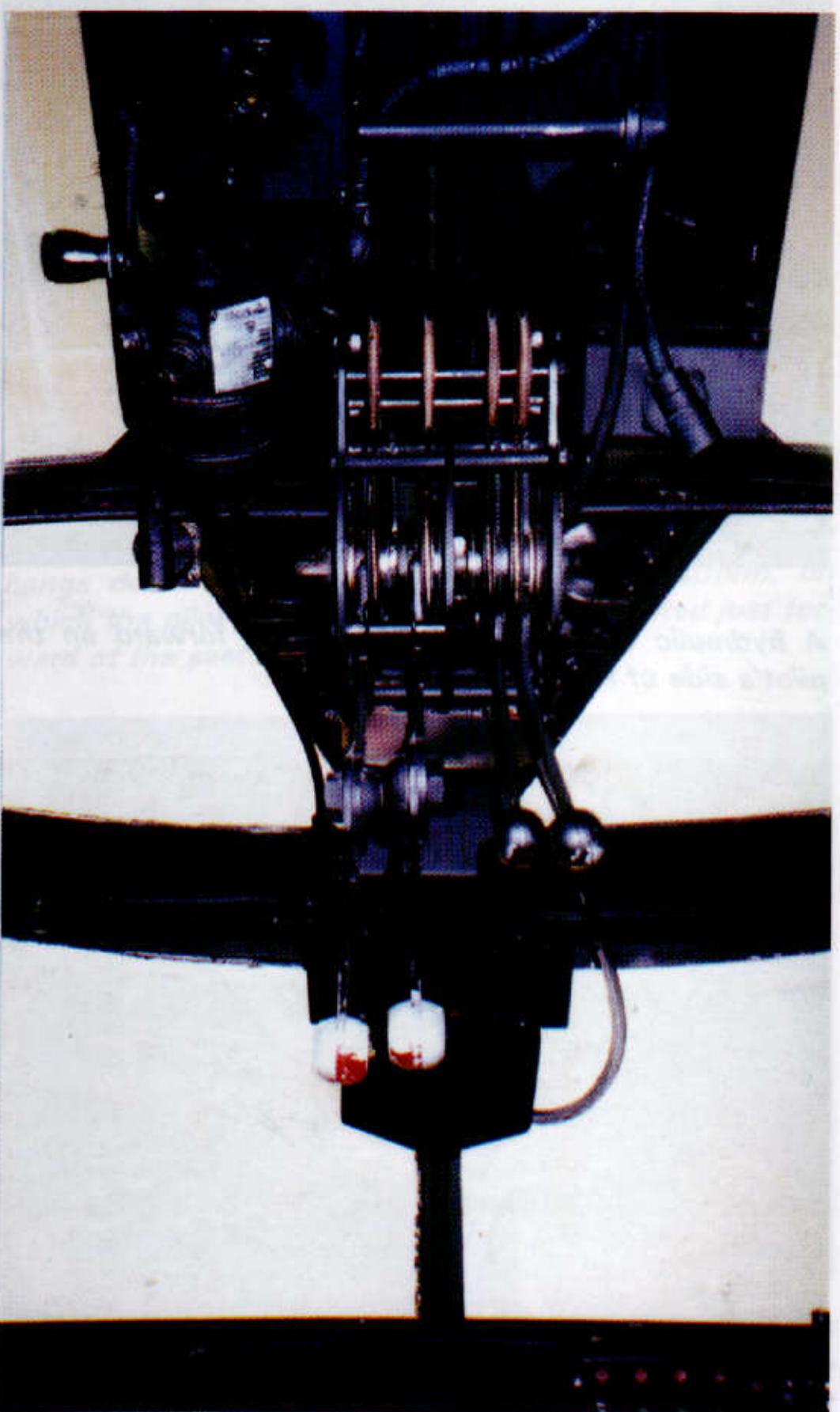
The pilot's control wheel and the left side of the instrument panel in the National Museum of Naval Aviation's PBY-5 are shown here. The instrument above the turn and bank indicator is the rate-of-climb indicator, but glare on its glass prevents the details from being visible. However, it can be seen clearly on the photograph below.



The co-pilot's side of the instrument panel had all of the basic flying instruments to include an artificial horizon, a turn and bank indicator, compass, rate-of-climb indicator, altimeter, and airspeed indicator. Some control wheels were "D" shaped and closed across the top, while others were open as seen here.



The yoke assembly included two horizontal bars on which the control wheels were mounted. The ignition switches for the engines were on the small panel to the left, and three light switches were on the large panel below the bar. Additional electrical switches were on the larger panels mounted to the upper bar. Engine instruments were located at the center of the main panel. The fluorescent light fixture was added by the museum to illuminate the bow compartment, and it would not be present on an operational aircraft.



This control panel for the radios and intercom system was located at the rear of the cockpit above the entrance in the bulkhead.

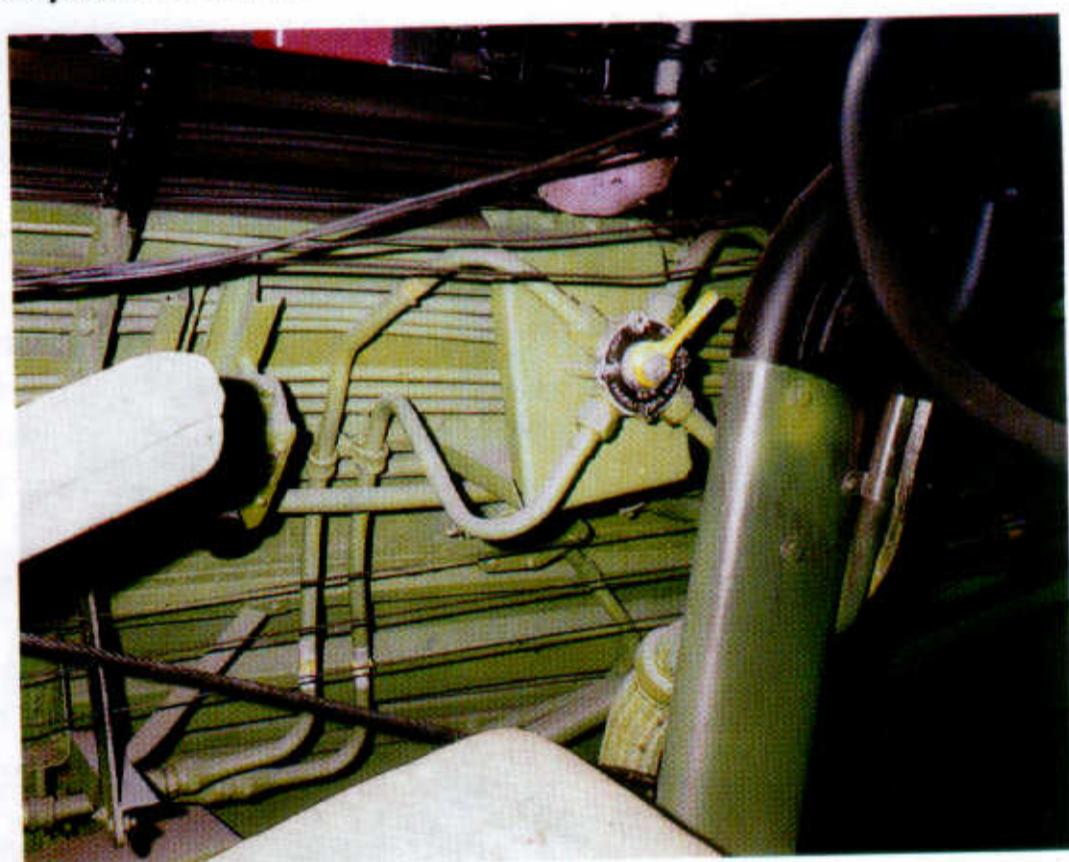
The throttles, mixture controls, and the propeller controls were mounted overhead within easy reach of both the pilot and co-pilot.



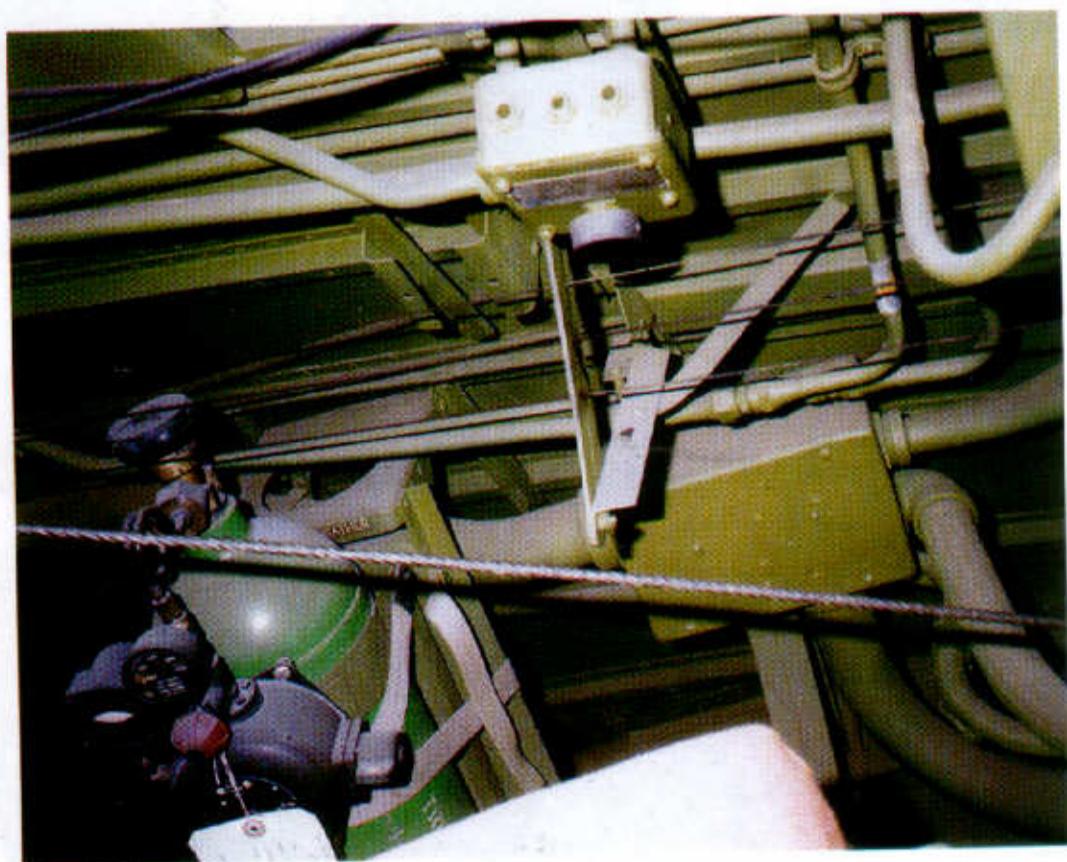
*There were no side consoles in the cockpit of a Catalina. The major item on the right side of the cockpit was the co-pilot's intercom box.*



*Next to the co-pilot's seat was a bottle of breathing oxygen. Each crew station had a similar bottle, although oxygen was seldom needed in a Catalina.*



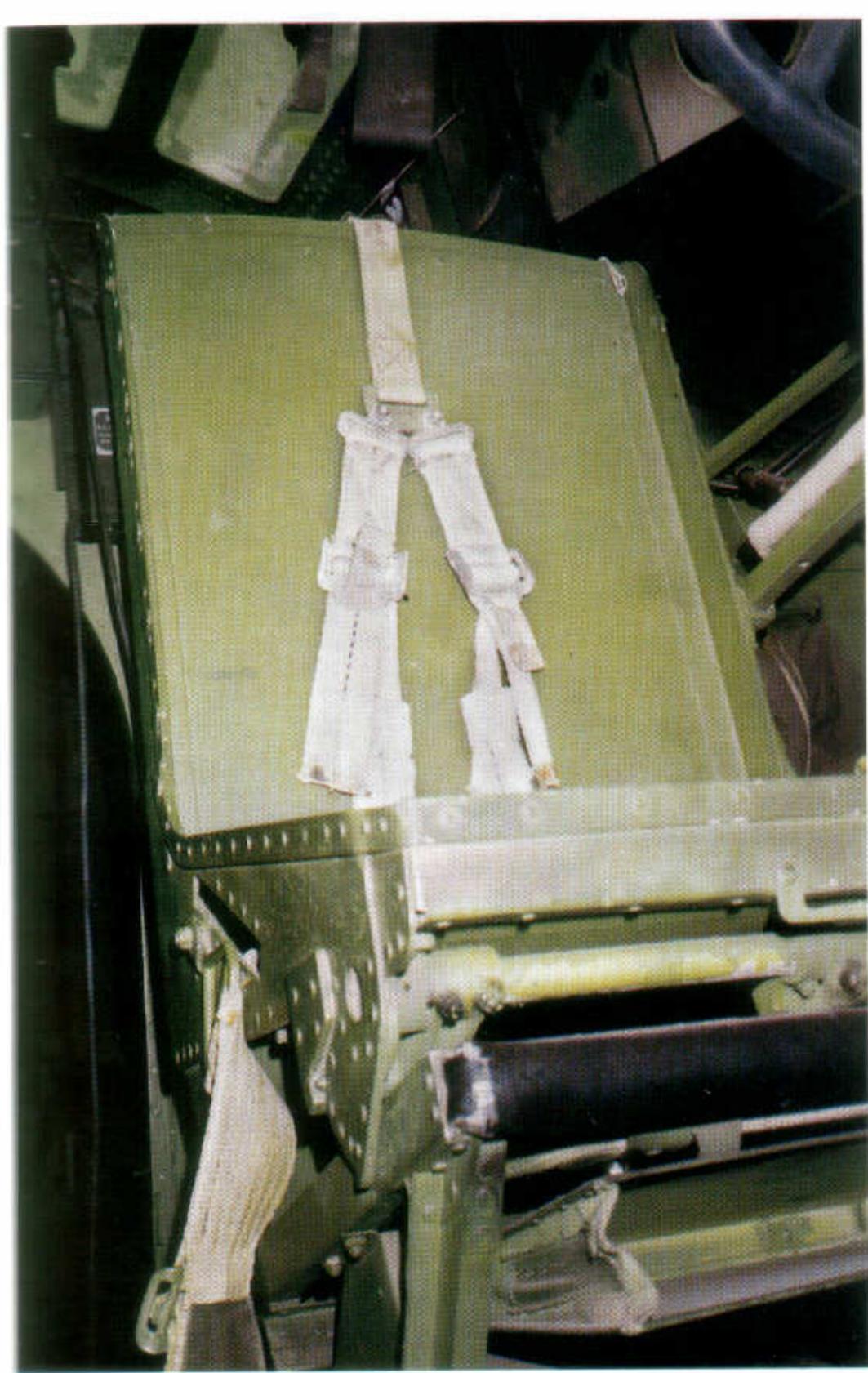
*A hydraulic control valve was located forward on the pilot's side of the cockpit.*



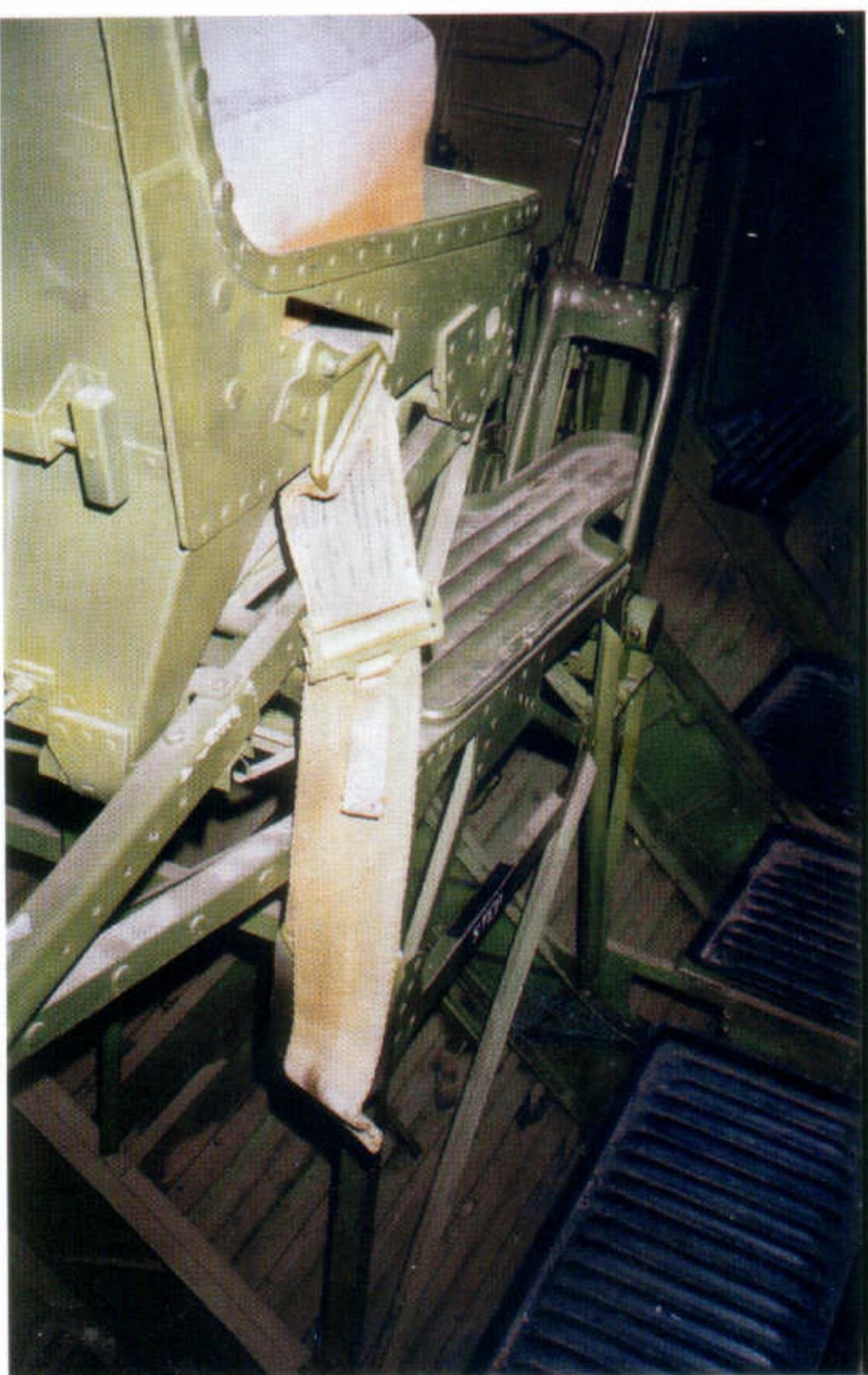
*Further aft on the left side of the cockpit was the pilot's intercom box and bottle of oxygen. Hydraulic lines, electrical wires, and various control cables are also visible.*



*A black walkway extended along the center of the hull for the full length of the aircraft. This view looks forward into the cockpit and bow compartment.*



The seats for the pilot and co-pilot were mounted on a framed structure. This is the pilot's seat as seen from the front, and the shoulder harness is visible on the back. Note the storage compartment for navigational charts and other papers beneath the seat.



Part of the framed structure that supported the pilot's seat is visible here. The right half of the wide lap belt hangs down next to the seat. A small platform, on which the pilot could rest his feet, was located just forward of the seat.

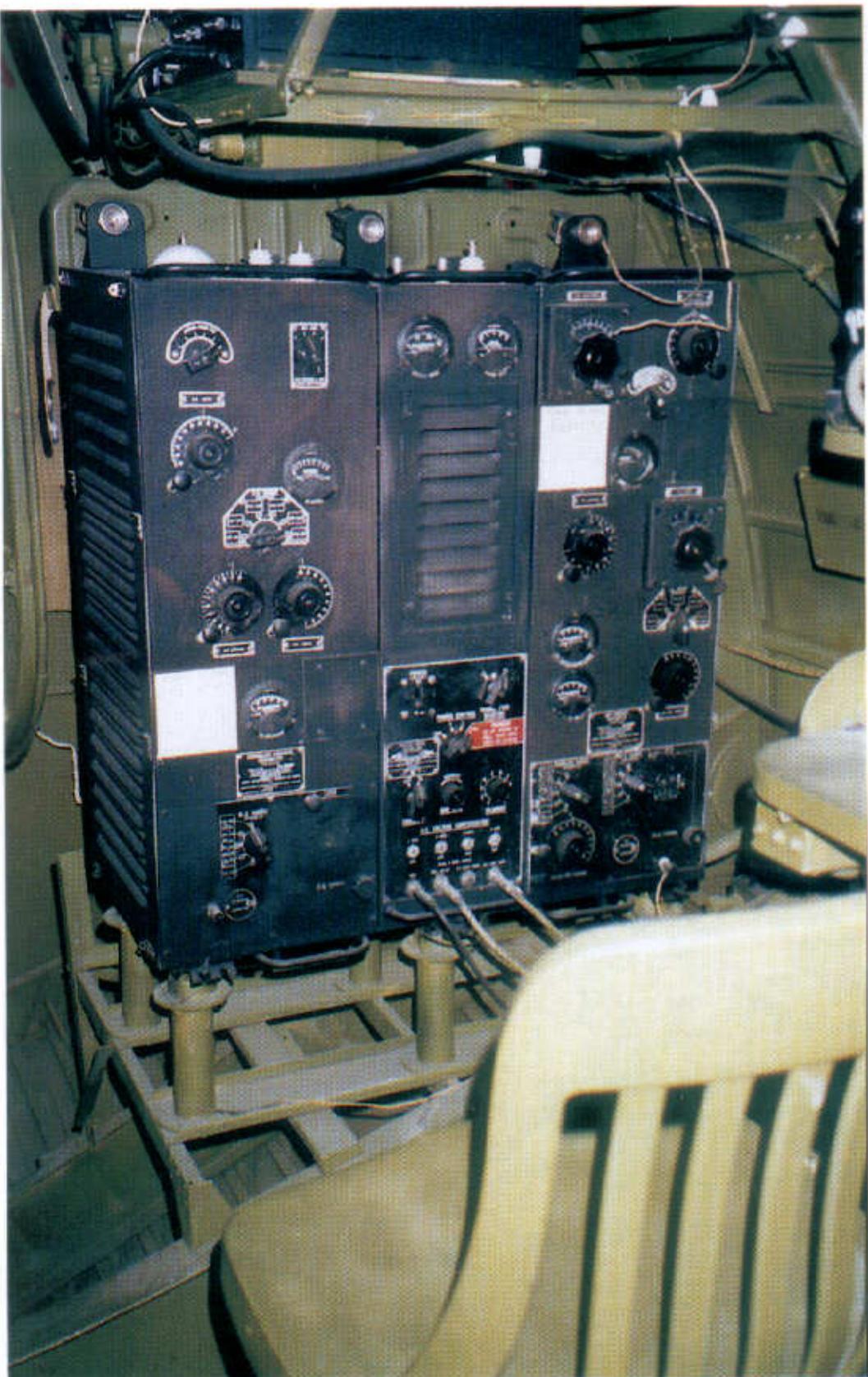


The seat was of all metal construction. Although they are no longer in this aircraft, cushions made of bound hair with cotton covering were placed in the seat bucket and against the back to provide comfort. Note the buckle details on the original shoulder harness that still remains in this aircraft.

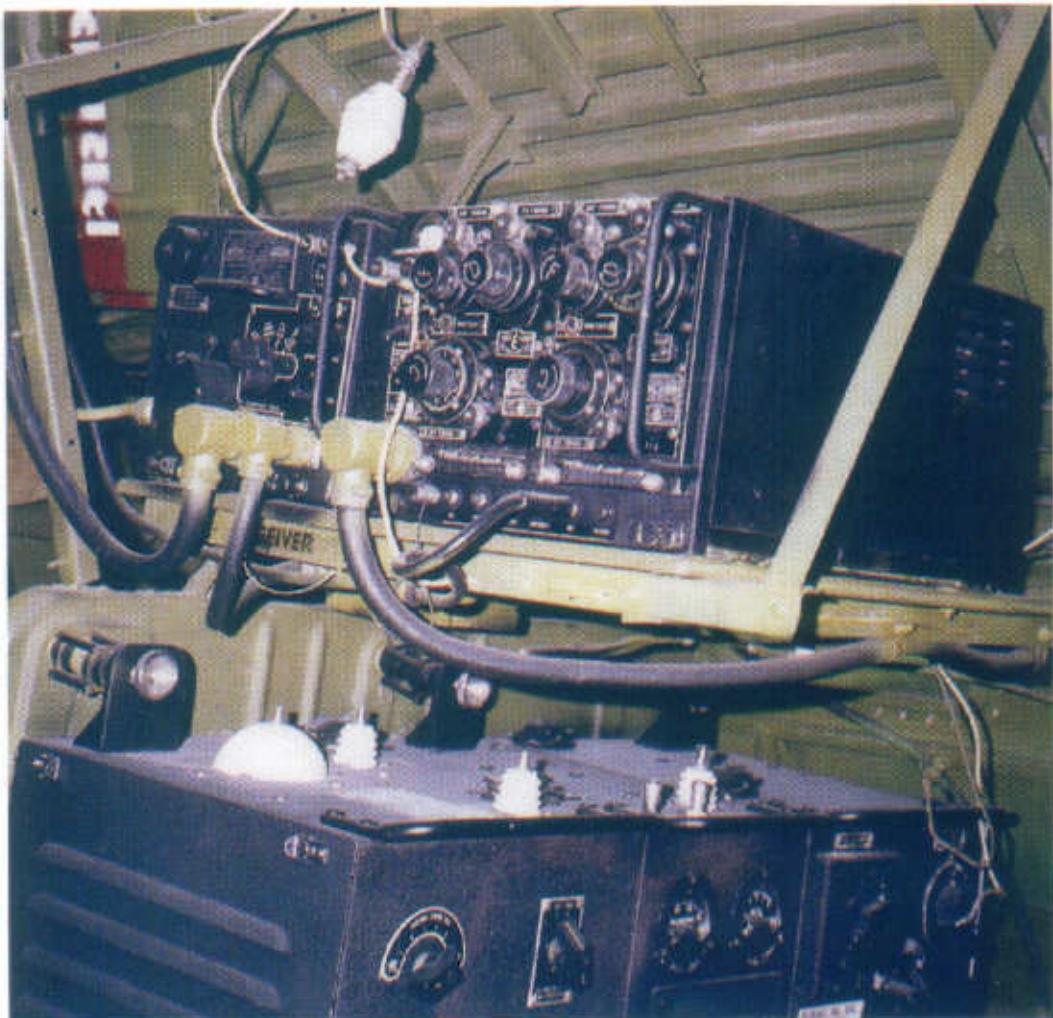


The small platform for the pilot's feet had two extensions through the rudder pedals. These rudder pedals are the type used on flying boats. Amphibians had brake pedals mounted on top of the rudder pedals. The co-pilot's side had the same platform and rudder pedal arrangement as shown here.

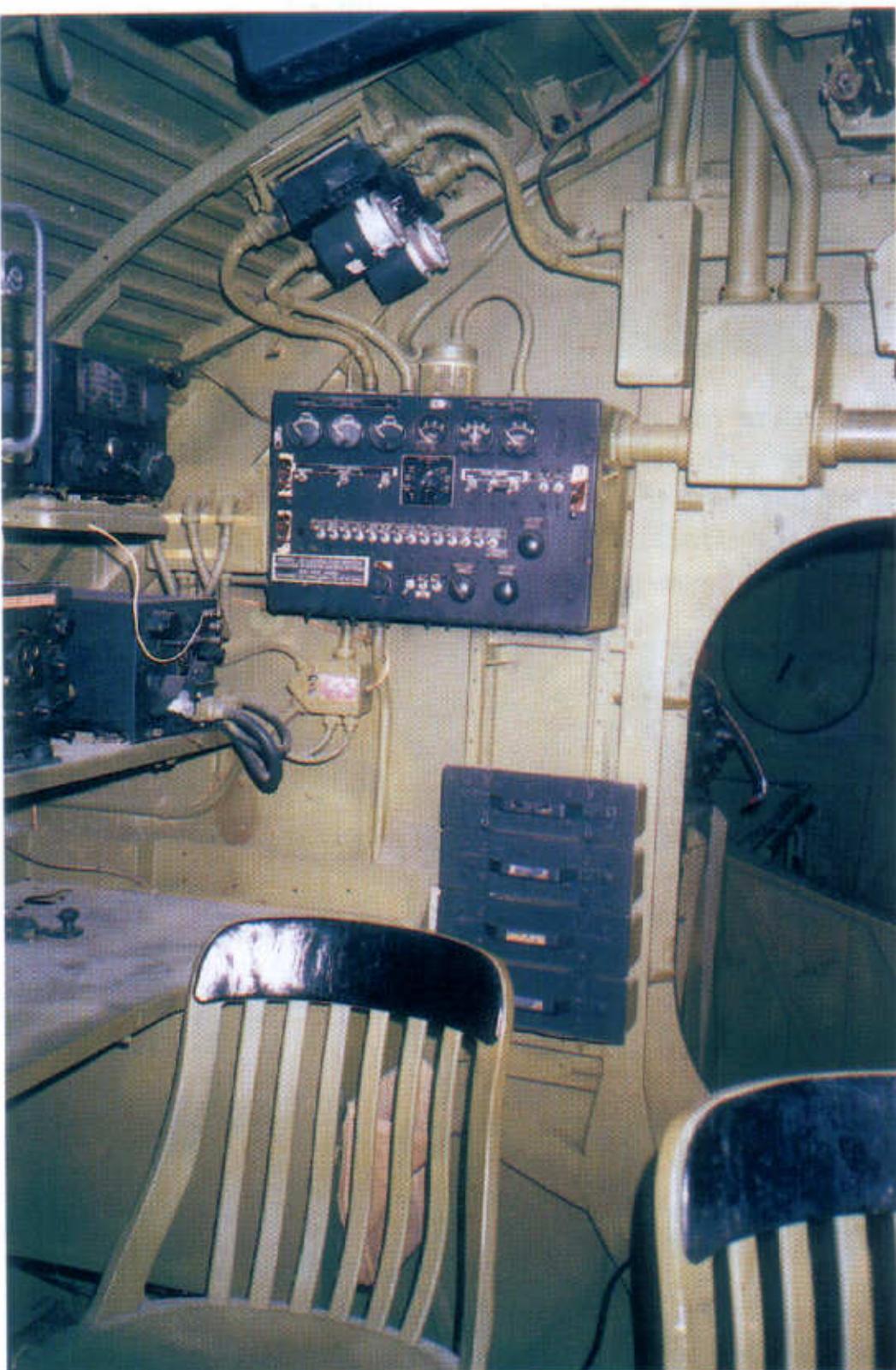
# RADIO OPERATOR'S STATION



Just aft of the cockpit was the compartment shared by the radio operator and the navigator. Although the radio gear in Catalinas varied to some degree depending on a number of factors, the equipment found in the PBY-5 at the National Museum of Naval Aviation is typical. This large transmitter was located just forward of the radio operator's chair on the right side of the compartment.



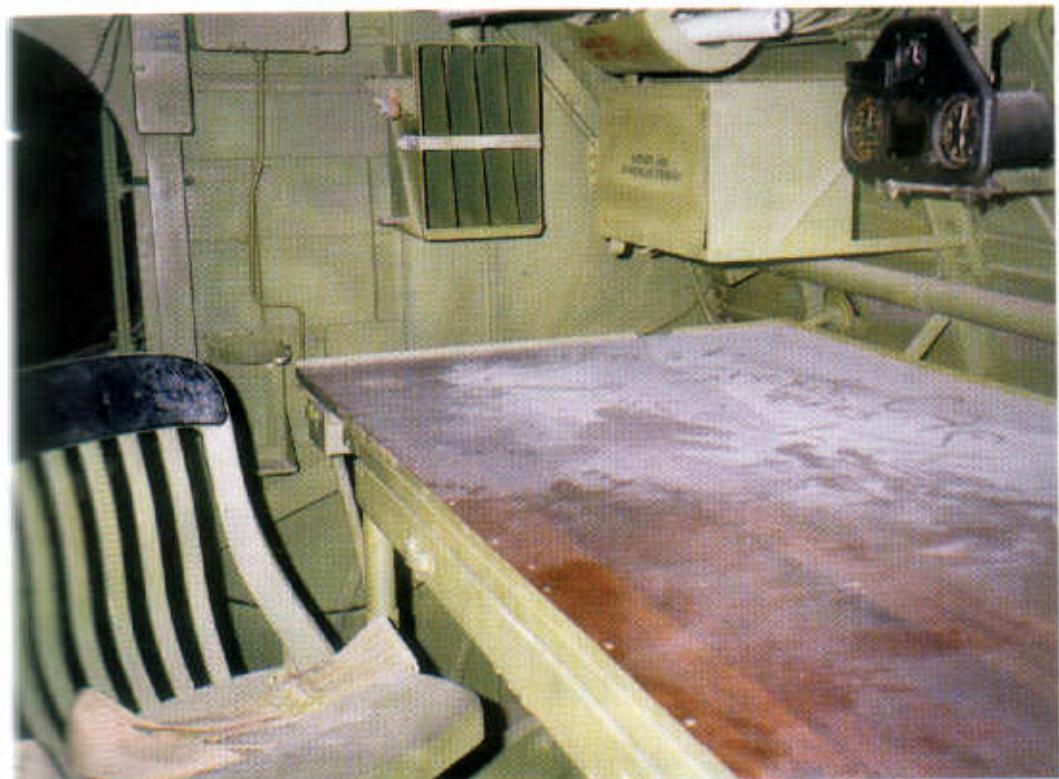
The transmitter and receiver for the pilot and co-pilot were mounted on a rack above the large transmitter shown at left.



The radio operator's receiver, his transmitter, a frequency meter, and other gear were mounted on shelves above his table. Note the key on the table.

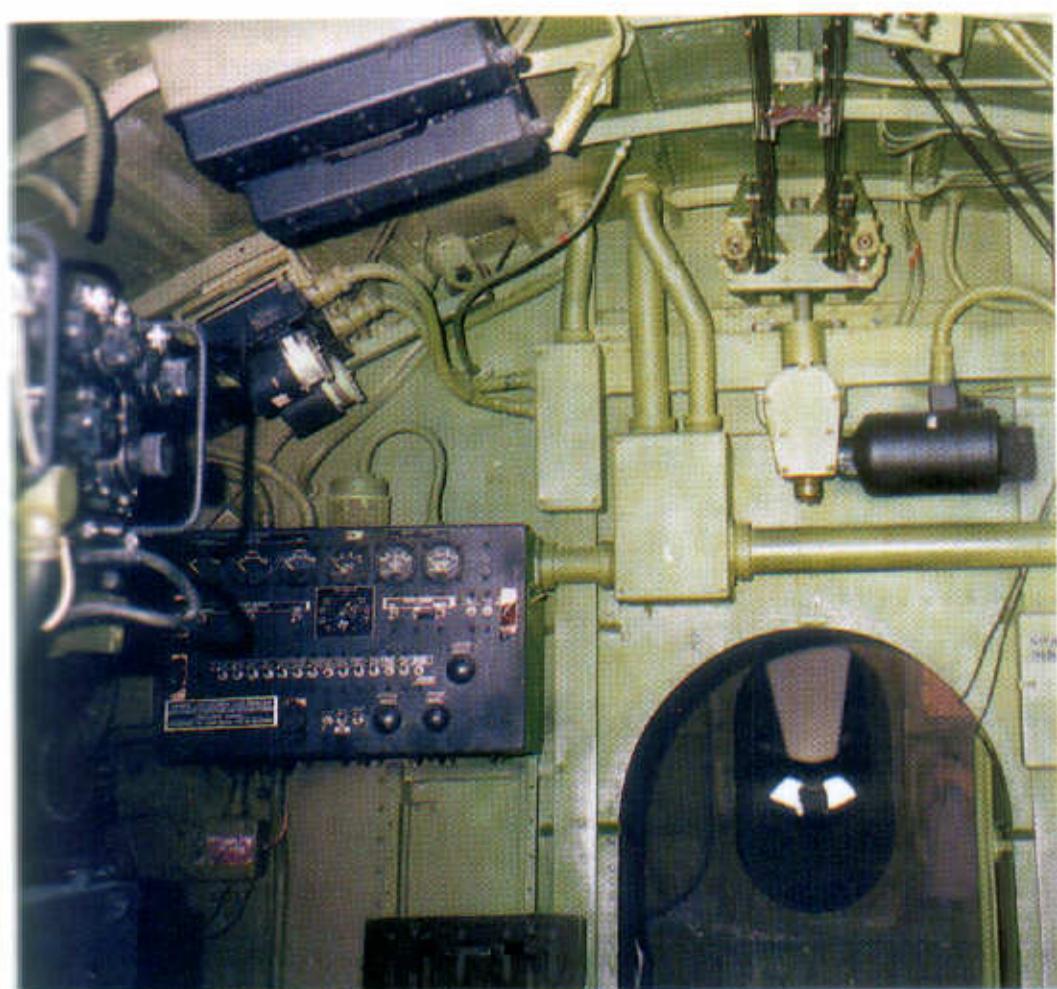
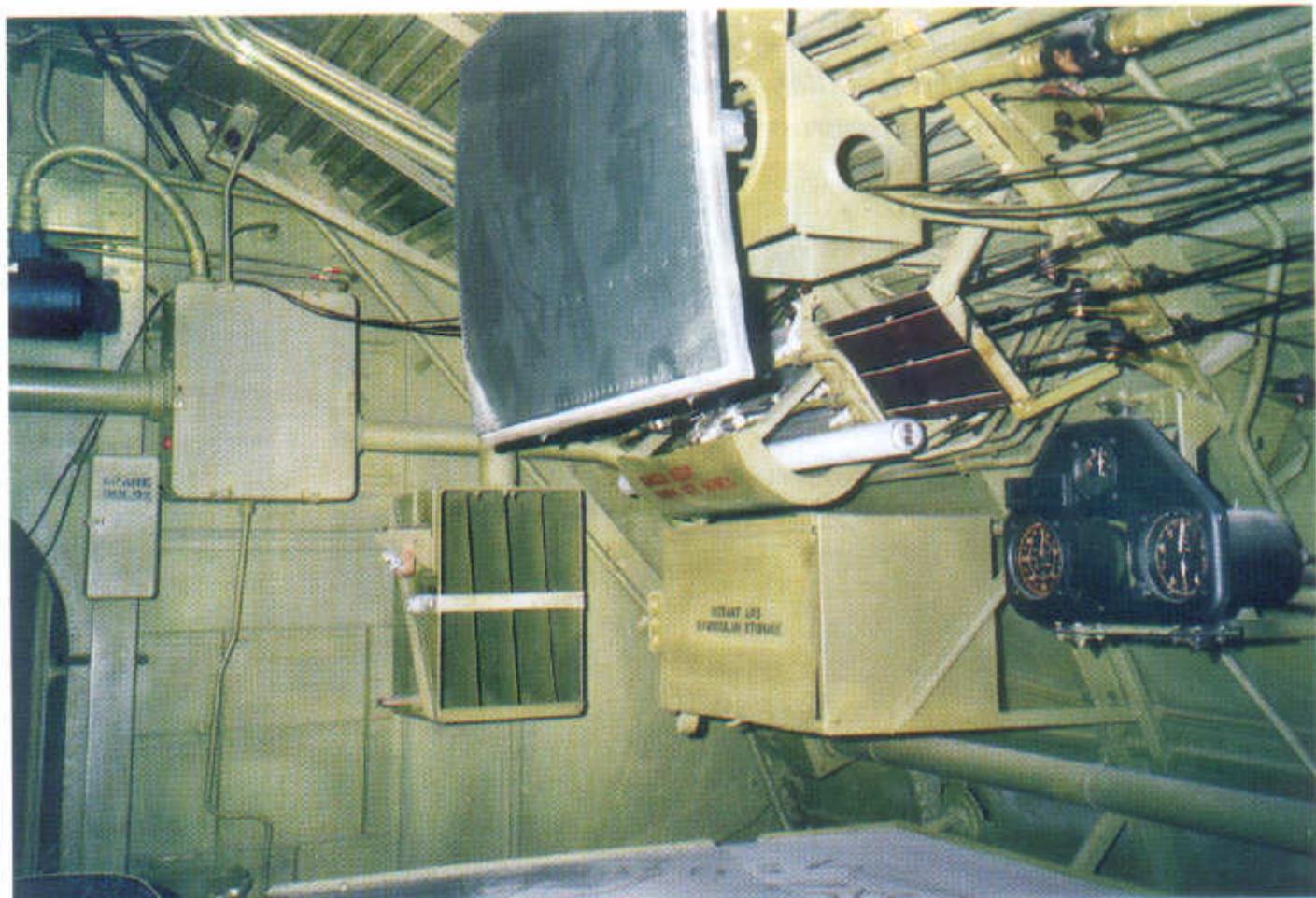
The main distribution panel for the electrical system was mounted on the aft bulkhead at the radio operator's station. Four spare tuning units are below it.

# NAVIGATOR'S STATION

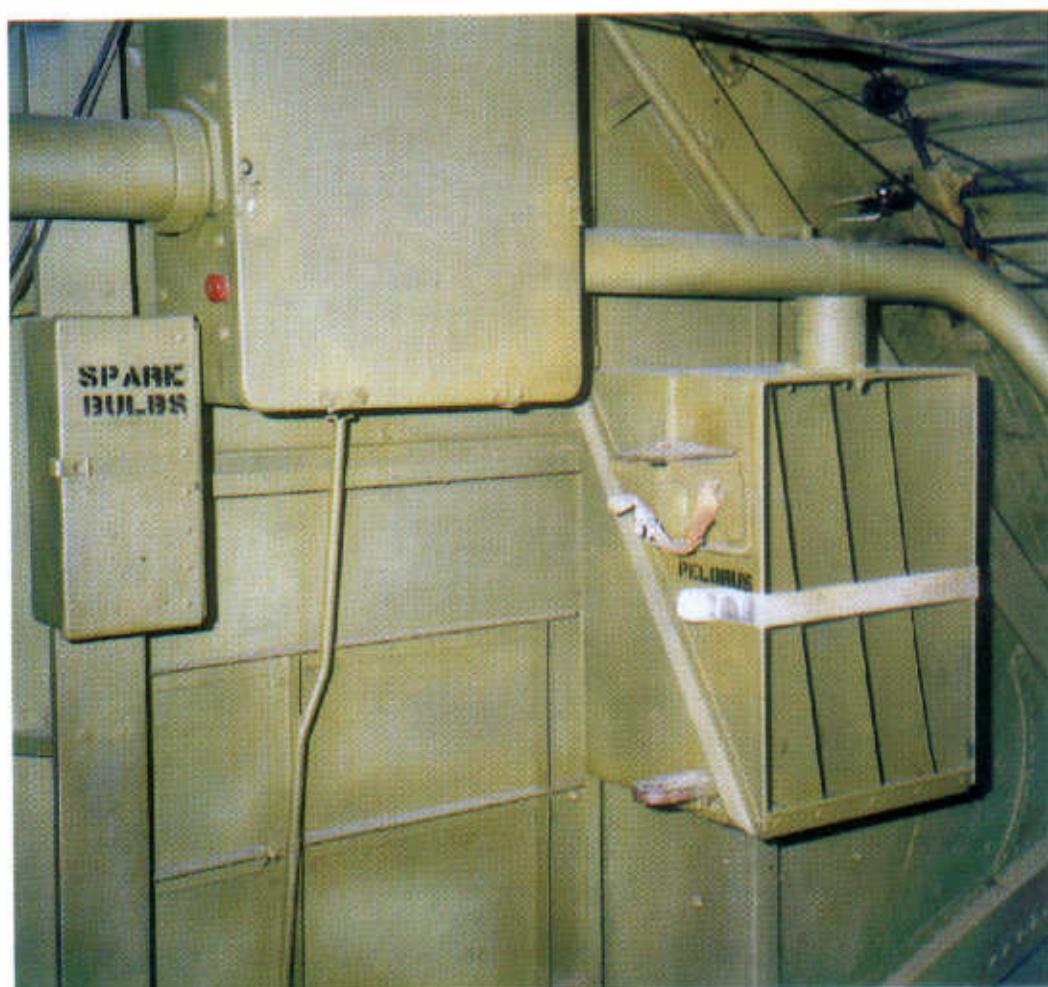


Above left and right. The navigator had a large table with a wooden top for his charts. Both the navigator and the radio operator were provided with large comfortable chairs which were equipped with lap belts.

Right: Above the navigator's table was a small panel with an altimeter, air speed indicator, and outside air temperature gage. Information provided by these gages was vital for accurate navigation. The storage box contained binoculars and the octant. The overhead hatch is shown hanging down in the open position, and the navigator could use a sextant to shoot the stars through this hatch as he determined the position and course of the aircraft.

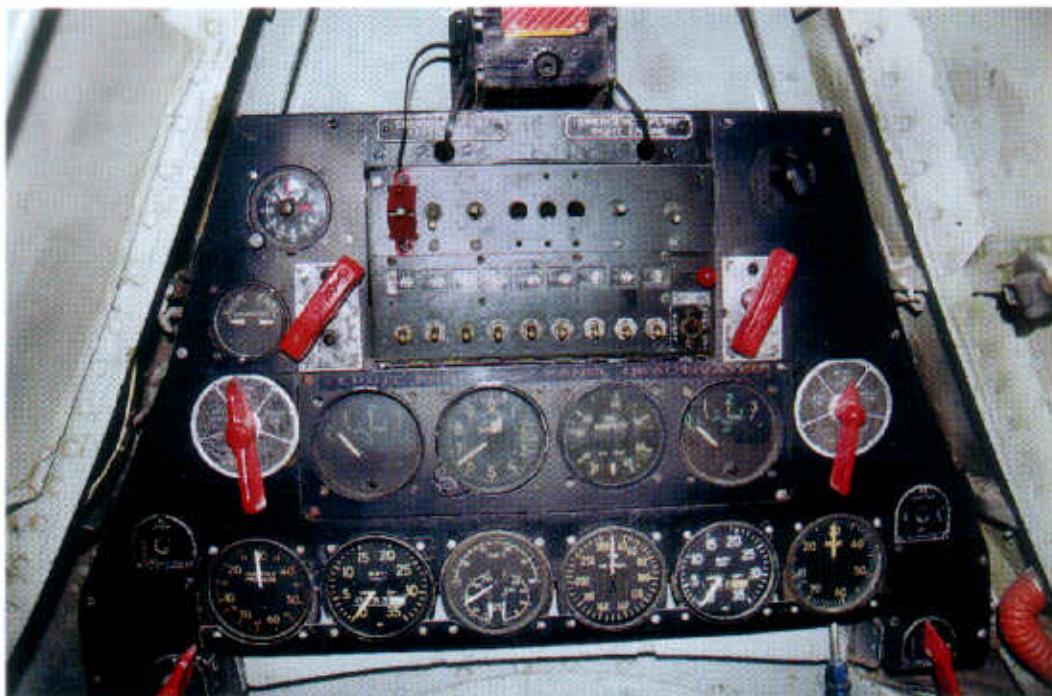


Details on the aft bulkhead of the radio operator's and navigator's compartment are shown here. Looking aft through the bulkheads, it is possible to see a silhouette of the tunnel gun in its position in the background.



When not in use, the navigator's Pelorus drift sight head and post were stowed in the case on the forward side of bulkhead 4. Spare bulbs were stored in the small container next to the passageway leading aft.

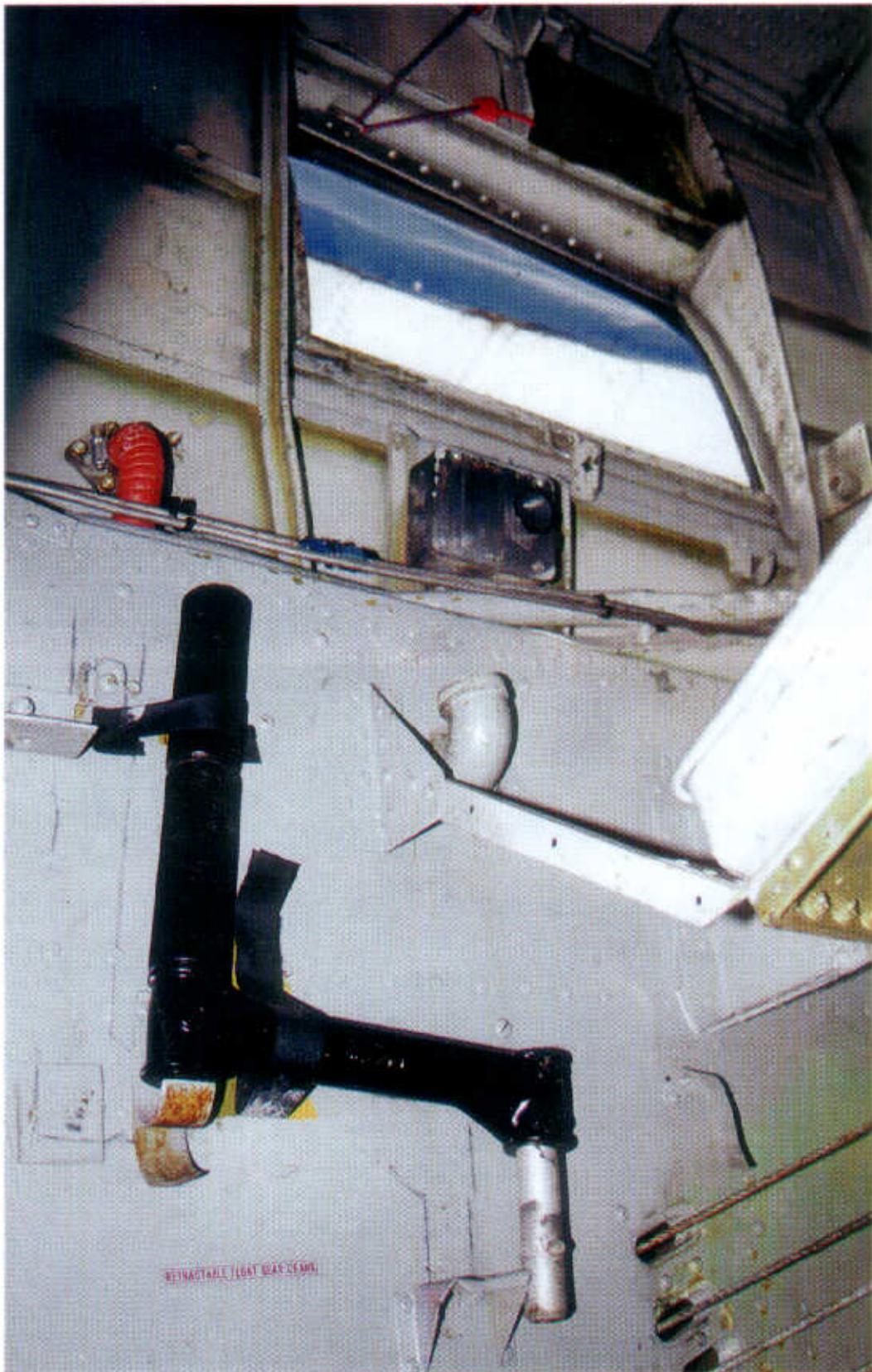
# MECHANIC'S STATION



The mechanic was the crewman who would be comparable to today's flight engineer. He sat in a compartment up inside the mounting structure for the wing. His panel of gages, switches, and handles was tapered to fit inside the forward end of this structure.



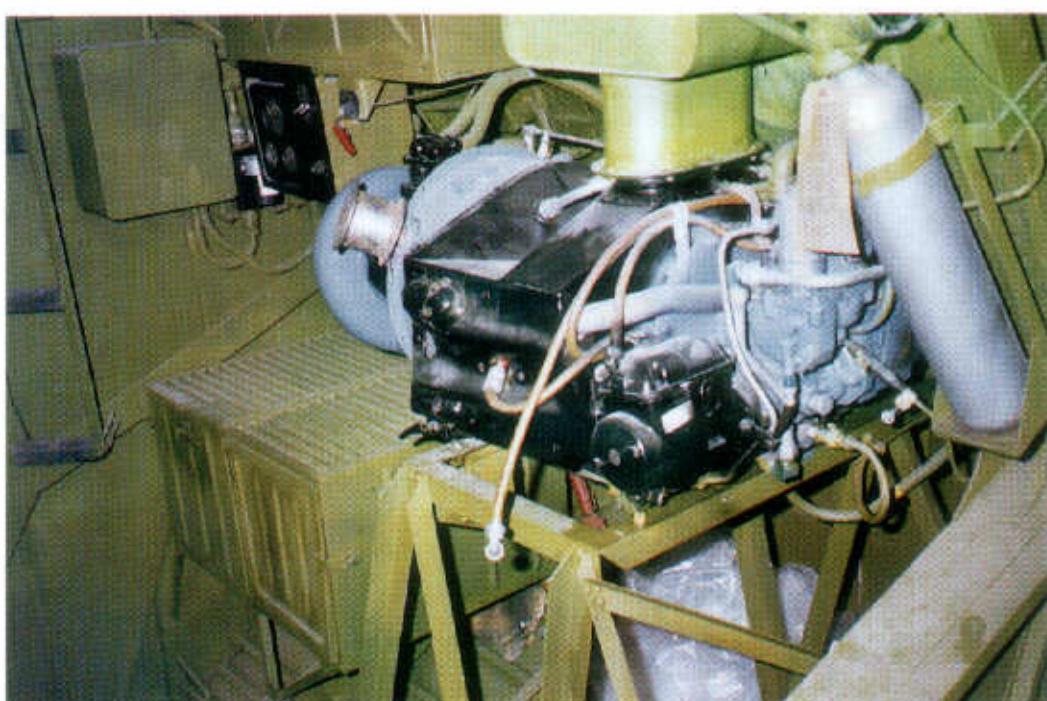
Above the mechanic's panel were mixture control handles for the engines. It should be noted that this restored aircraft has features that are basically accurate, but the interior has been repainted light gray. The original interior would have been Interior Green as illustrated in the other interior photographs in this color section.



The right window in the mechanic's compartment is visible at the top of this photo. This window, and the one on the left, provided the mechanic with a good view at the engines and retractable floats. The emergency hand crank for the retractable floats was mounted on the wall next to the mechanic's right knee.

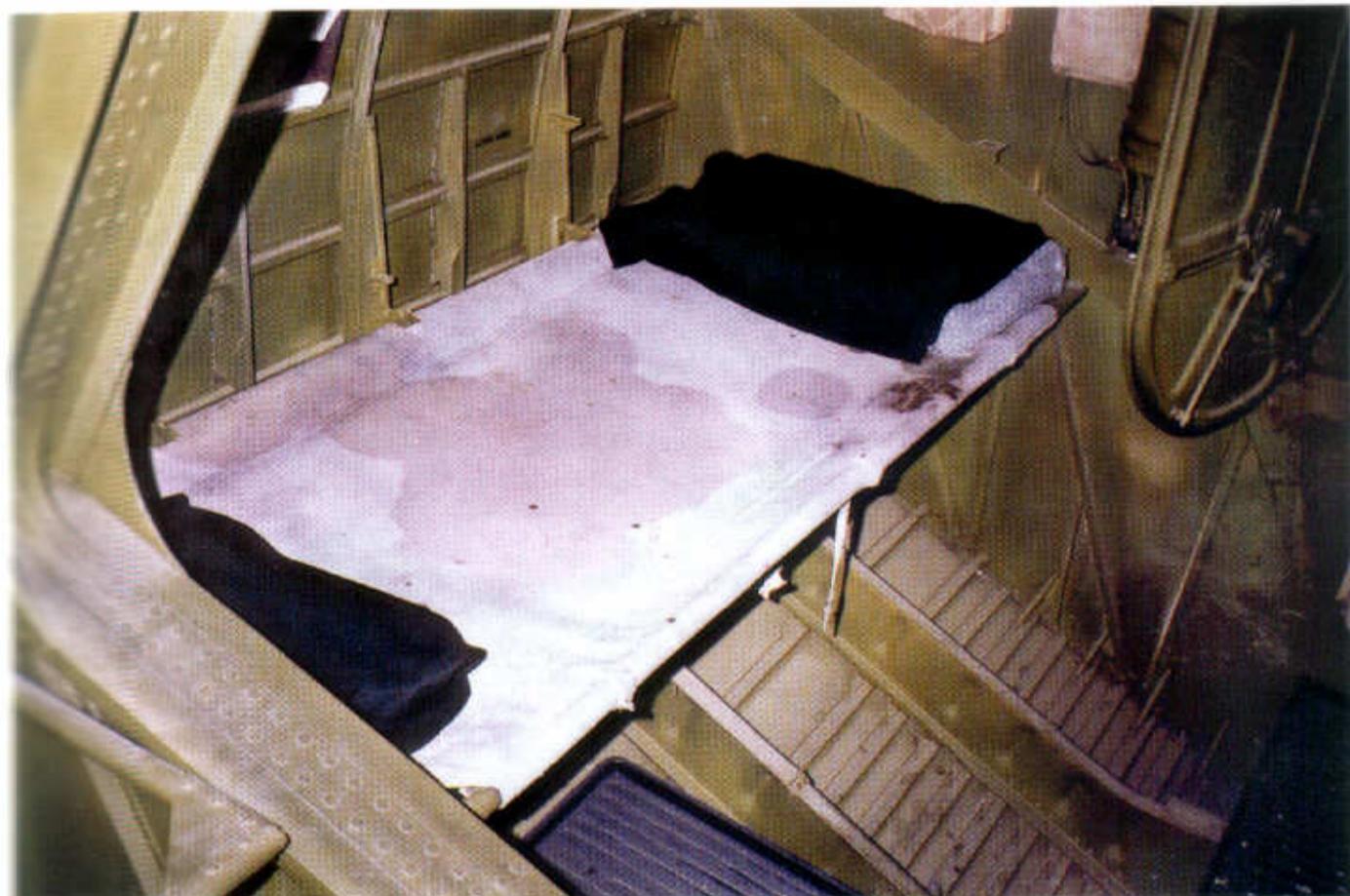


Under normal circumstances, the retractable floats were raised or lowered by electric motors. If the electrical system failed, the emergency hand crank would be inserted into one of two sockets beneath the mechanic's panel, and then the floats could be raised or lowered manually by turning the crank.



The auxiliary power unit (APU) in the PBY-5 was located just forward of bulkhead 5 on the starboard side of the aircraft as shown here. The APU in the PBY-5A was just aft of bulkhead 4 on the port side. In either case, the APU was in the mechanic's compartment between bulkheads 4 and 5.

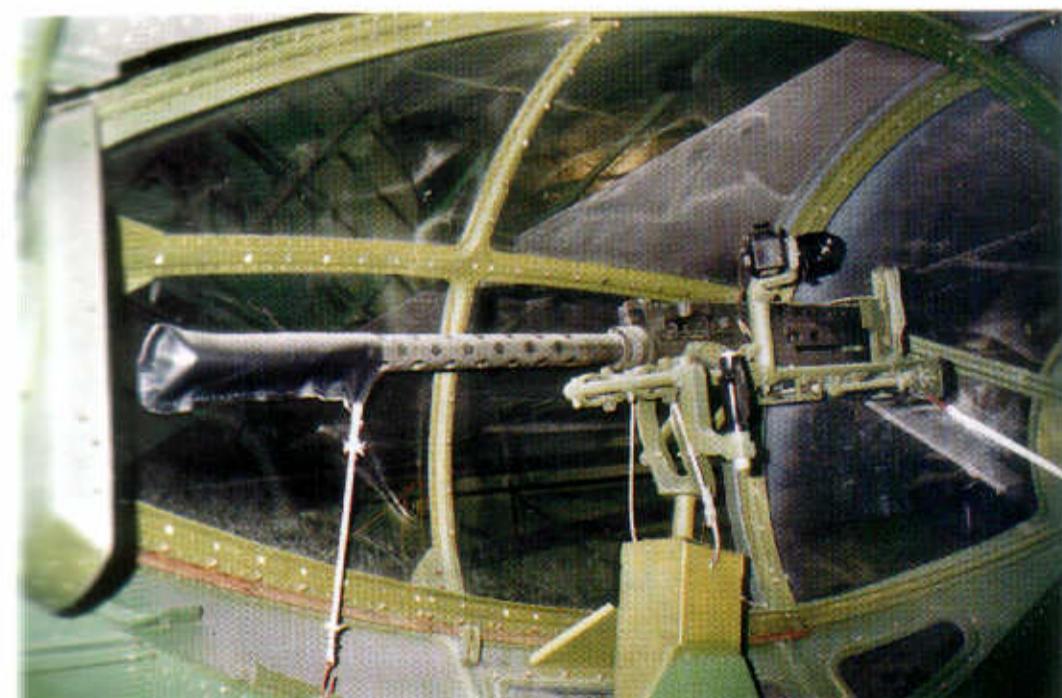
# LIVING QUARTERS & WAIST GUNS



The living quarters between bulkheads 5 and 6 usually had several canvas bunks with metal frames which could be used by crewmen or passengers on long flights. On some PBYs, this section, or at least part of it, was occupied by scopes and other equipment associated with radar arrays carried by the aircraft.



Beginning with the PBY-5, all variants of the Catalina and the PBN-1 Nomad had large blisters for observation on each side of the aft fuselage. The two .50-caliber waist guns were also fired through these blisters when they were open. Details of the left blister in the closed position are revealed here.



The interior of the same blister shown above is visible in this view, and the gun is in the stowed position. Note that even the interior of the framework on the blister is painted Interior Green. Additional details of these blisters and waist gun positions on operational aircraft can be found on page 59 and on the rear cover.



When firing the guns, the waist gunners stood on a C-shaped non-skid walkway around the base of the gun. This is the walkway for the left side gun. The chemical toilet was simply a covered can mounted to the port side of the center walkway in the waist gunners' compartment.

# LANDING GEAR DETAILS & COLORS



The landing gear remained the same on both amphibious versions of the Catalina. This front view of the nose gear reveals the double fork design of the strut and the tapered cross section of the gear doors.



Note how the gear doors were mounted on hinges that swung them slightly out from the hull when they were in the open position. A Goodrich 30-inch tire with a smooth tread was used on the nose gear wheel.



Additional details of the nose gear on a PBY-5A are illustrated from the left side of the aircraft.



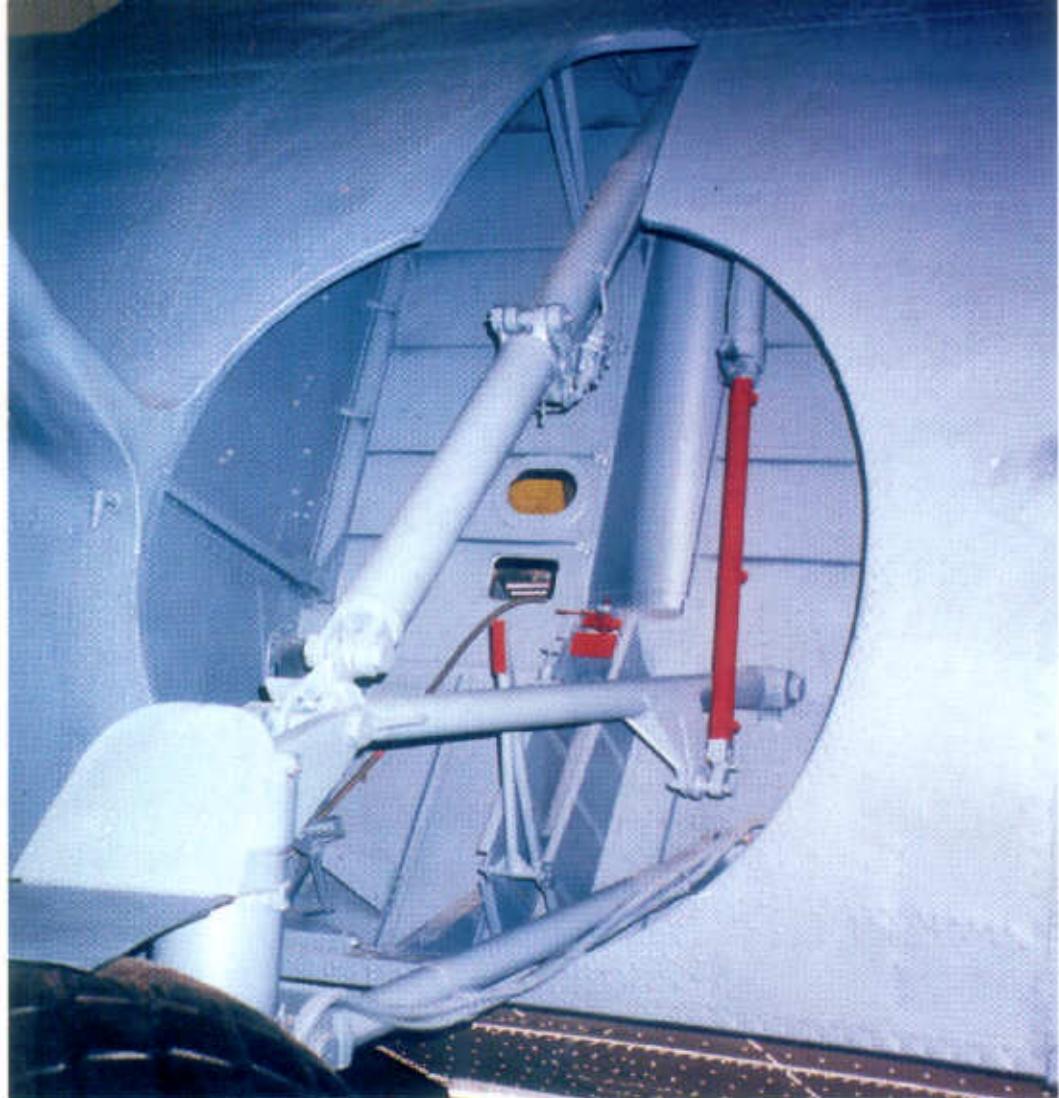
The main gear retracted into wells on each side of the hull. Although disc covers were available for the wheels, they usually were not used, thus revealing the eight spokes as seen here. A Goodrich 47-inch tire with a smooth tread was specified for each main gear.



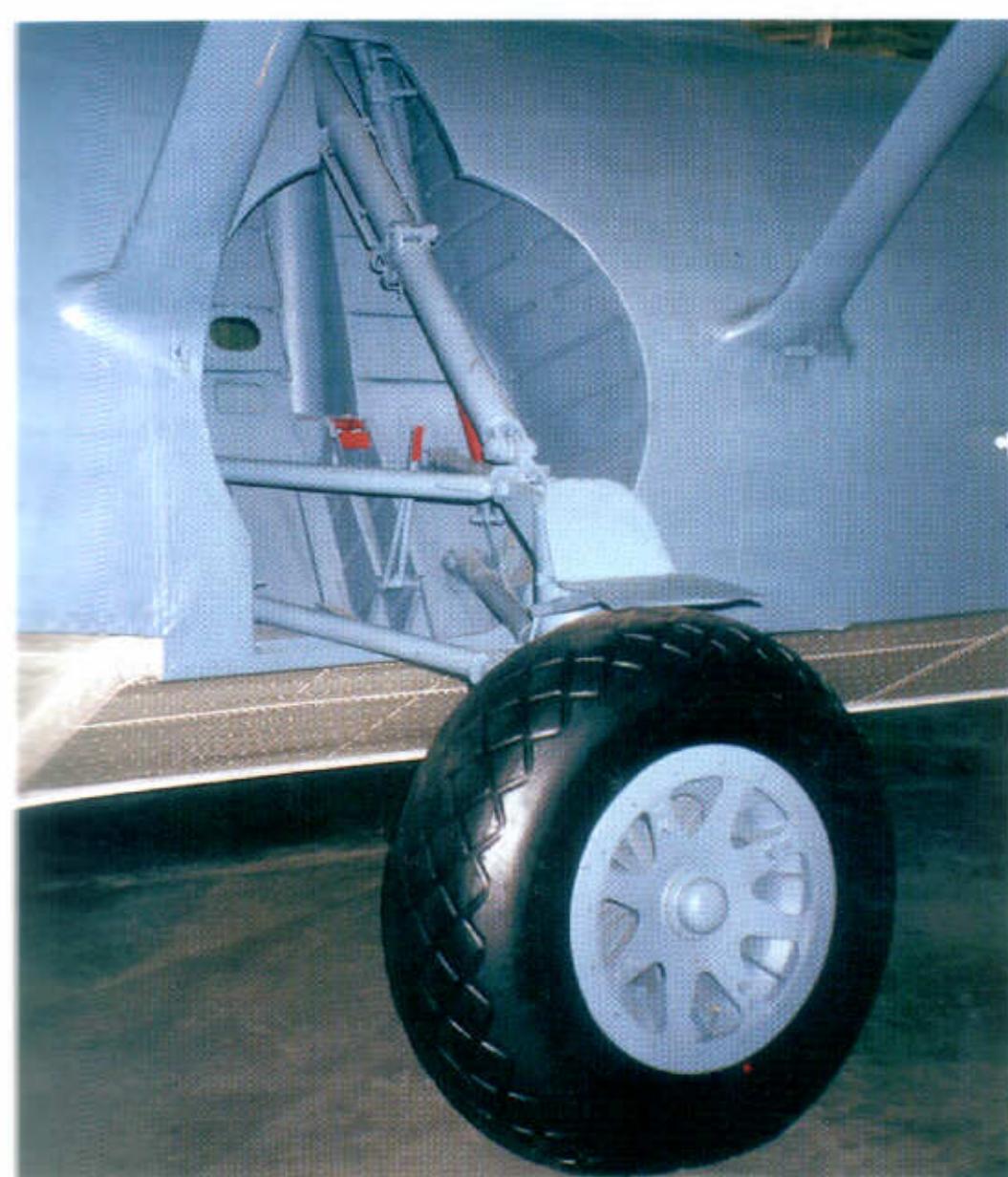
The link for the oleo portion of the main gear was on the forward side of the strut. Hydraulic lines for the brakes are visible in this front view of the right main landing gear. Struts and wheels were usually painted the same color as the sides of the hull.



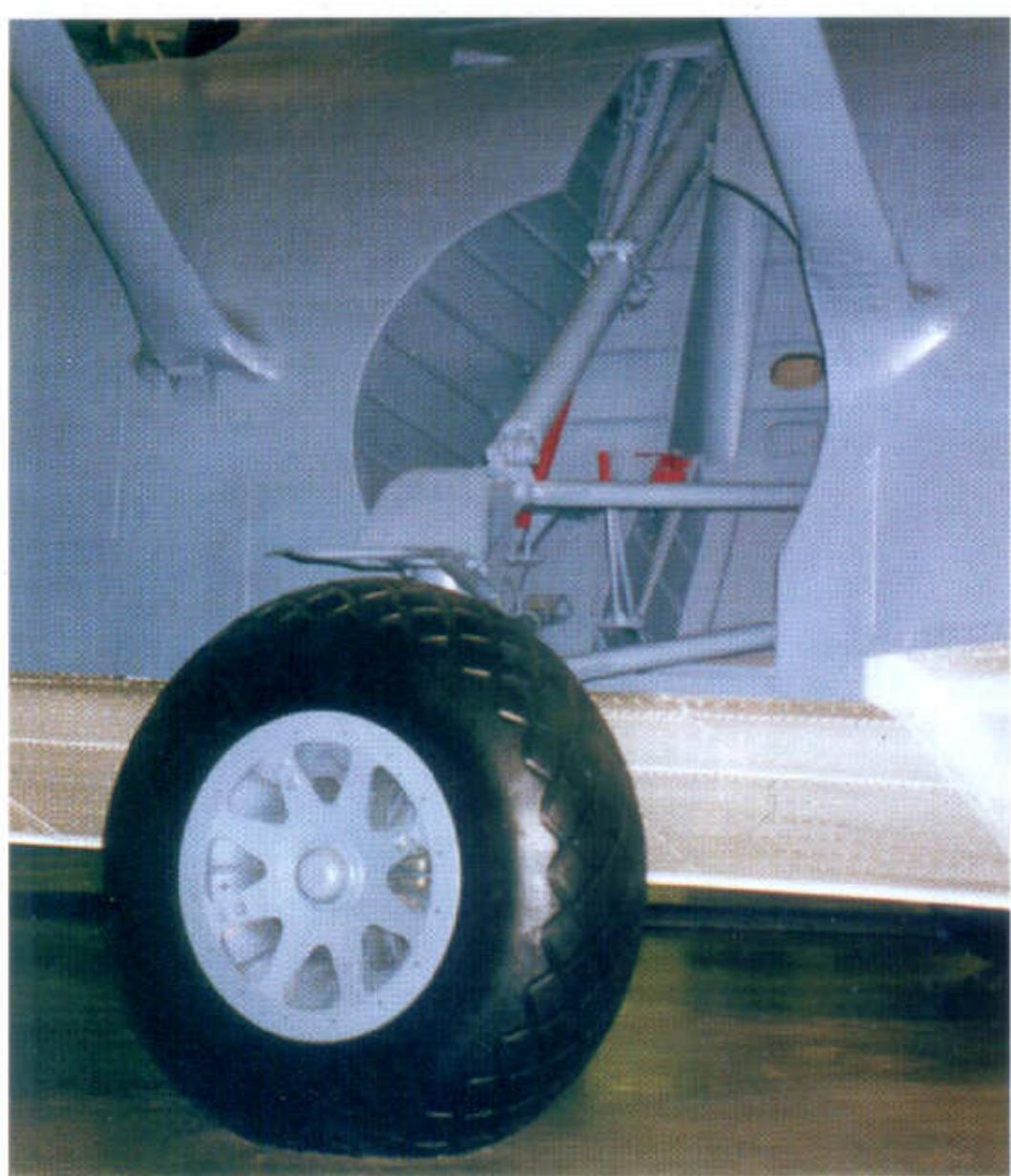
The Catalina on display at the U. S. Air Force Museum at Dayton, Ohio, is beautifully restored. This is an overall view of the right main landing gear. The interiors of the wheel wells are painted the same color as the side of the fuselage, but photographs of vintage Catalinas provide evidence that the wells were sometimes painted black.



A close-up of the right gear well reveals some of its details. Note especially the small, oval shaped, observation window through which the gear could be inspected from inside the aircraft while it was in flight. The small panel below it has been removed as it would be to provide access to the retracted gear from inside the fuselage.



The right main gear is shown again from slightly behind. Note the small hinged door mounted on the strut above the wheel. When the gear retracted, this door flattened out along its hinge line and covered the tapered slot at the top of the well. In this photo, as well as in the one above, the access panel is in place inside the well.



The left main gear on the Air Force Museum's Catalina is shown here from approximately the same angle as the right gear in the photograph to the left. Again note the small observation window inside the well. The access panel is in place just below the window, but it is difficult to see.

# R-1830-92 ENGINE DETAILS & COLORS



*Two Pratt & Whitney R-1830-92 engines powered the PBY-5A and PBY-6A versions of the Catalina. This is the right engine as seen from the front. Note that the oil cooler below the engine is offset to the outboard side of the nacelle.*



*The left engine is shown here with the cowl flaps open. Notice that the oil cooler remains on the right side of the nacelle and is therefore on the inboard side of this engine. The air for the carburetor was taken in through a scoop on the inside of the cowl ring at the top.*



*This outside view of the right engine shows the cooling flaps on the cowling in the closed position. The exhaust stubs were located on top of the nacelle. Also note the two small scoops on the side of the oil cooler.*



*The cooling flaps are open in this outside view of the left engine. This beautifully restored PBY-5A is at the National Museum of Naval Aviation, and it is painted in the two-tone gray and white scheme used in the Atlantic.*

# PBY-5



*Like the previous Catalina variants, early production PBY-5s were painted silver. The tops of the wings and horizontal stabilizers were usually yellow. This PBY-5 was assigned to VP-52, and it was photographed at NAS Norfolk, Virginia, in March 1941. (National Archives)*

First ordered in 1939 by the British and named the Catalina I, Consolidated's Model 28-5 was designated the PBY-5 by the U. S. Navy. It became the first version to be ordered in quantity when, in December 1939, the Navy placed an order for 200 PBY-5s. Only the first 167 of these, BuNos. 2289 through 2455, were completed as PBY-5s, and of these BuNo. 2290 was provided to the U. S. Coast Guard. The remaining thirty-three were delivered as PBY-5A amphibians. The initial order for 200 PBY-5s was placed to provide aircraft that were needed to meet the requirements of the Neutrality Patrols that had been ordered in September 1939. This number was more than three times that of any previous variant, and more than the total number of all four earlier versions combined. An additional ninety were ordered in September 1941, and these were assigned BuNos. 4425 through

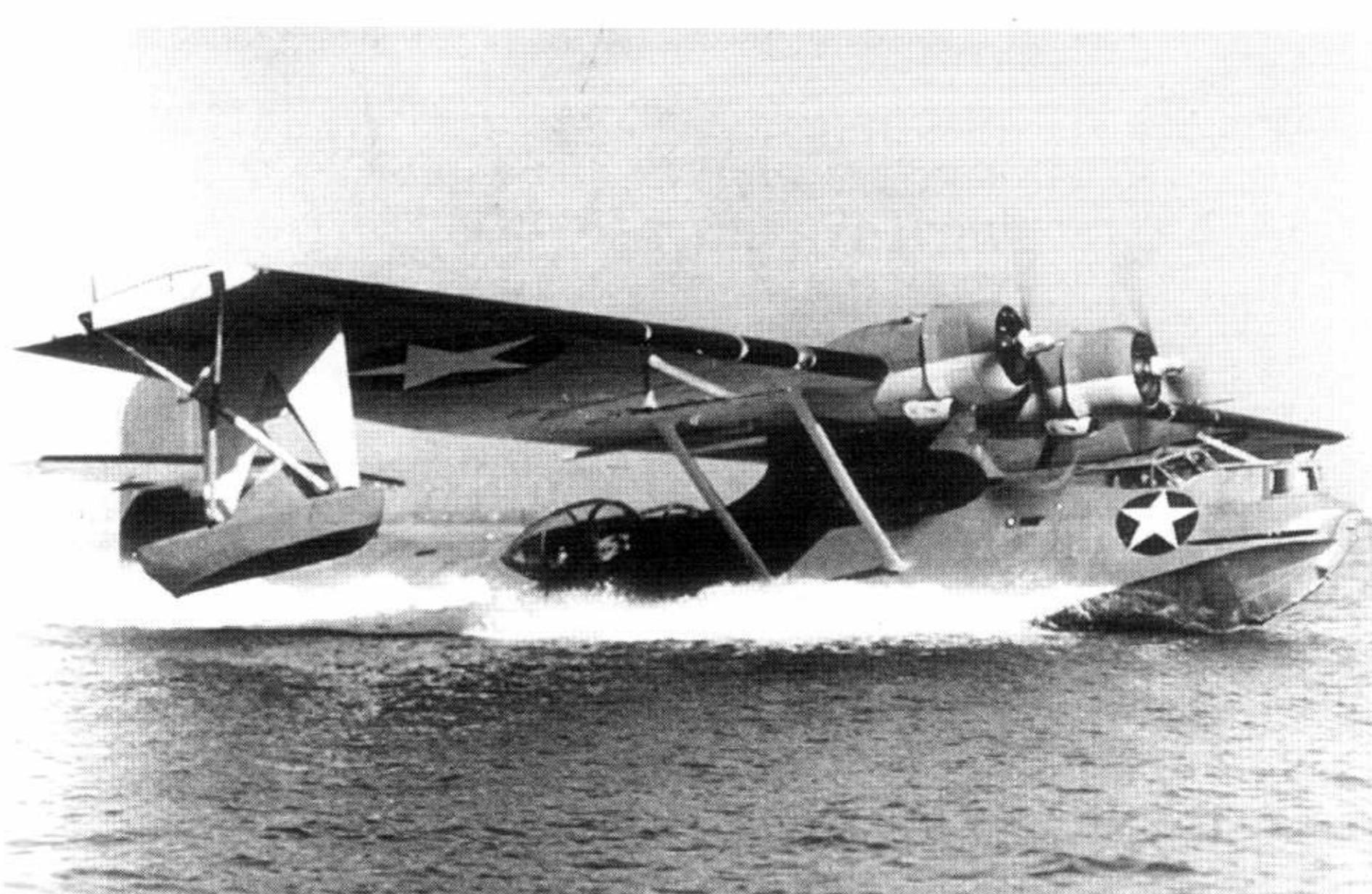
4514. After America entered the war, the Navy placed orders for an additional 427 PBY-5s. Others were produced for the British and Canadians. Those built by Boeing of Canada were designated PB2B-1s by the Navy and called Catalina IVBs by the British.

The U. S. Navy liked the name the British had chosen, and in October 1941, they officially adopted the name Catalina for their aircraft. Although the name was often used within the U. S. Navy, all versions of the aircraft were usually referred to simply as PBYs.

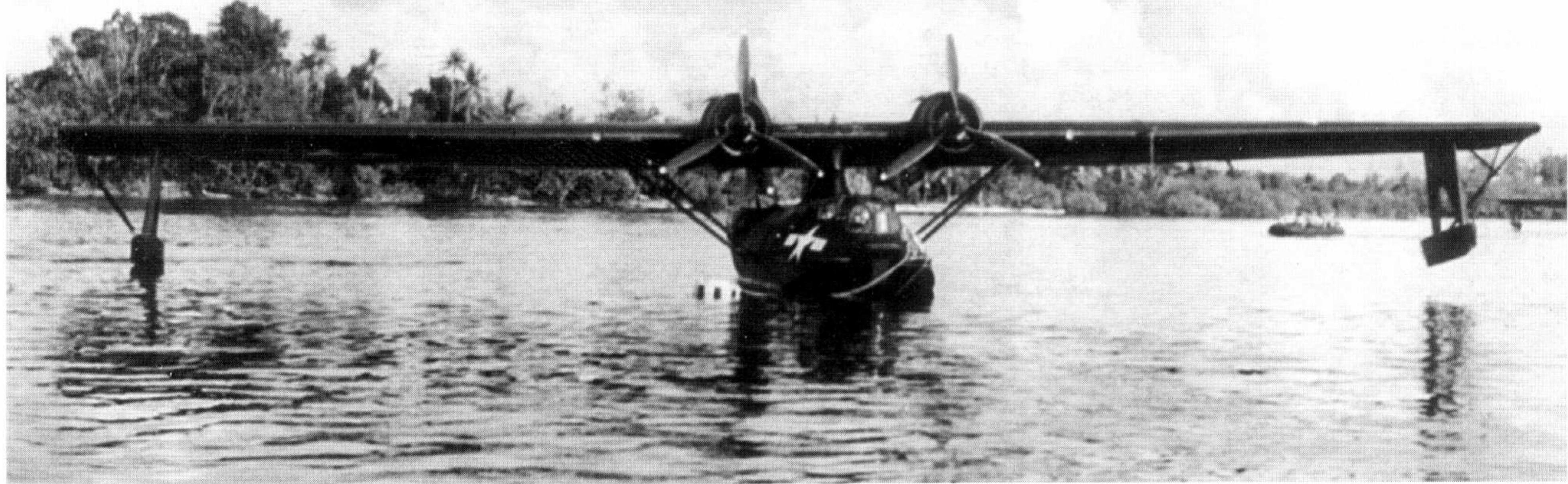
There were several very noticeable changes that differentiated the PBY-5 from the previous PBY-4. The most easily recognizable of these was the addition of the large framed blisters over the waist positions. These had first appeared on the final four PBY-4s, and they became a standard feature on the PBY-5. They remained on all the subsequent variants as well. These blisters not only made it far easier for the two waist gunners to observe the area around and below the aircraft, they also provided much better fields of fire for the two .50-caliber waist guns.

Two visible changes were made to the tail section. The rudder was redesigned and had a straight trailing edge instead of being curved as on all of the previous variants. The horizontal stabilizer and elevators were also redesigned. A minor change was that the loop antenna was moved from its position above the cockpit to a new location between the engines on top of the wing. In some cases, an ADF "football" antenna replaced the loop antenna.

The PBY-5 was powered by two Pratt & Whitney R-1830-82 engines, each of which produced 1,050 horsepower. Like the R-1830-72, which had powered the PBY-4, the -82 version of the engine had a downdraft carburetor. But unlike the -72, it did not have the scoop for the carburetor mounted on top of the engine. Instead, it was located inside the top of the cowl ring. The radiator for each oil cooler was moved from its previous position inside the leading edge of the wing to a housing on the lower right side of each nacelle. The top speed of the PBY-5 was 190 miles-per-hour, and the service ceiling was 21,600 feet. Gross weight was 26,200 pounds.



*With engines at full power, this PBY-5 generates a large wake during its takeoff run. (National Archives)*



*A Black Cat rests in a lagoon at Morota, north of Halmahera, on September 23, 1944. Note the eyeball turret on this particular PBY-5.* (National Archives)

As more and more PBY-5s entered service, they became the standard flying boat in the Navy's inventory, and all earlier versions were transferred to training or utility squadrons. PBY-5s would remain the most numerous flying boat in service with the U. S. Navy throughout World War II, but as the war progressed, Catalina production changed to the more versatile amphibious variants.

U. S. Navy PBY-5 Bureau Numbers were as follows:

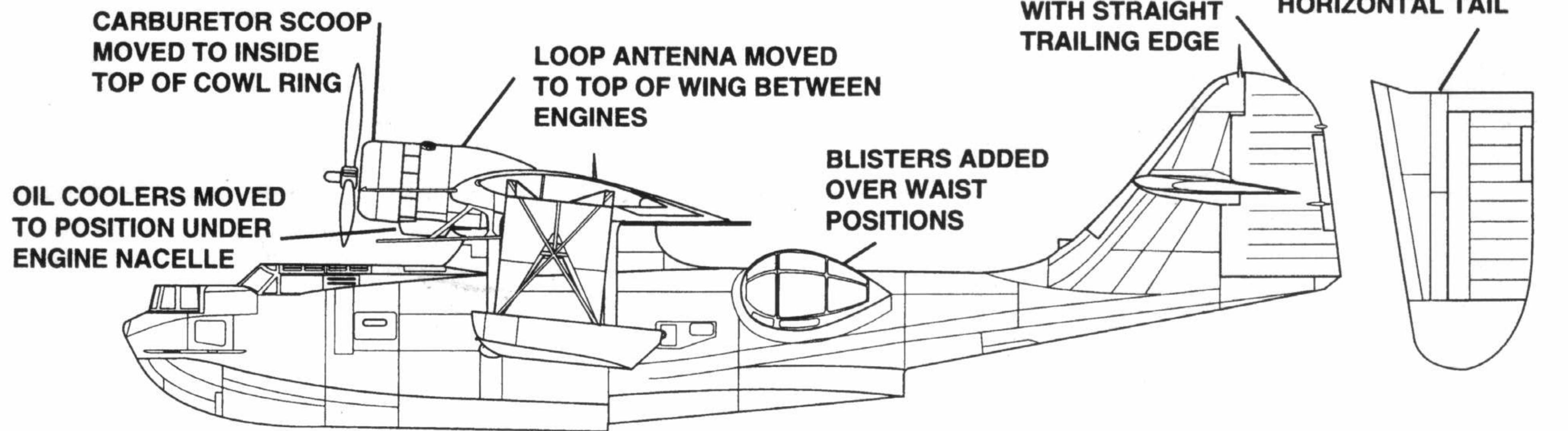
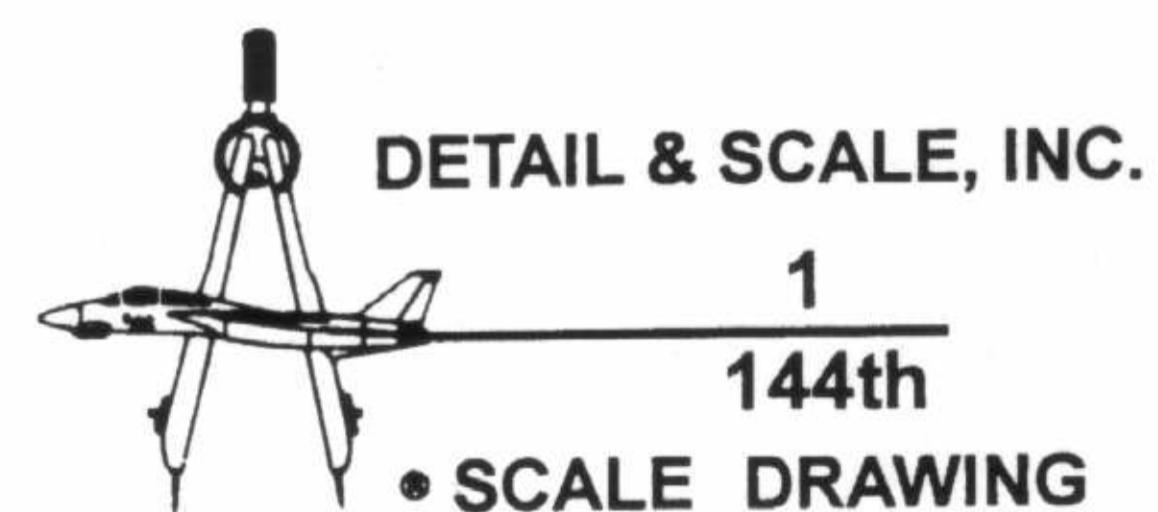
NUMBER	BUREAU NUMBERS
167	2289 through 2455
90	04425 through 04514
426	08124 through 08549
<hr/> 1 684	63992



*Antisubmarine retrorockets are loaded under the wing of this PBY-5. The two-tone gray and white paint scheme indicates that this aircraft operated in the Atlantic.*

(National Archives)

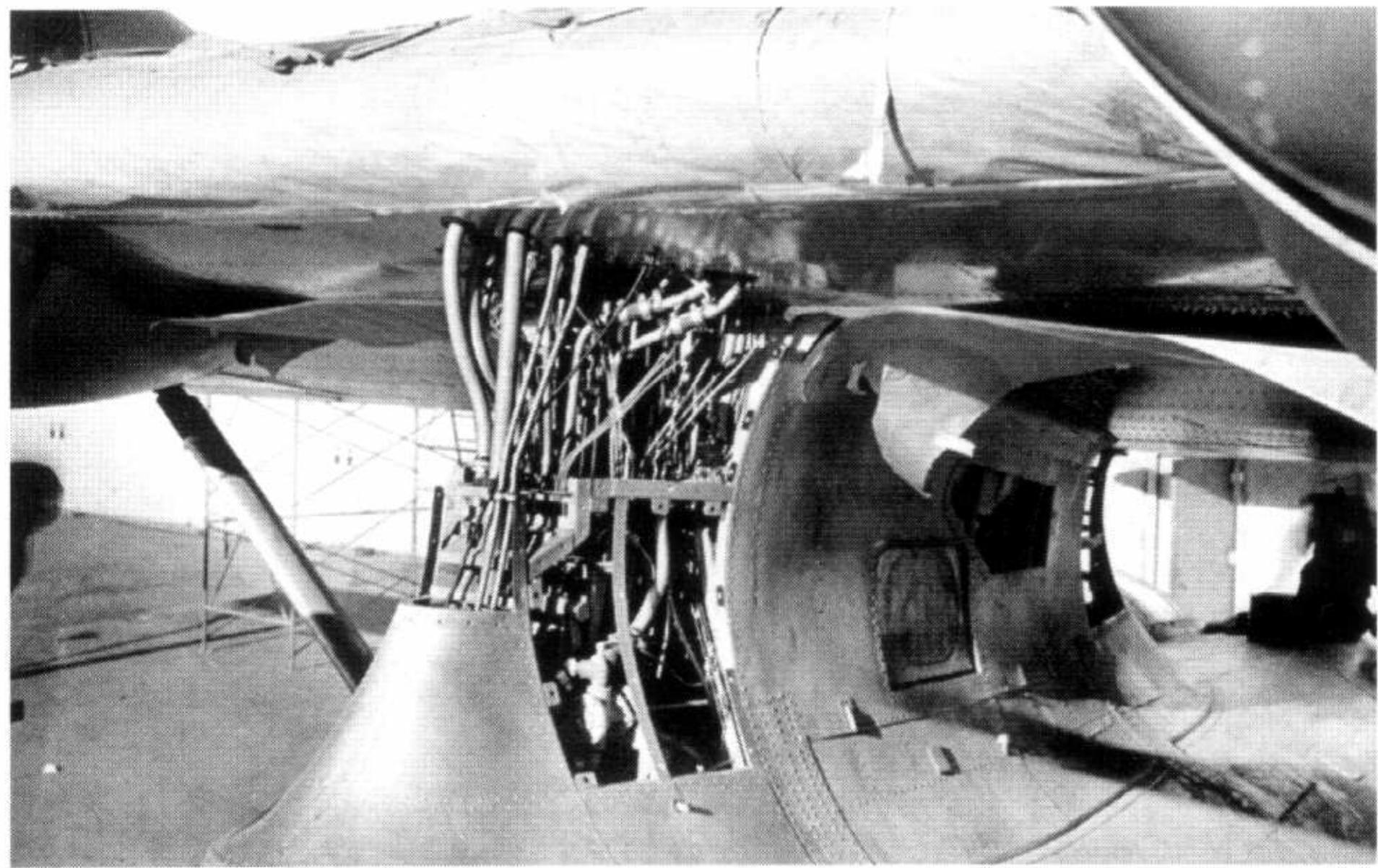
## PBY-5 (PB2B-1) 1/144th SCALE DRAWING



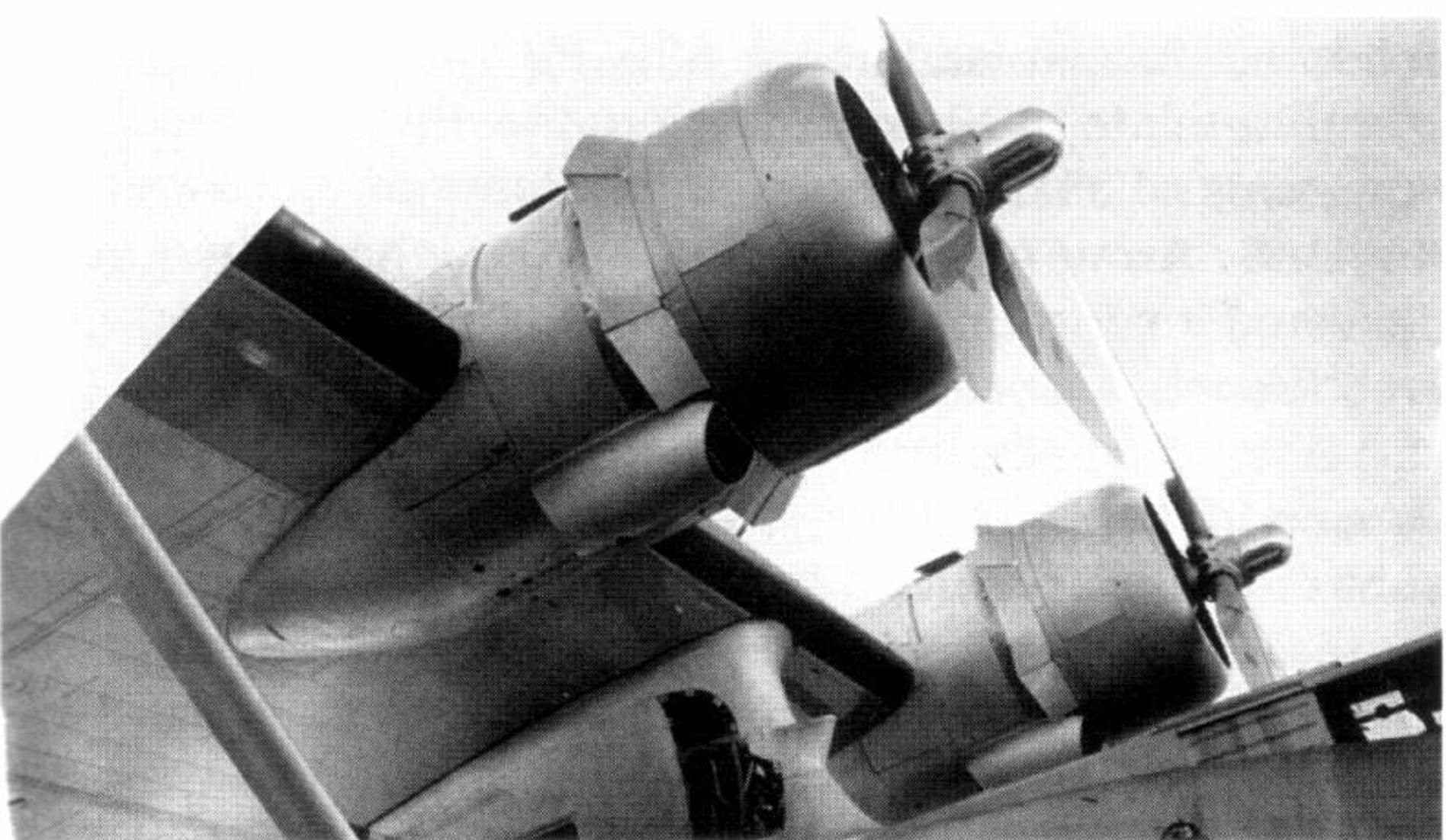
# PBY-5 DETAILS



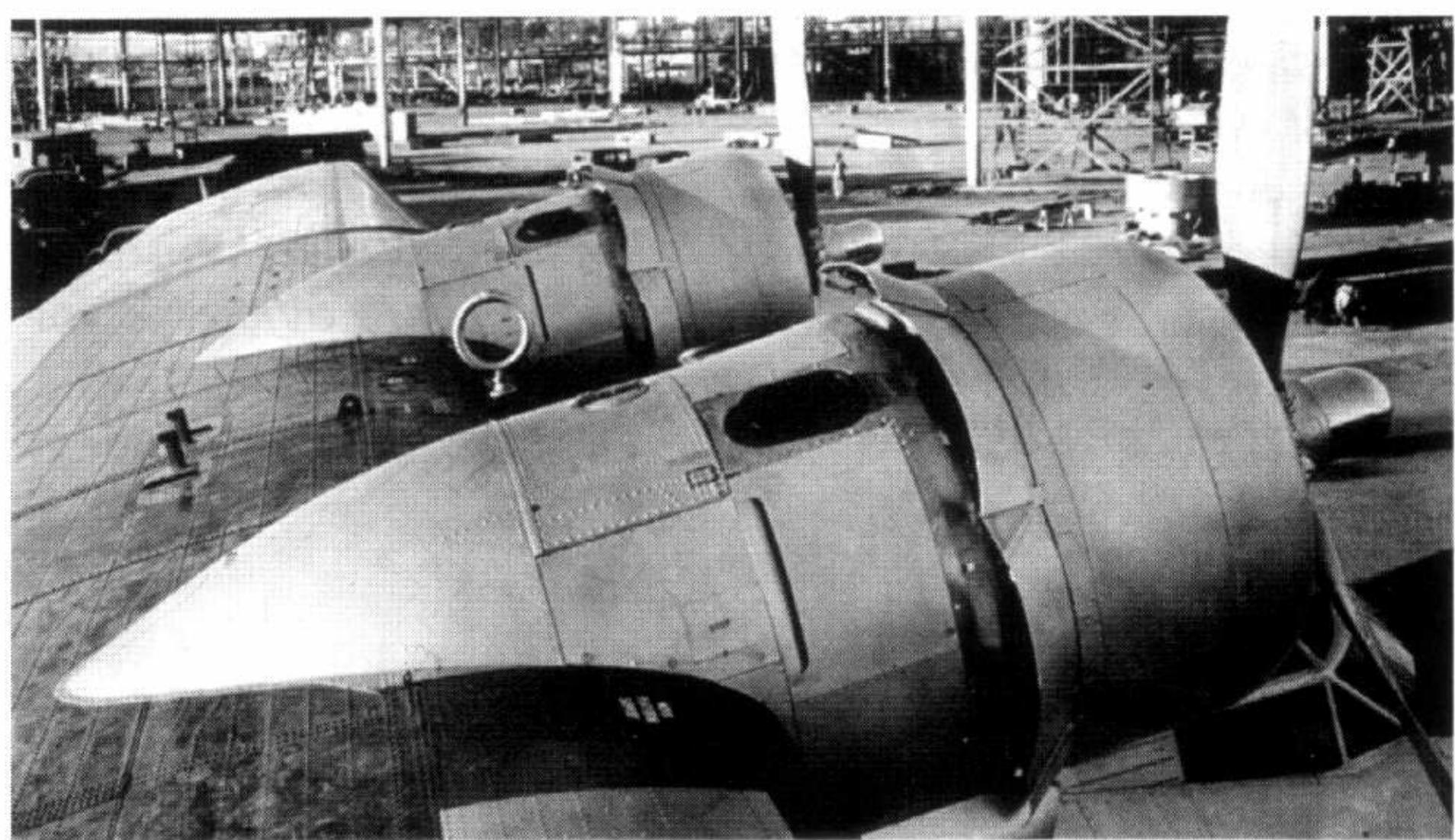
A view from above a PBY-5's cockpit shows the torpedo director installed above the instrument panel. The director was mounted only when it was going to be used. Compare this director to the one used in the PBY-3 as illustrated on page 29.  
(National Archives)



Within the structure on which the wing was mounted, and just forward of the mechanic's position, there was a mass of wires, cables, and plumbing. Fuel lines, control cables, electrical wiring, and hydraulic lines all ran through this area.  
(National Archives)



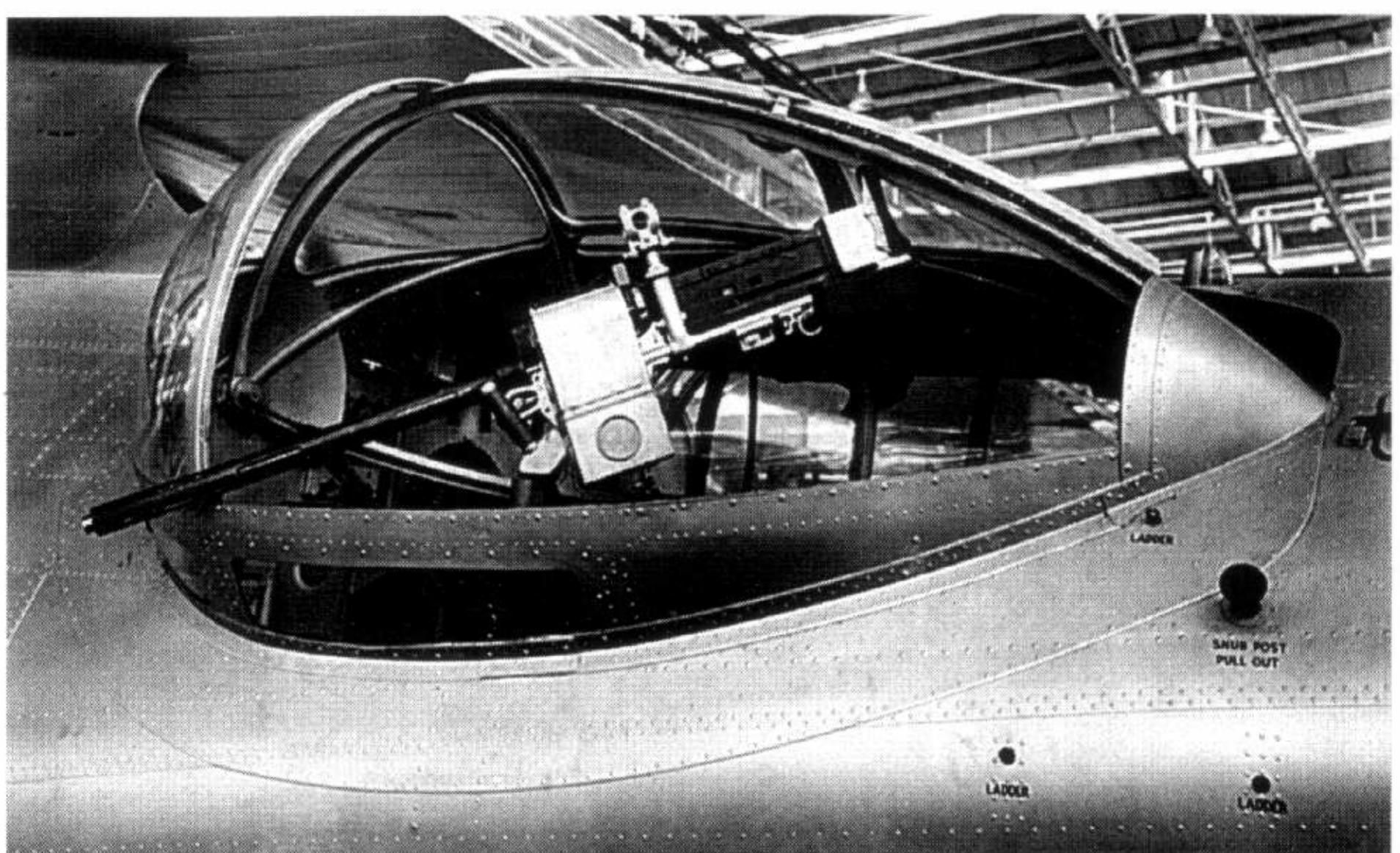
The PBY-5 was powered by two Pratt & Whitney R-1830-82 engines. The radiators for the oil coolers were moved from their previous positions in the leading edge of the wing to housings on the lower right side of each nacelle. Hamilton Standard hydromatic propellers were used on the PBY-5.  
(National Archives)



The intake for the carburetor was removed from the top of each engine and relocated inside the top of the cowl ring. Also note the repositioned loop antenna on the top of the wing between the engines. The vertical items aft of the loop antenna are vents for the fuel tanks.  
(National Archives)



The left .50-caliber waist gun is shown here in its stowed position. Note the gunner's chair in the background. It is the same office style swiveling chair with wide lap belts as provided for the radio operator and navigator. Early PBY-5s had the same flat area around the gun's pedestal as found in the earlier variants, but the C-shaped area, as shown on page 45, was added later during PBY-5 production.  
(National Archives)



An outside view of the port waist gun and blister shows the weapon with its ammunition box in place and ready for firing. Early PBY-5s did not have the shield on the gun, but this was subsequently added. Later production PBY-5s also had a single large ammunition box in the center of the compartment to provide continuous ammunition feed to both guns without the need to frequently replace the small boxes.  
(National Archives)

# PBY-5A



*The last PBY-4, BuNo. 1245, was used as the prototype XPBY-5A amphibian. Note that the aircraft retains its original rudder with the curved trailing edge, the spinners on the propeller hubs, and the sliding hatches over the waist windows. A disc cover is in place over each of the main gear wheels, and although these were available for production aircraft, they were seldom used.*

*(National Archives)*

As useful as the flying boats were, both the Navy and Consolidated realized that their value could be significantly increased if they could operate from both the land and the sea. The last PBY-4 off the production line, BuNo. 1245, was used as the prototype for the first amphibious version of the Catalina, and it was designated the XPBY-5A. It was fitted with a retractable tricycle landing gear and first flown on November 22, 1939. The following month it was turned over to the Navy for further evaluation. The Navy was quite pleased with the amphibian, therefore they amended the original PBY-5 contract so that the last thirty-three aircraft were completed as PBY-5As instead. The first of these was delivered to the Navy in October 1941. The Navy also ordered an additional 134 PBY-5As on November 25, 1940, and deliveries began in December 1941. After

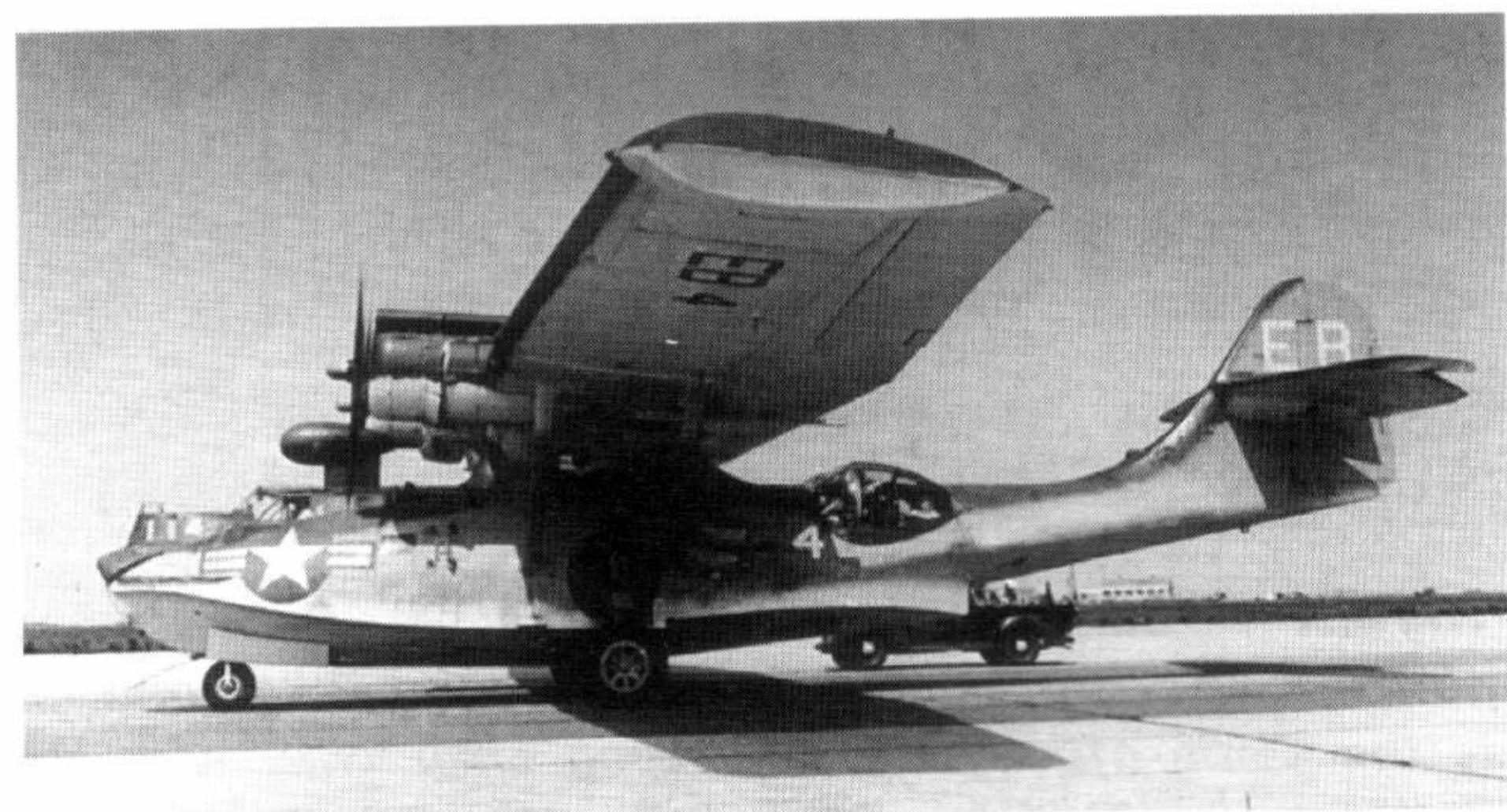
America entered the war, the Navy contracted with Consolidated for an additional 635 PBY-5As, bringing the grand total to 802 and making the PBY-5A the most numerous of all Catalina variants. Some of these went to the U. S. Army Air Forces as OA-10s, while others were delivered to the British, Canadians, Australians, and the Free French.

Boeing of Canada also began construction of this version in 1940, and fifty-five, assembled from parts and subassemblies provided by Consolidated, were delivered to the Royal Canadian Air Force and given the name Canso A. Canadian Vickers, Ltd. at Montreal also built this version which was designated the PBV-1A by the Navy. Some of these amphibians also went to the RCAF as Canso As, while 230 were delivered to the U. S. Army Air Forces as OA-10As.

Except for the addition of the retractable landing gear, the PBY-5A was very much like the PBY-5, and it had the same redesigned tail surfaces including the rudder with the straight trailing edge. However, several differences are noteworthy. The auxiliary power unit was moved from the starboard side of the aircraft just forward of bulkhead five to the port side just aft of bulkhead four to make room for the right main gear well. The type of APU was also changed from a Lawrance Model 30D, Navy Type 1-A, as used in the PBY-5, to an Eclipse



*This PBY-5A is painted in a modified three-tone scheme of Non-specular Sea Blue, Non-specular Intermediate Blue, and white. It has the deicing covers on the outboard exhaust stub of each engine. (National Archives)*



*Although it is still painted in the three-tone scheme, this PBY-5A carries post-war markings and the national insignia with the red stripes that was introduced in 1948. It was assigned to VP(AM)-3. (National Archives)*



**This PBY-5A was assigned to the U. S. Coast Guard, and it is fitted with a life boat under its wing. If the sea state was too rough for the aircraft to land, the boat could be dropped to survivors in the water. (National Archives)**



**The Coast Guard also operated this overall silver PBY-5A during the post-war years. The aircraft retains the search radar above the cockpit. Also note the external fuel tanks under the wing.** (NMNA)

Aviation Number 699-1-A, Navy Type NEP-2 in the PBY-5A. This newer unit was a four-horsepower, single-cylinder design that was smaller, lighter, and more fuel efficient than the two-cylinder, ten-horsepower APU used in the PBY-5, yet it supplied the same electrical current for use within the aircraft. Brakes for the landing gear were added to the top of the rudder pedals for both the pilot and co-pilot, and the lever and linkages to retract and extend the landing gear were also added. A detailed look at the landing gear can be found on pages 46 and 47.

The PBY-5A had Pratt & Whitney R-1830-92 engines which produced 1,200 horsepower for take-off, but externally the physical appearance of the R-1830-92 was identical to that of the R-1830-82 used in the PBY-5. Maximum speed of the PBY-5A was 179 miles-per-hour, the service ceiling was 14,700 feet, and the gross weight was 33,975 pounds.

Late production PBY-5As had the eyeball bow turret, the search radar above the cockpit, and the blister mounts for the tunnel gun on each side of the aft fuselage. These features are usually associated with the subsequent PBY-6A, and all three were standard on that variant.

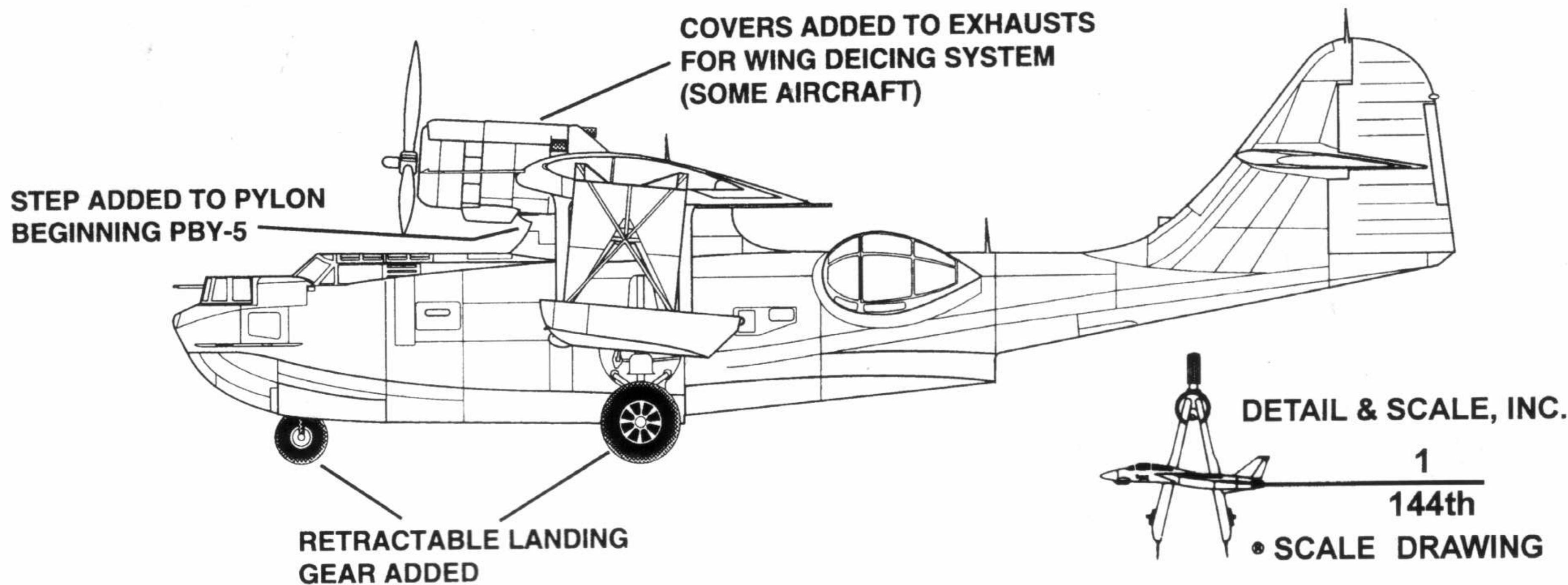
A number of PBY-5As were converted for use as transports, and some had VIP interiors. These had extra seats for passengers, and additional windows were added in the fuselage. These administrative aircraft were redesignated PBY-5Rs.

U. S. Navy PBY-5A Bureau Numbers were as follows:

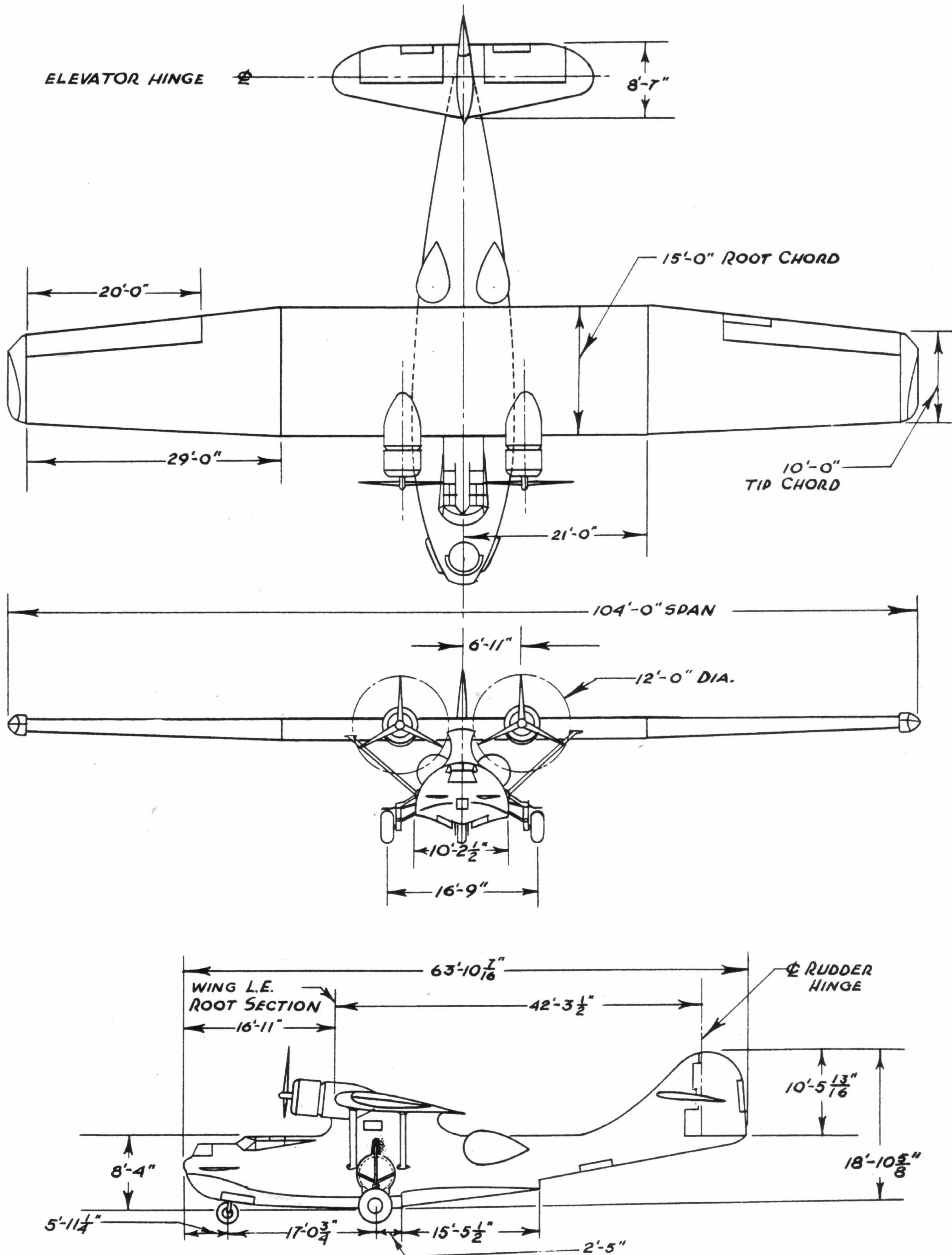
NUMBER	BUREAU NUMBERS
33*	2456 through 2488
60	7243 through 7302
30	02948 through 02977
22	04399 through 04420
74	04972 through 05045
94	08030 through 08123
100	33960 through 34059
130	46450 through 46579
59	46580 through 46638
<u>200</u>	48252 through 48451
802	

\* These were the last 33 aircraft on the initial order of PBY-5s.

## PBY-5A 1/144th SCALE DRAWING



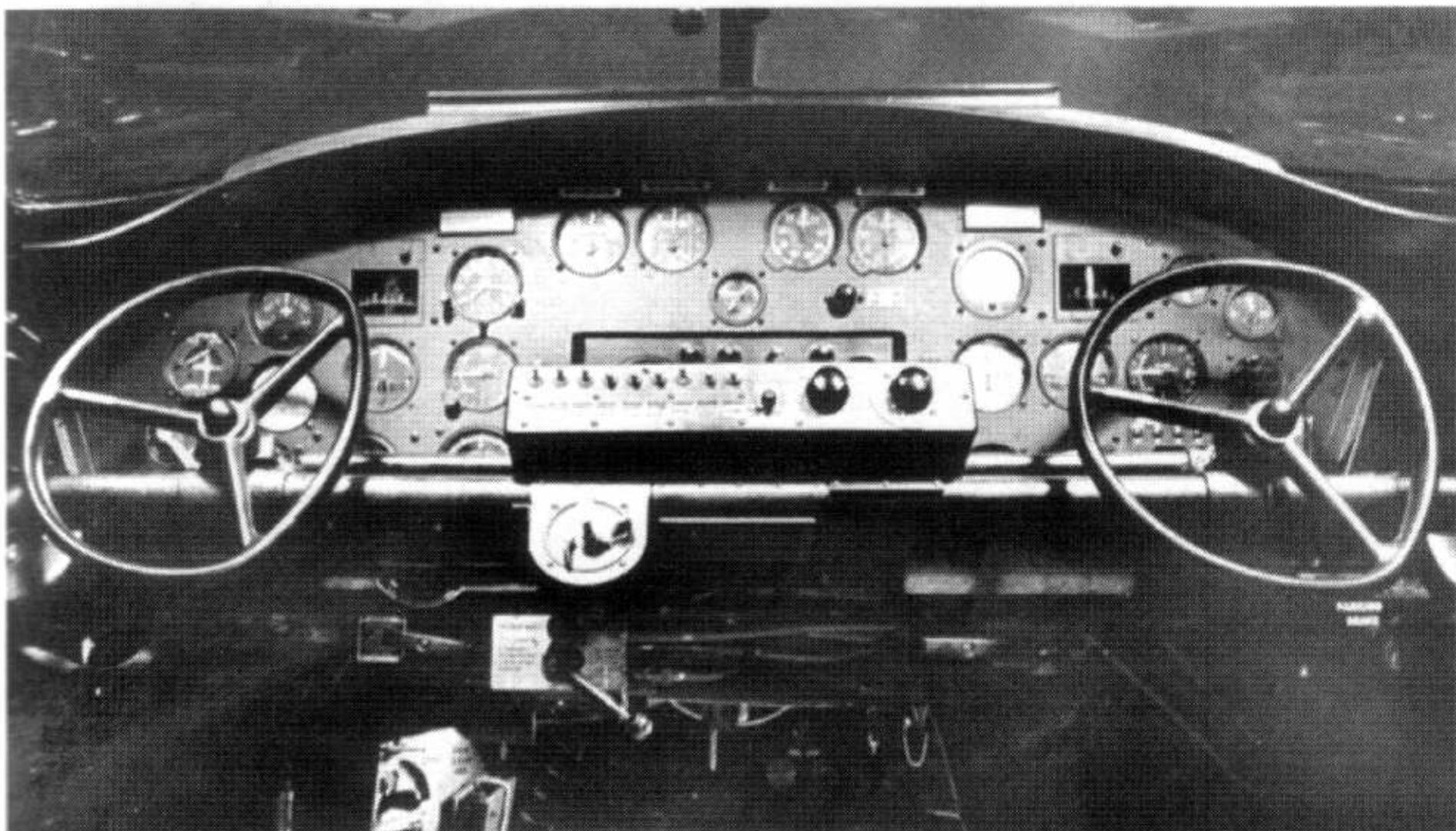
# DIMENSION DRAWINGS



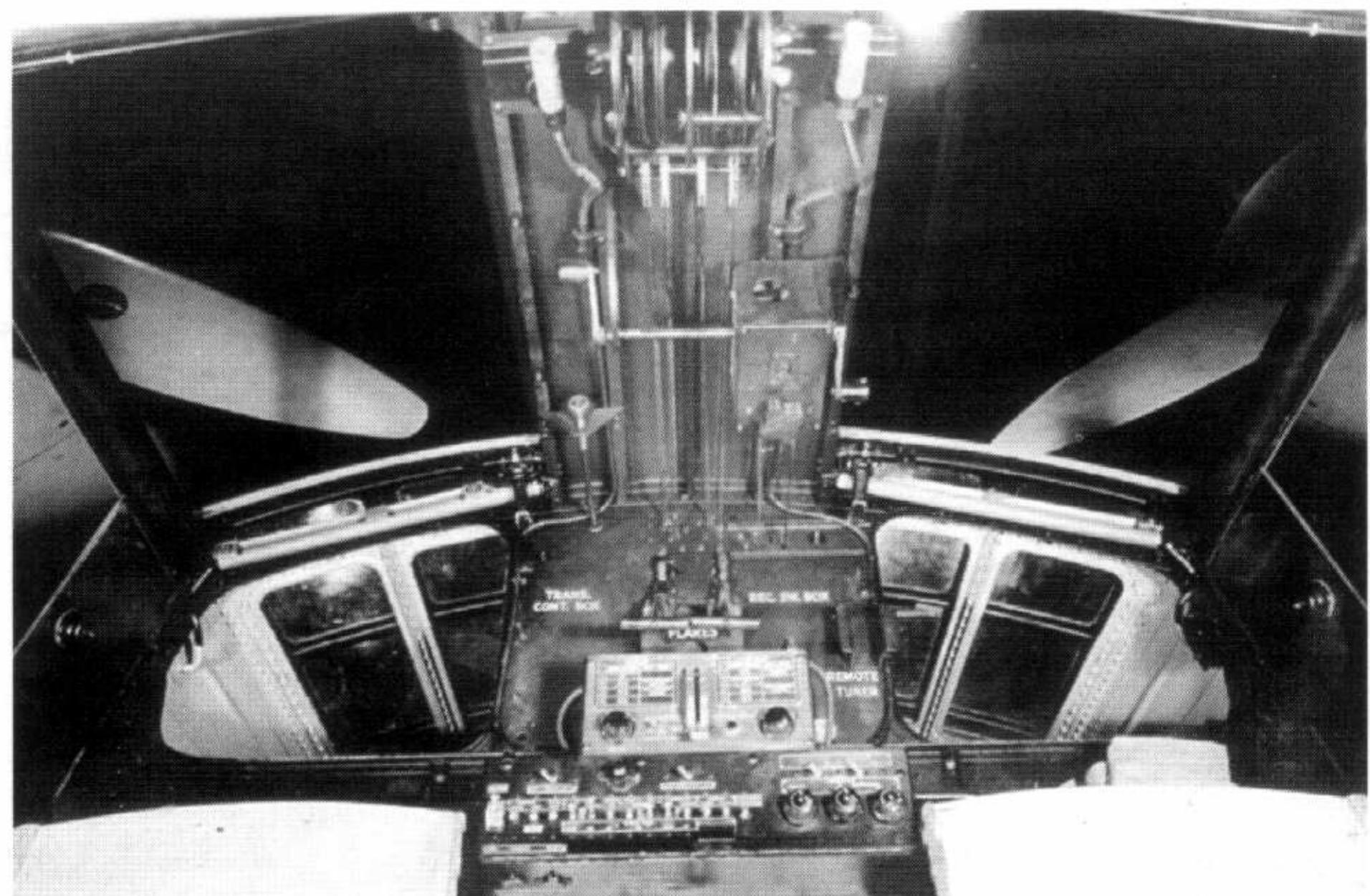
Principle dimensions of the PBY-5A are indicated on this drawing from the official erection and maintenance manual.

# PBY-5A DETAILS

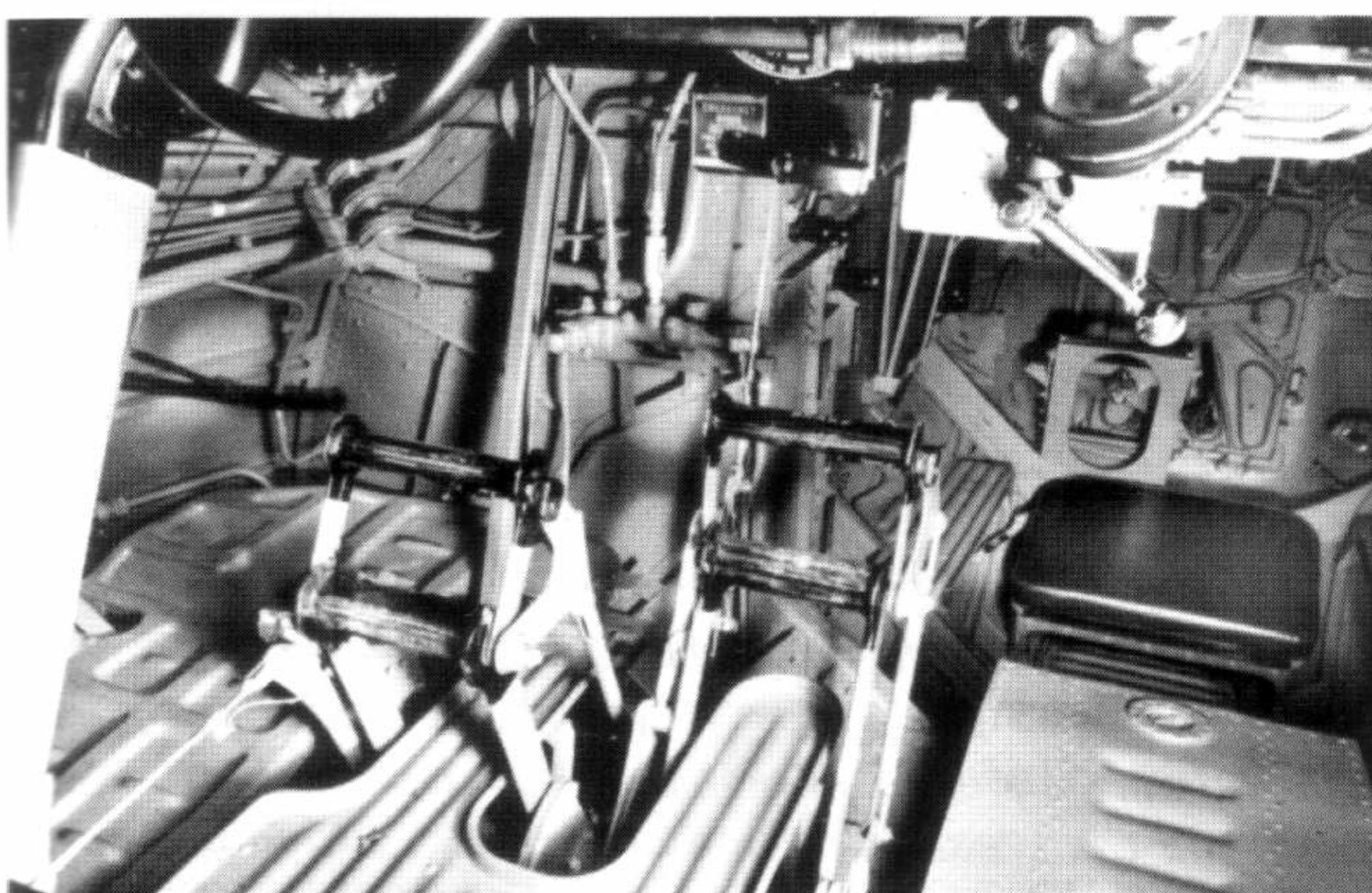
## COCKPIT DETAILS



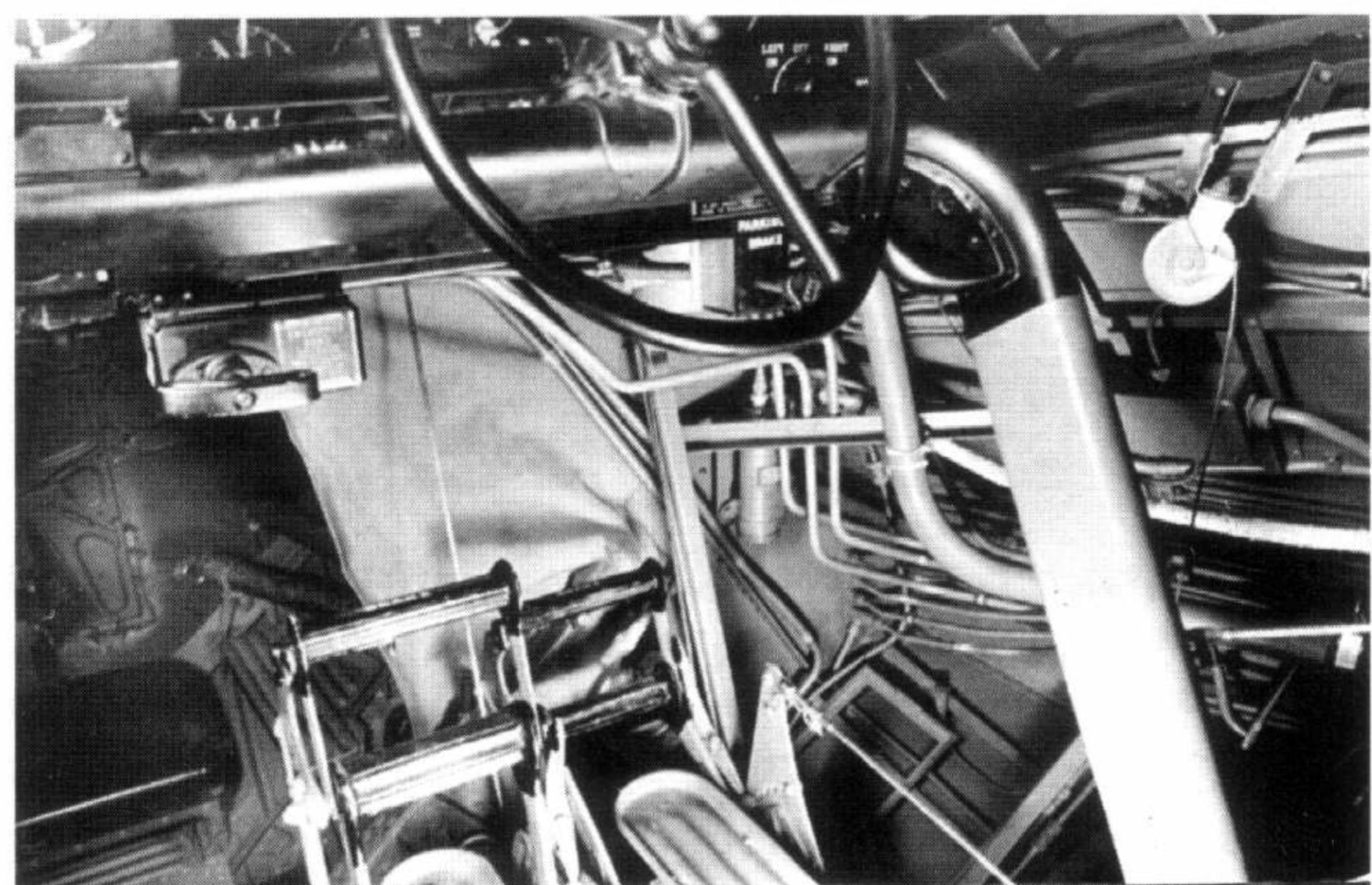
The instrument panel in the PBY-5A was basically the same as in other Catalina variants, but one important addition was the lever that operated the landing gear. It can be seen just below the ignition switch panel on the pilot's side of the cockpit. (National Archives)



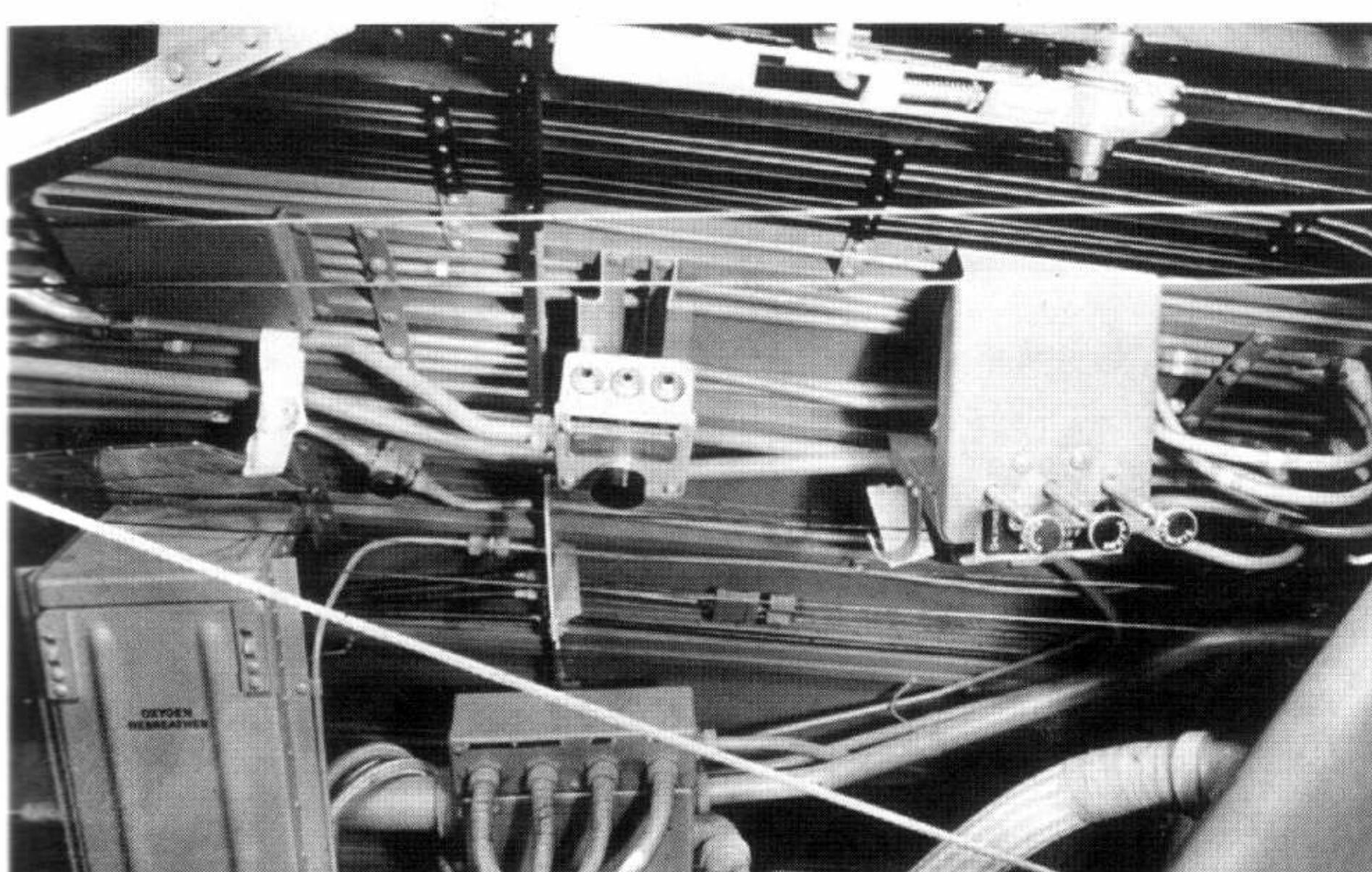
A view looking up and aft into the cockpit reveals the levers for the engine and propeller controls as well as the panel above the entry door. As with other versions of the Catalina, this panel contained controls for the pilots' radios and intercom switches. (National Archives)



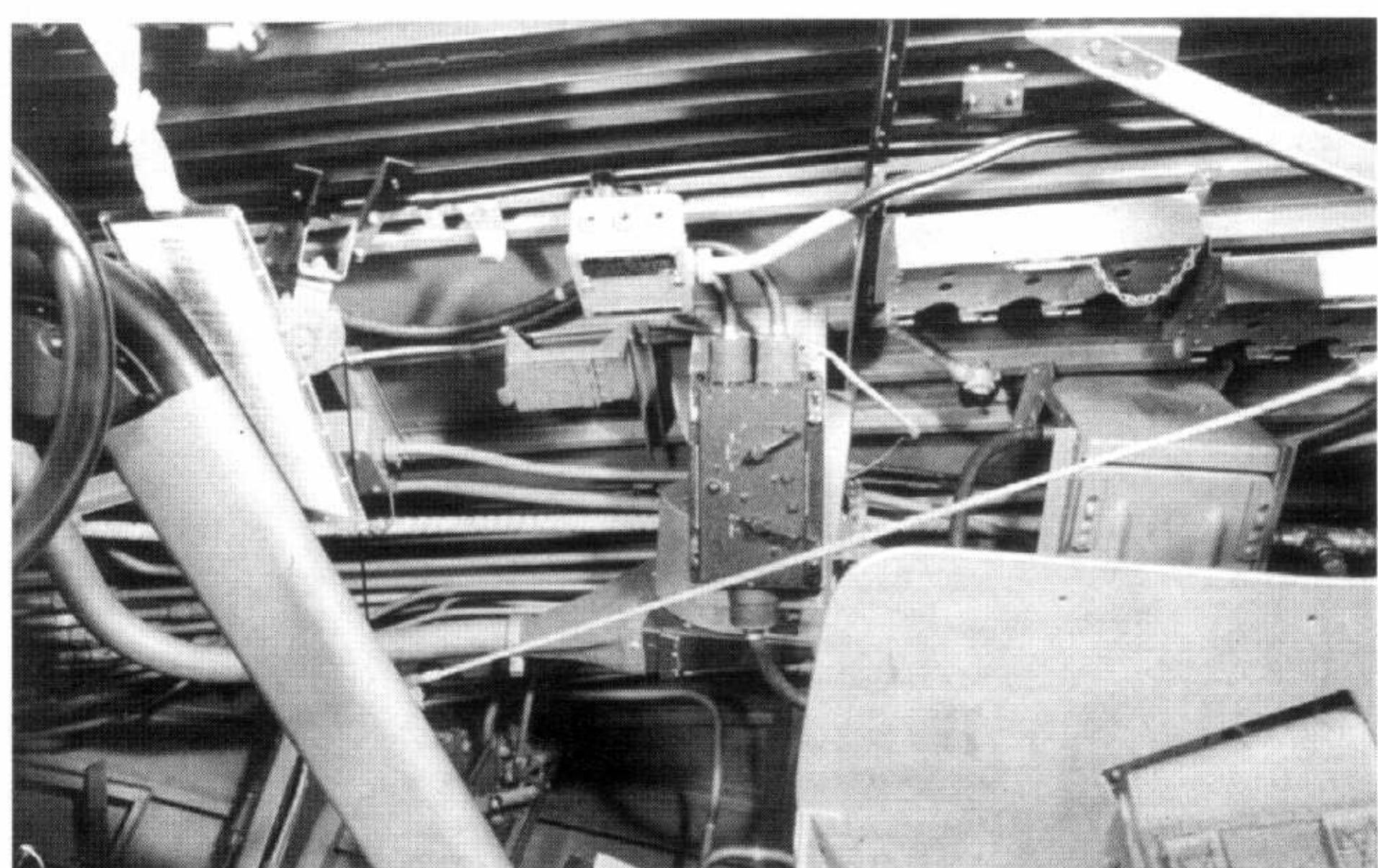
Another difference in the PBY-5A's cockpit was the addition of brake pedals at the top of the rudder pedals. Notice how the platform in front of the seat had foot rest extensions under the pedals. (National Archives)



The co-pilot also had brake pedals on top of his rudder pedals. Note how the top of the cockpit and yoke assembly were painted flat black, while the rest of the cockpit was Interior Green. (National Archives)

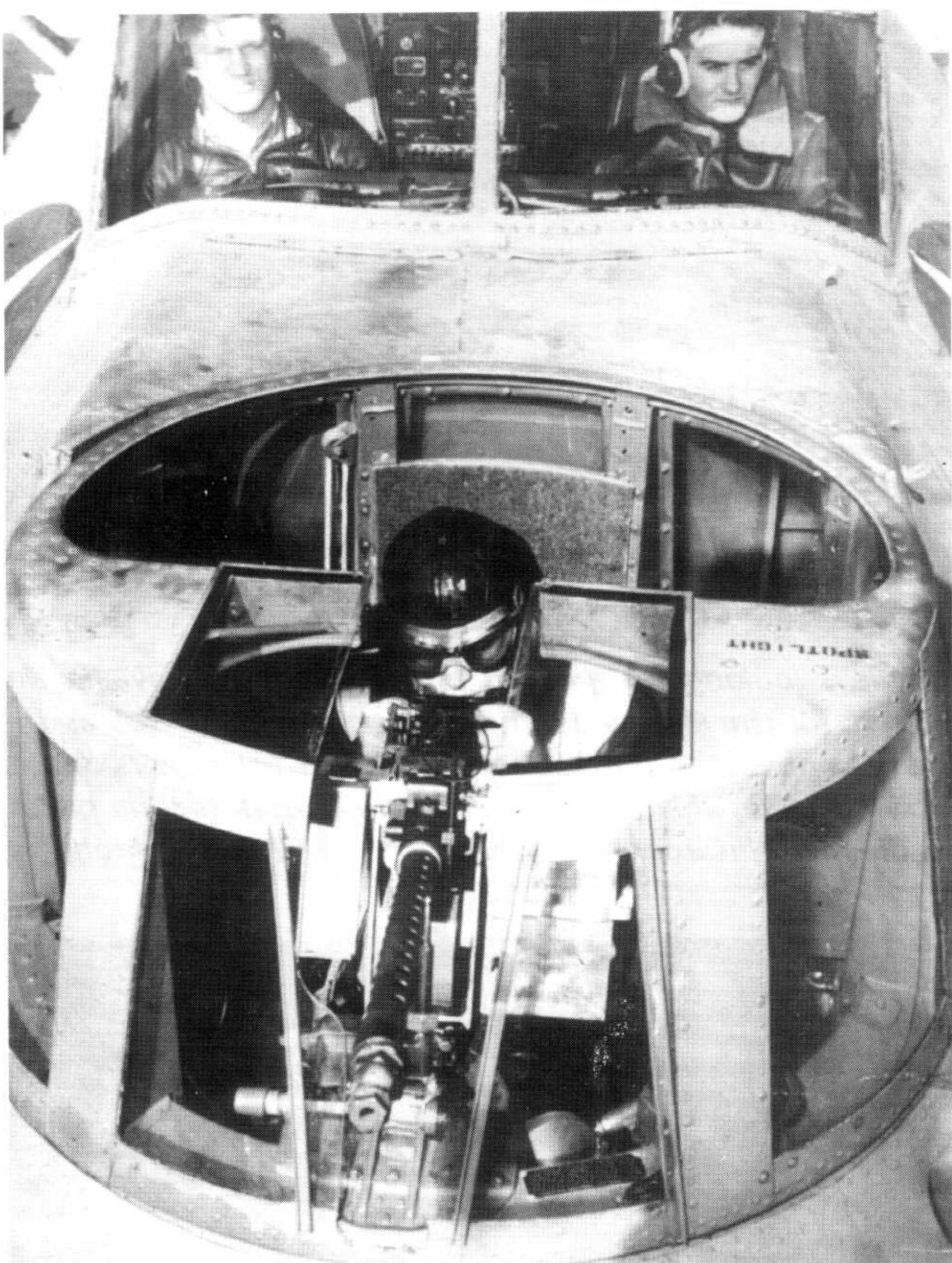


The side of the cockpit next to the pilot's seat was covered with cables, wiring, and boxes. The small box near the center of the photograph is where the pilot's headphones were connected to the intercom system, and from front to rear, the three knobs on the larger panel controlled the trim tabs for the elevator, aileron, and rudder. (National Archives)



The co-pilot's side of the cockpit also had numerous wires and cables. His intercom box is near the center of the photograph, and the panel just below and aft of it with the two large switches is part of the radio equipment. The vertical plates, located right next to the seats in this photo and in the one to the left, were mounts for the oxygen rebreathers. (National Archives)

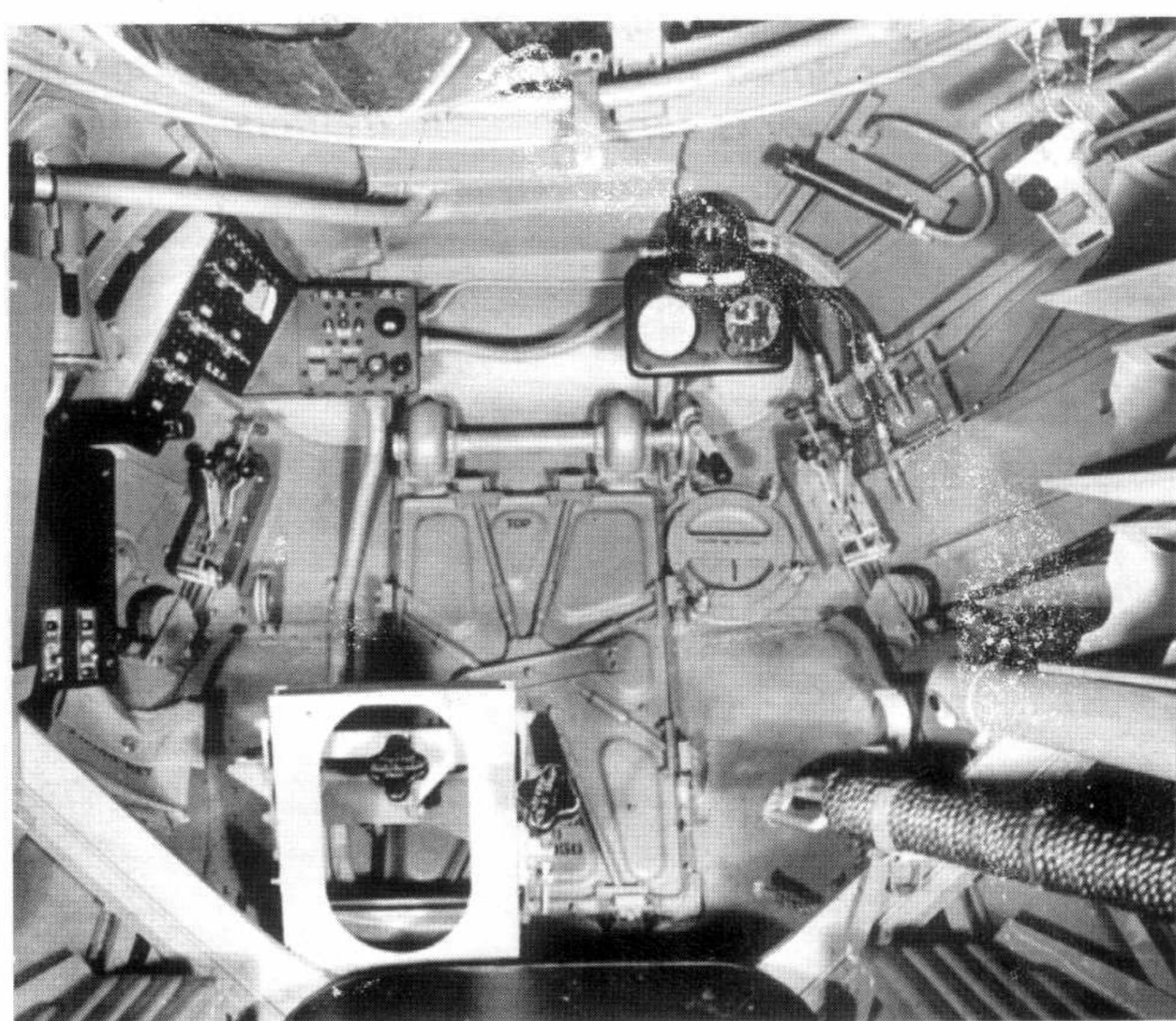
## BOW TURRET



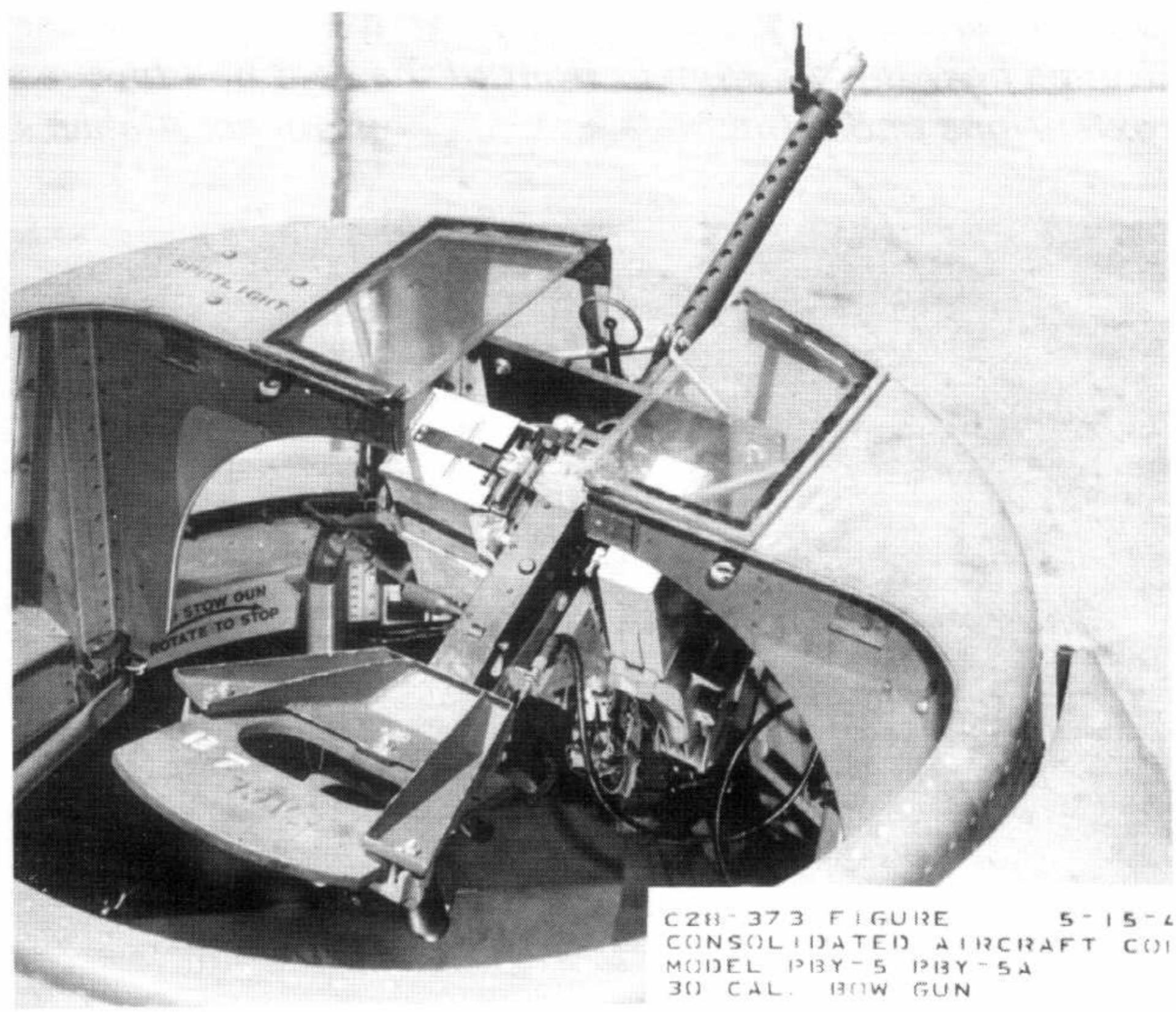
The standard bow turret used on most Catalinas housed a single .30-caliber machine gun that was manned by the bombardier. The turret could transverse just over 180 degrees in front of the aircraft, and the gun could be depressed 40 degrees from the horizontal or elevated to the 90-degree vertical position. (National Archives)



While wearing goggles and a leather flight helmet, the bombardier could fire the gun in the bow turret from a partly exposed position. This was possible because of the Catalina's slow flying speed, but usually the bombardier fired the weapon from a crouched position inside the turret. (National Archives)

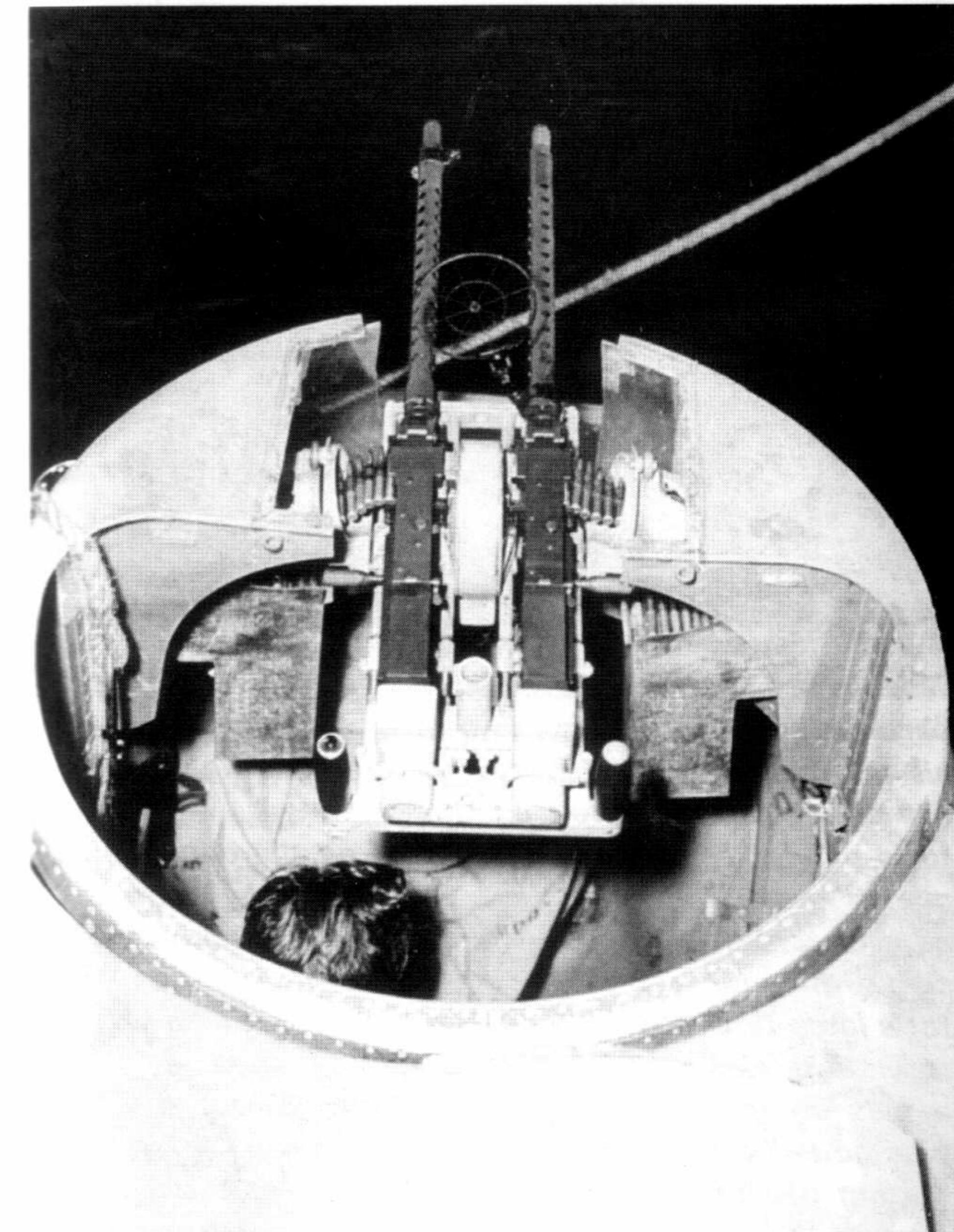


This is the interior of the bombardier's compartment in the nose. Note the metal door that covers the bomb aiming window. The basic layout of the compartment remains the same as on earlier versions of the Catalina, but there are some small differences in the instruments and electrical panels. (National Archives)



C28-373 FIGURE 5-15-4  
CONSOLIDATED AIRCRAFT CO.  
MODEL PBY-5 PBY-5A  
30 CAL. BOW GUN

This top view shows the shield of armor plate added to some guns to provide extra protection for the bombardier. However, many bombardiers did not like this armor, because it added weight to the gun and restricted visibility. As a result, it was often removed in the field. (National Archives)



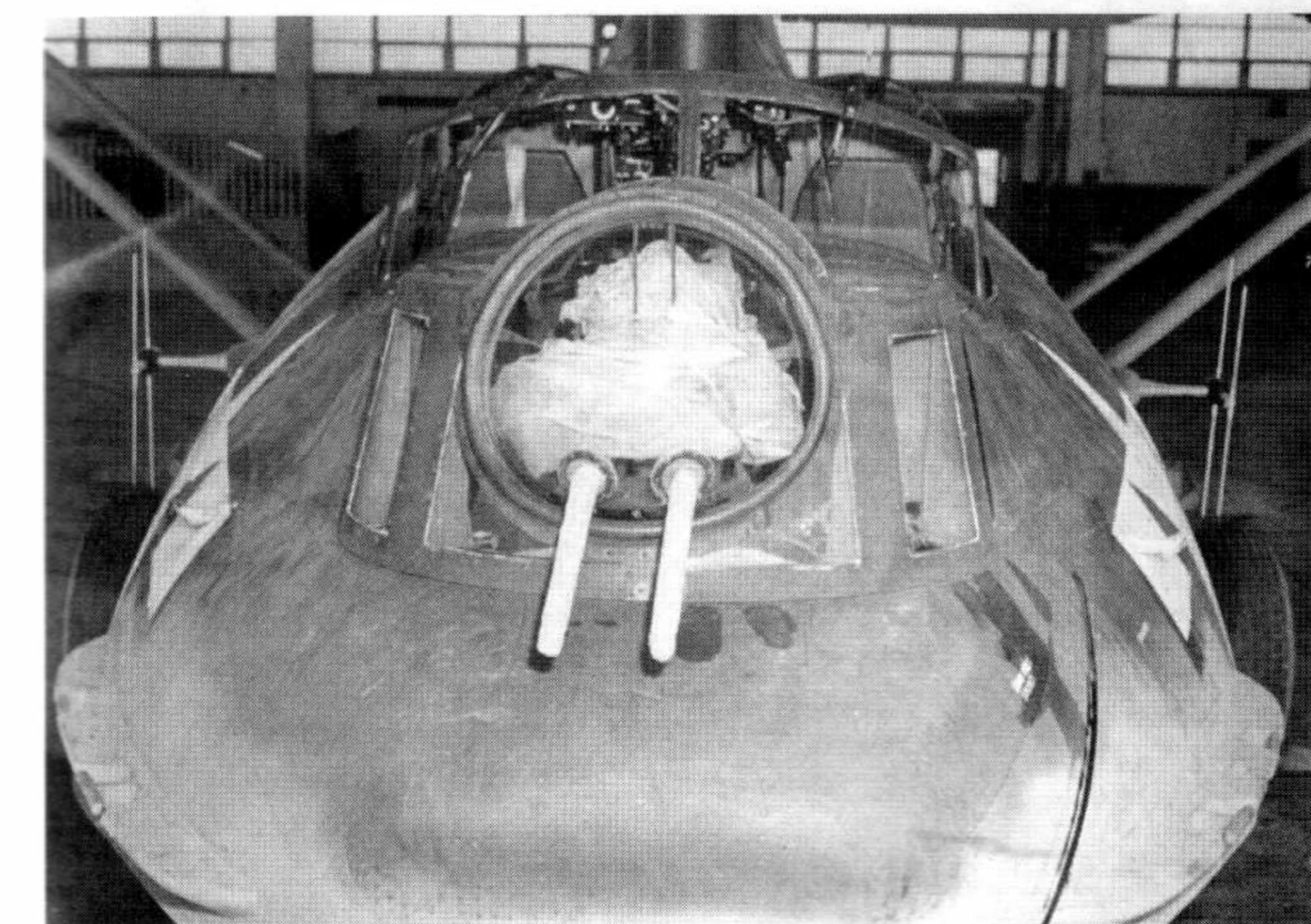
To increase firepower to the front, some Catalinas had their bow turrets modified to carry two .30-caliber machine guns. The twin mount was an "off the shelf" unit like the one used in other Navy aircraft including the later versions SBD Dauntless and SB2C Helldiver.

(National Archives)



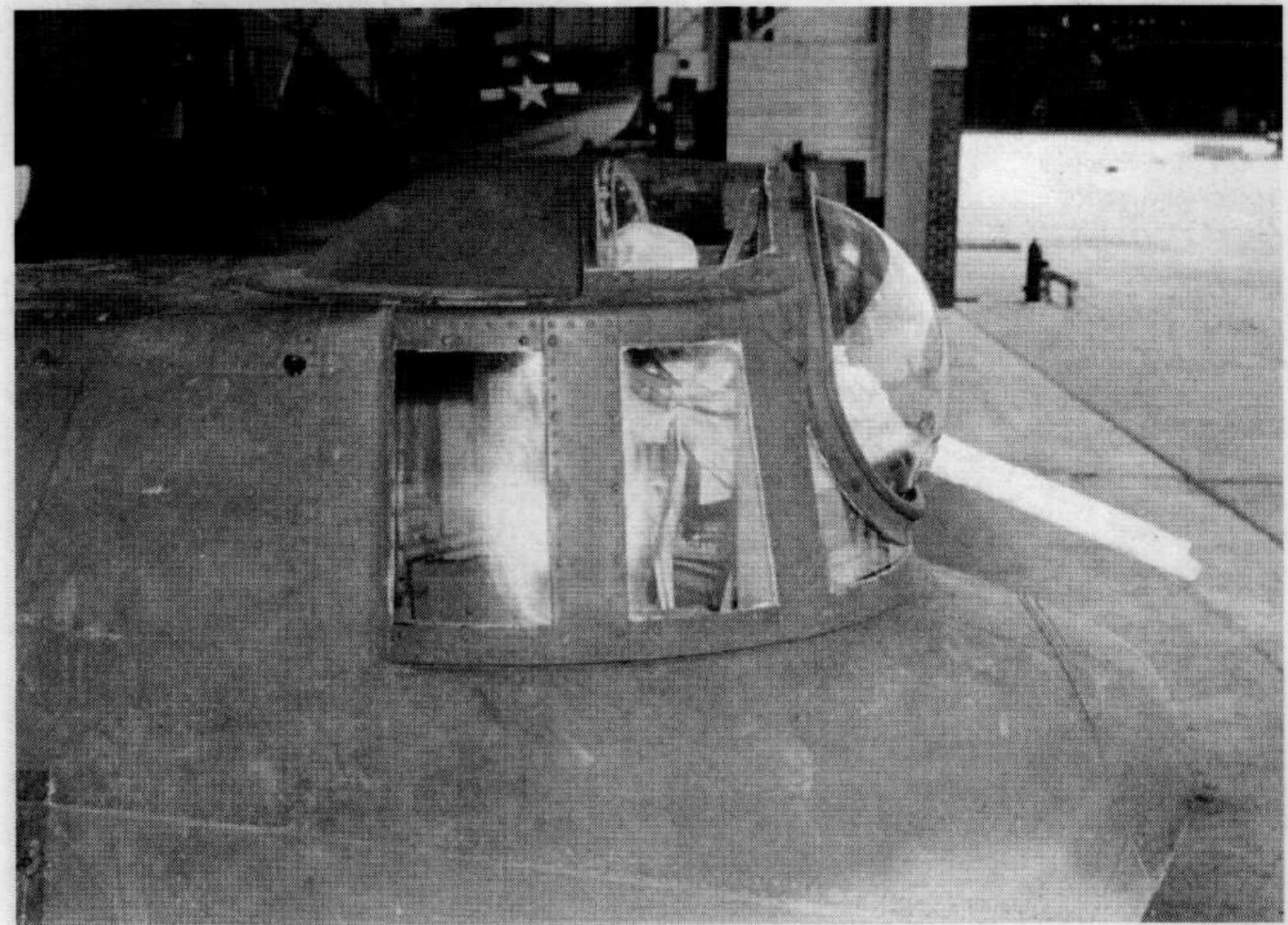
The twin .30-caliber machine guns were not only more effective against enemy aircraft, they also doubled the forward firepower when the Catalina was attacking targets on the ground or water. During the run to the target, these weapons were used to suppress enemy anti-aircraft fire.

(National Archives)



The final bow turret used on Catalinas was known as the eyeball turret because of its large rounded forward glass. This provided more protection for the bombardier while giving him a better forward field of view. Two .30-caliber machine guns were mounted through sockets in the dome. The eyeball turret first appeared on late production PBY-5As beginning with BuNo. 46580, and it was also installed on some PBY-5s. It was the standard bow turret used on PBY-6As.

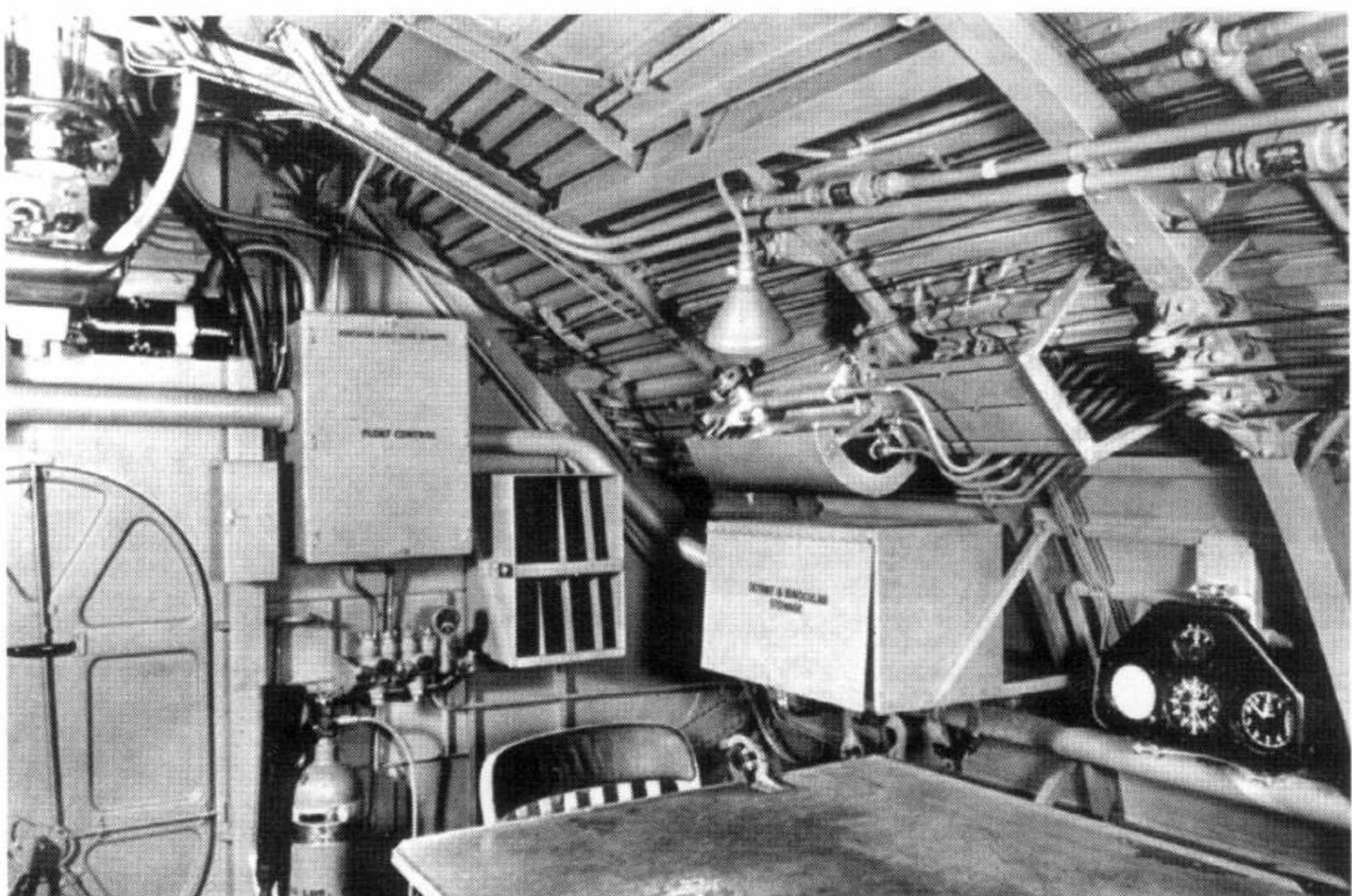
(National Archives)



A side view of the eyeball turret shows the heightened area for the bombardier's head. Also note that the turret itself did not rotate. Instead, the guns were aimed simply by moving the domed or eyeball part of the turret's glass. This reduced the angle through which the guns could be fired, but it was considered quite sufficient in most situations. A later version of the turret had a large glass dome for the bombardier's head and it provided even better visibility.

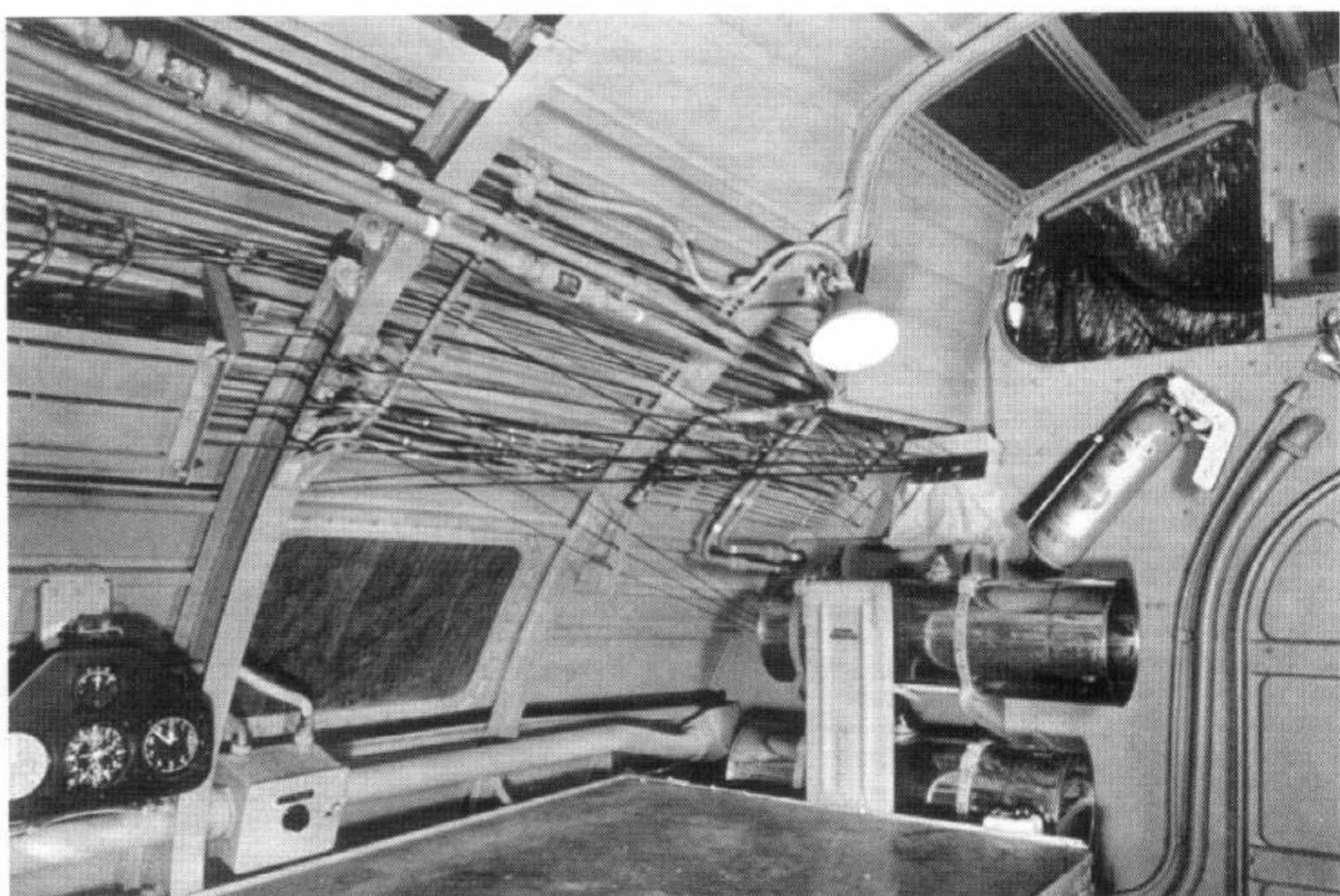
(National Archives)

## RADIO OPERATOR'S & NAVIGATOR'S COMPARTMENT



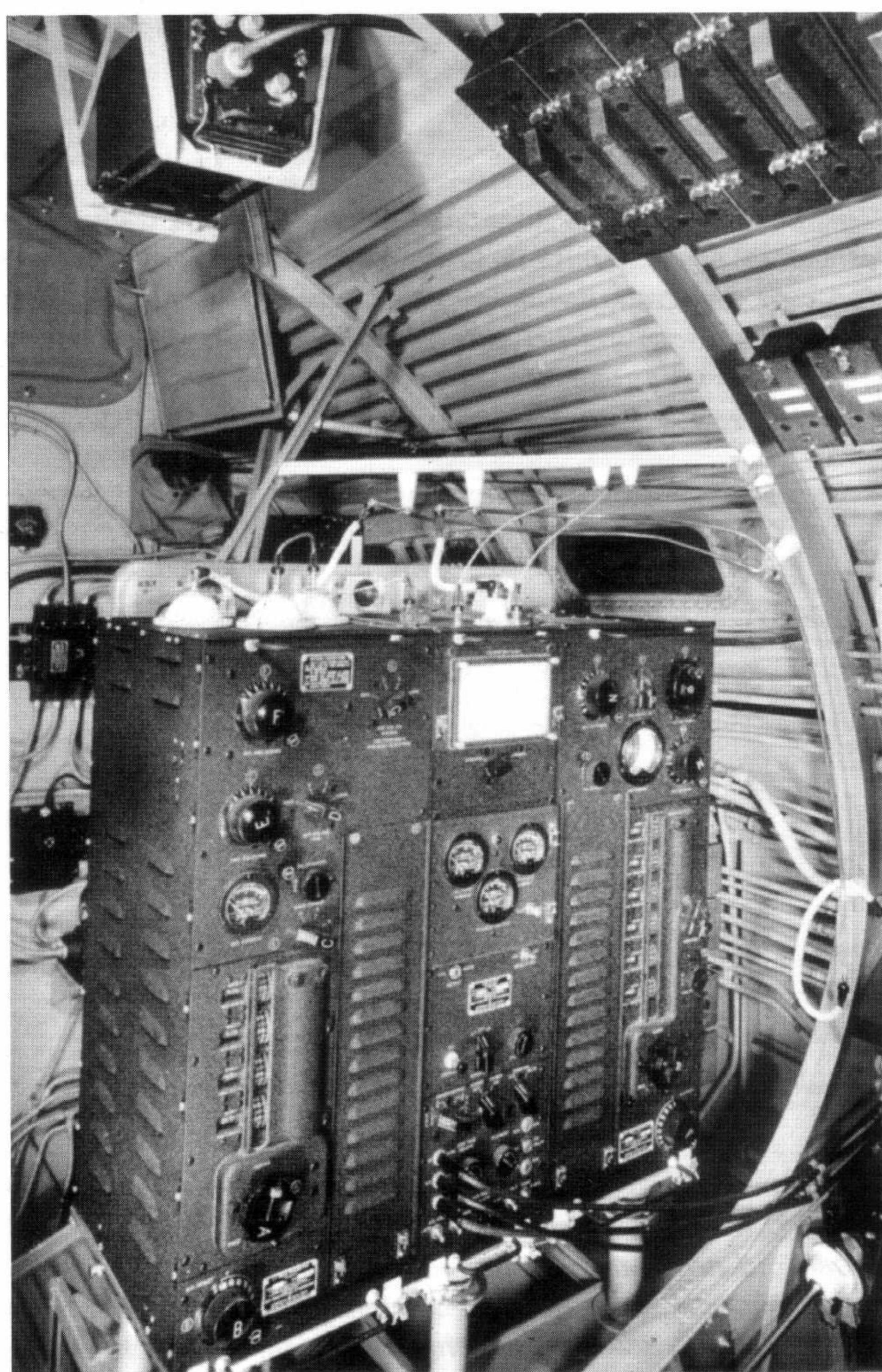
*As on all production versions of the Catalina, the compartment just aft of the cockpit in the PBY-5A was occupied by the navigator and the radio operator. Part of the navigator's table and chair are visible in this view that looks aft from the cockpit. The instrument panel contained a voltmeter, airspeed indicator, directional gyro, and altimeter. The octant and binoculars were stored in the box above the table.*

(National Archives)



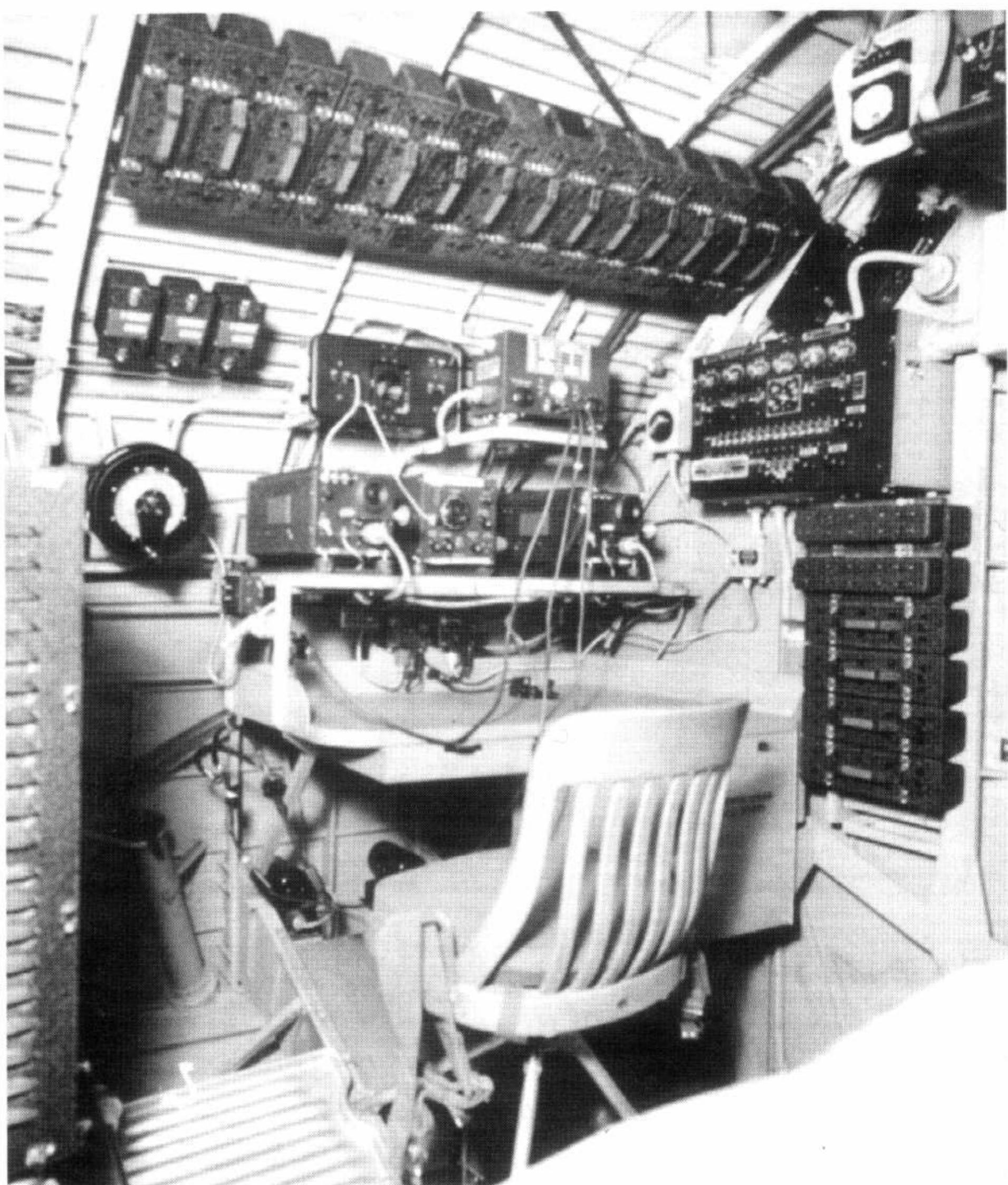
*This view looks forward and to the port side of the compartment, and it reveals the navigator's window next to his instrument panel. Note the overhead light and the fire extinguisher located on the bulkhead. The navigator's oxygen rebreather is mounted on the opposite side of the vertical plate at the end of the table. Numerous control cables, electrical wires, and tubing ran along the side of the compartment above the window. The navigator's large table was made of metal, but it had a wooden top. It is also interesting to note that the rear row of panels on the greenhouse enclosure above the cockpit was actually aft of the bulkhead and above the forward portion of this compartment to provide natural lighting. Two of the panels can be seen in the top right corner of this photograph. An additional window on each side of the bulkhead allowed the navigator and the radio operator to see forward into the cockpit.*

(National Archives)



*The large radio transmitter remained located on the starboard side of the compartment about two feet aft of bulkhead 2.*

(National Archives)



*An overall view of the radio operator's station reveals additional transmitters and receivers as well as the transmitter key on his table.*

(National Archives)

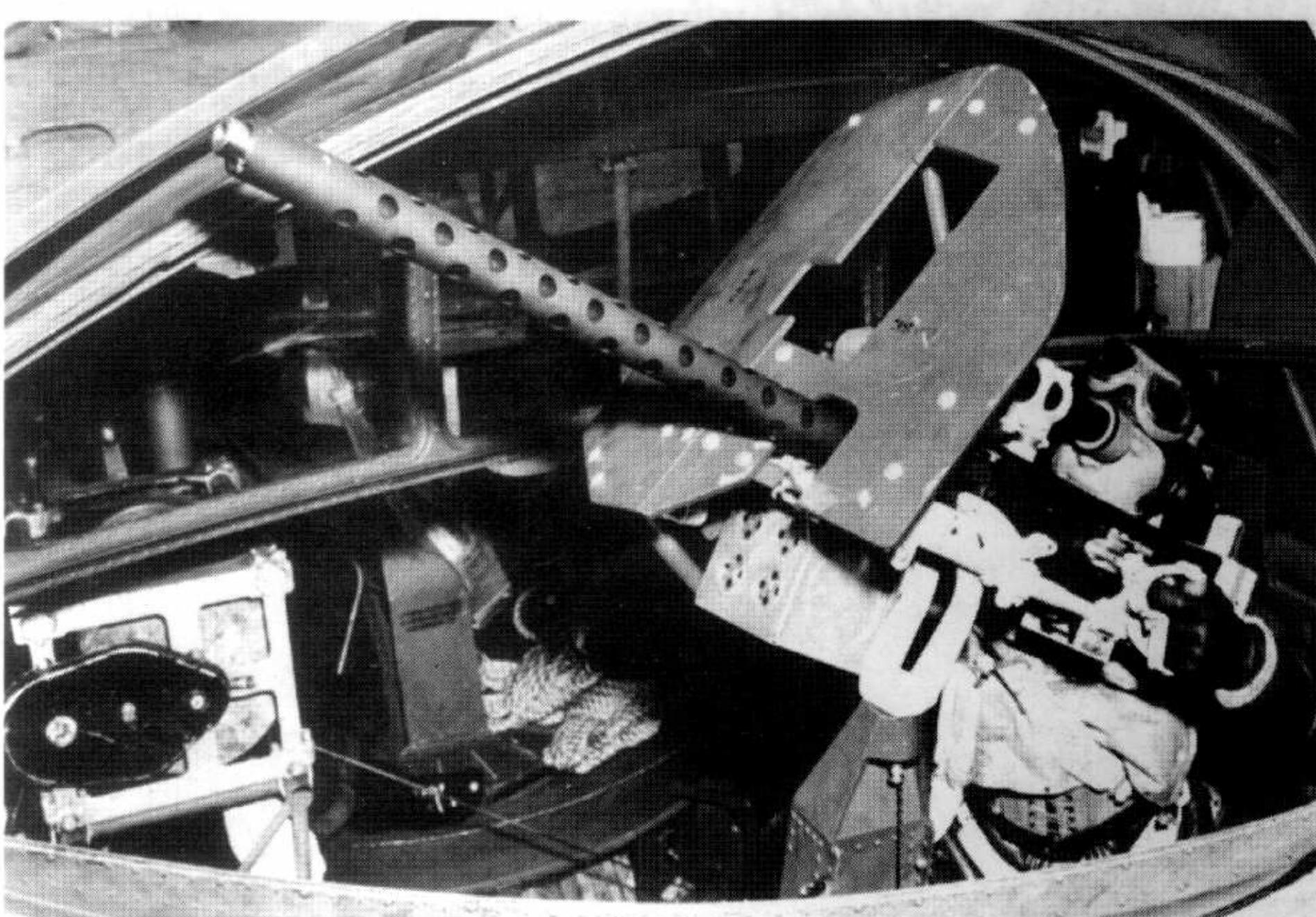
# WAIST GUN INSTALLATION & BLISTERS



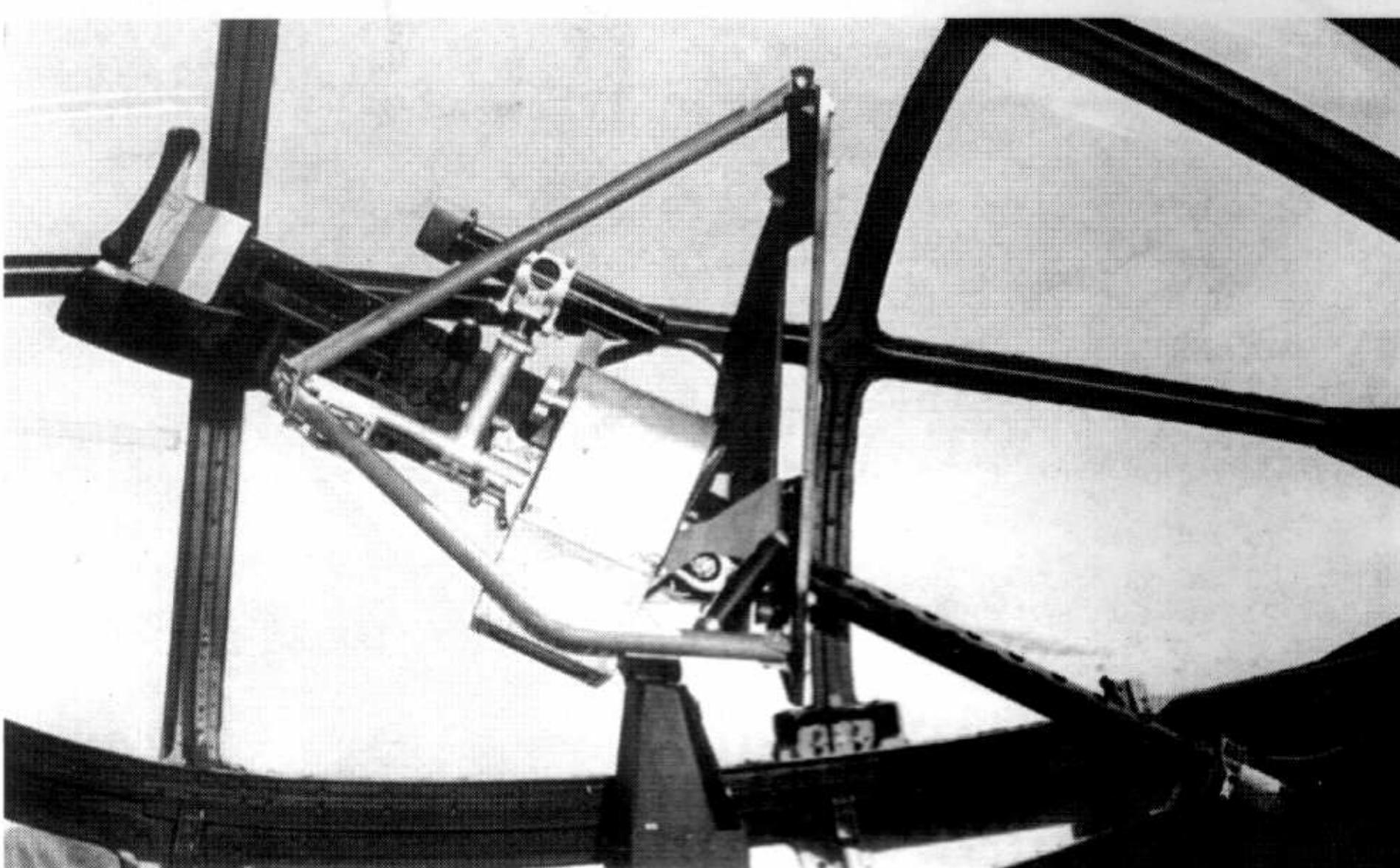
*Flight gear worn by crewmen in cold climates, like that found along the Aleutian Islands or in the North Atlantic, included a heavy leather jacket with fleece lining at the collar and cuffs. The port waist gun in a PBY-5A is shown here ready to be fired.* (National Archives)



*In this view, the starboard gun is depressed to its full down firing position.* (National Archives)



*Combat experience demonstrated that a shield of armor plating should be added to the gun mount to provide added protection for the gunner. The cutout in the shield permitted sighting through the telescopic sight. This is the starboard waist gun position.* (National Archives)



*The starboard gun is shown here in its stowed position, and additional details of the sight and shield are revealed. This picture is dated May 15, 1942. Later in the war, the telescopic sight was replaced with a Mark 9 illuminated sight, and individual ammunition boxes were replaced with one large box at the center of the compartment.* (National Archives)



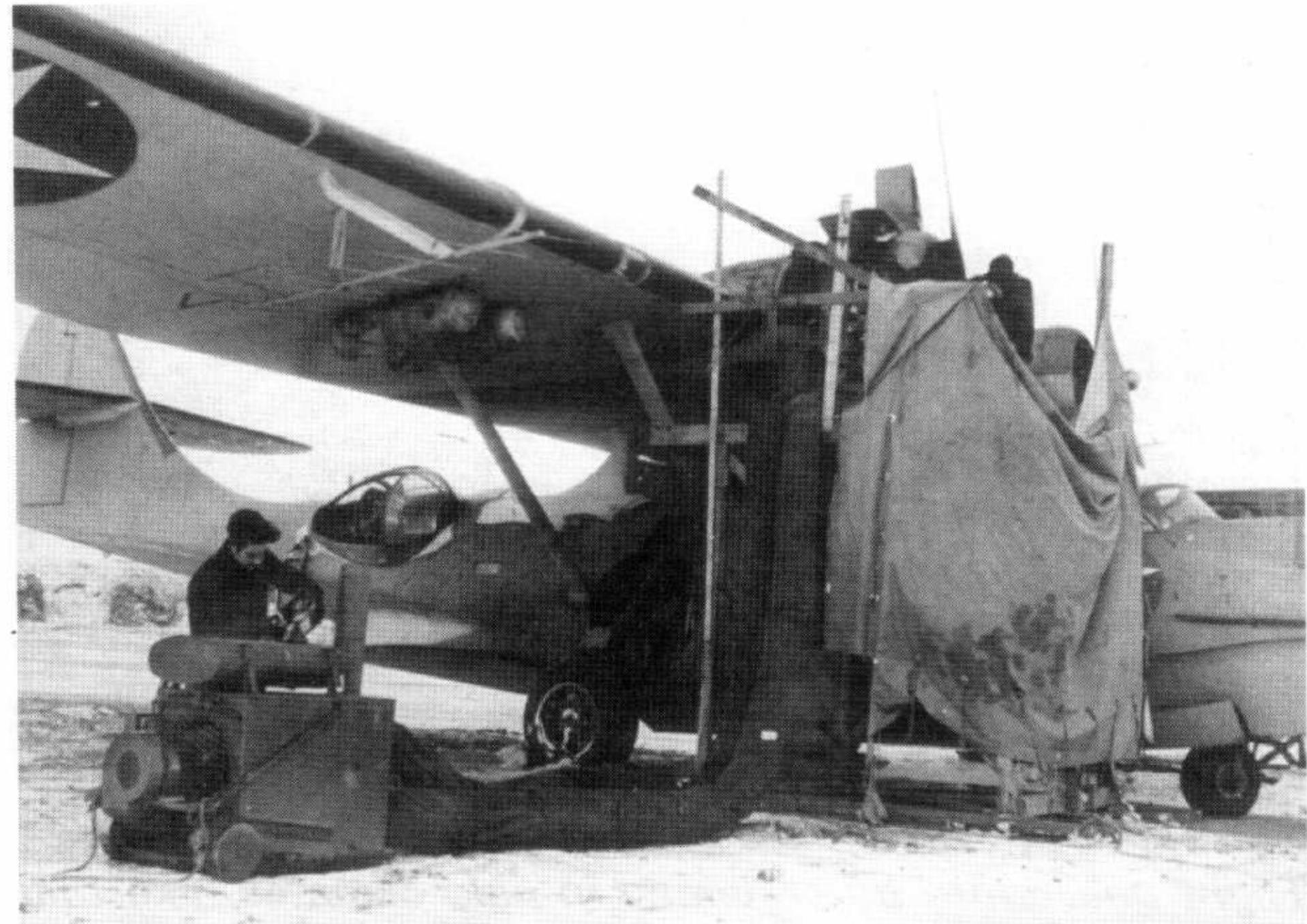
*This gun has the Mark 9 illuminated sight but no shield. Also note the ammunition belt that runs back to a large box at the center of the compartment. This box provided a continuous feed of ammunition to both waist guns and eliminated the need to change small boxes during combat. This photograph was taken of one of VP-54's Black Cats during operations in the Pacific.* (National Archives)

## OFFENSIVE ARMAMENT



A PBY-5A drops a depth bomb on a target during a practice run. Depth bombs were the standard weapons used most often against submarines, although the small retro-rockets shown on page 50 were also used.

(National Archives)



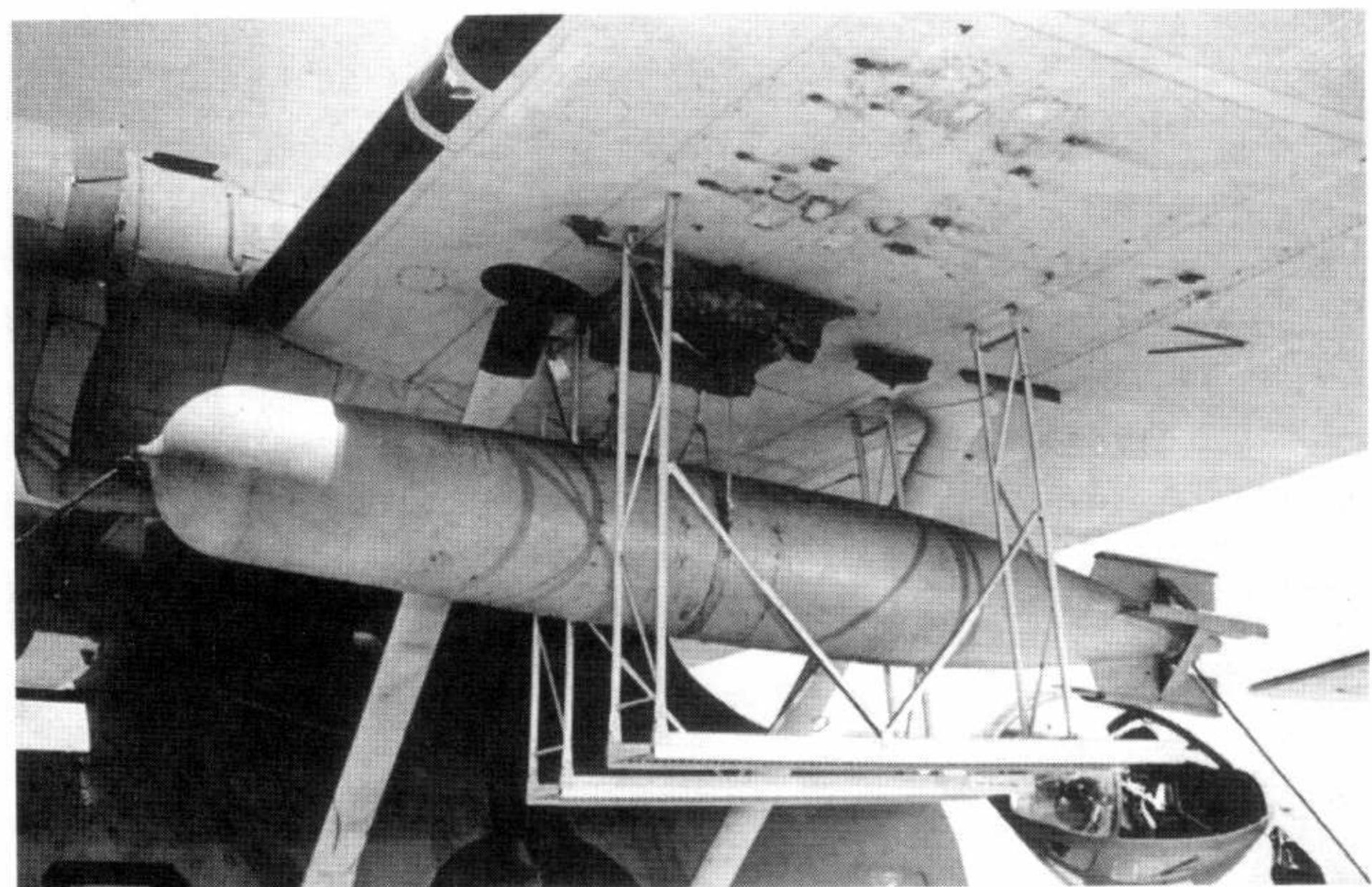
Two depth bombs can be seen under the wing of this PBY-5A as crewmen preheat the engines prior to a mission from Adak, Alaska. Such preheating was standard procedure in the frigid winter weather of the Aleutian Islands.

(National Archives)



Standard bombs in the 100-pound class were very effective when attacking small merchant ships or barges. Six of these bombs are attached beneath the wing of this PBY-5A at Cold Bay, Alaska.

(National Archives)



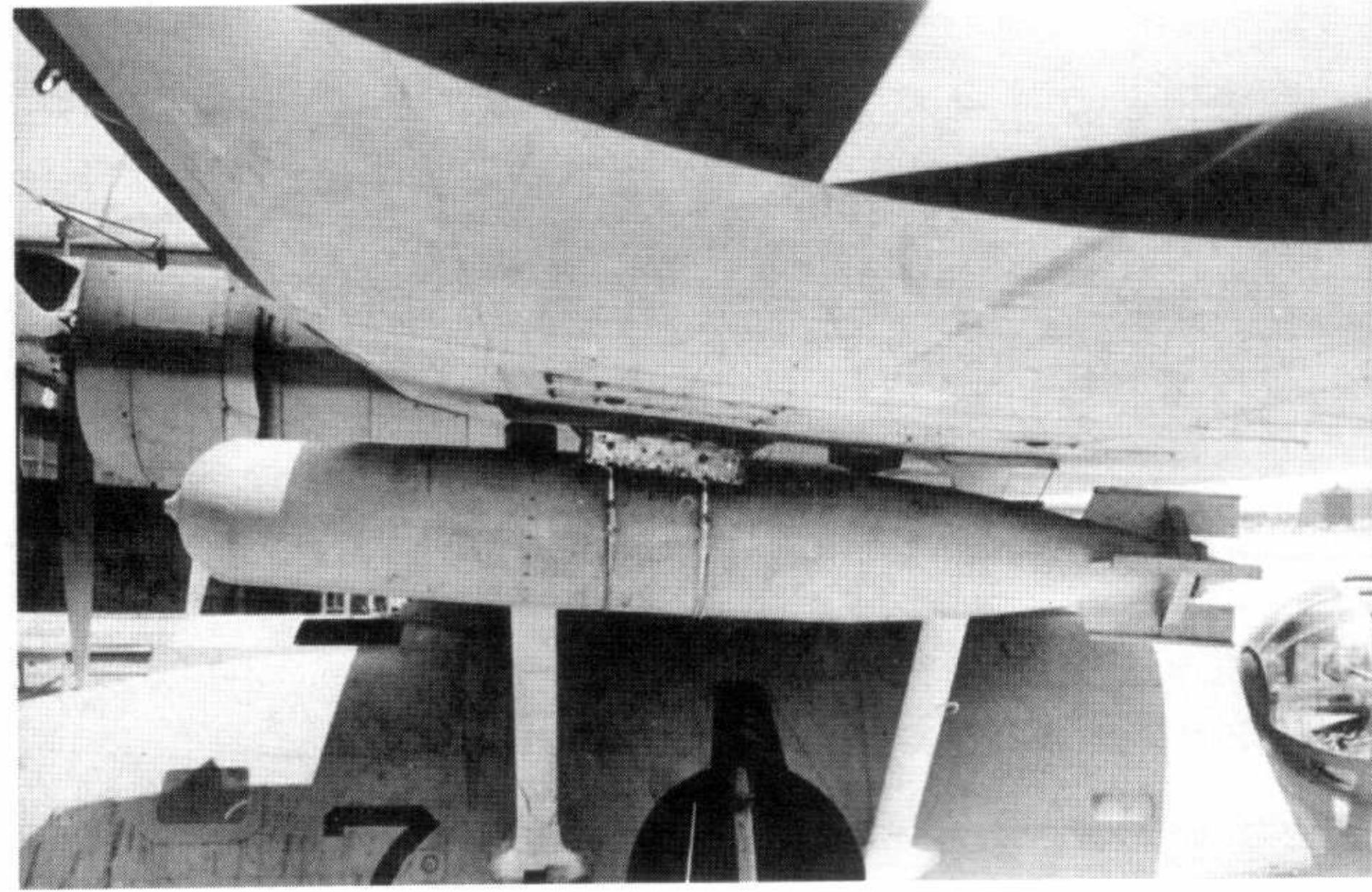
Early in the war, torpedoes were used for attacking larger ships. Here a Mark XIII torpedo is being hoisted into place under the left wing. One 2,000-pound torpedo could be carried under each wing.

(National Archives)



In this view, the two men operating the hoists can be seen on top of the wing, while two other men are on the work stands ready to attach the torpedo to its rack. Other men hold the torpedo steady using ropes attached to its nose and tail.

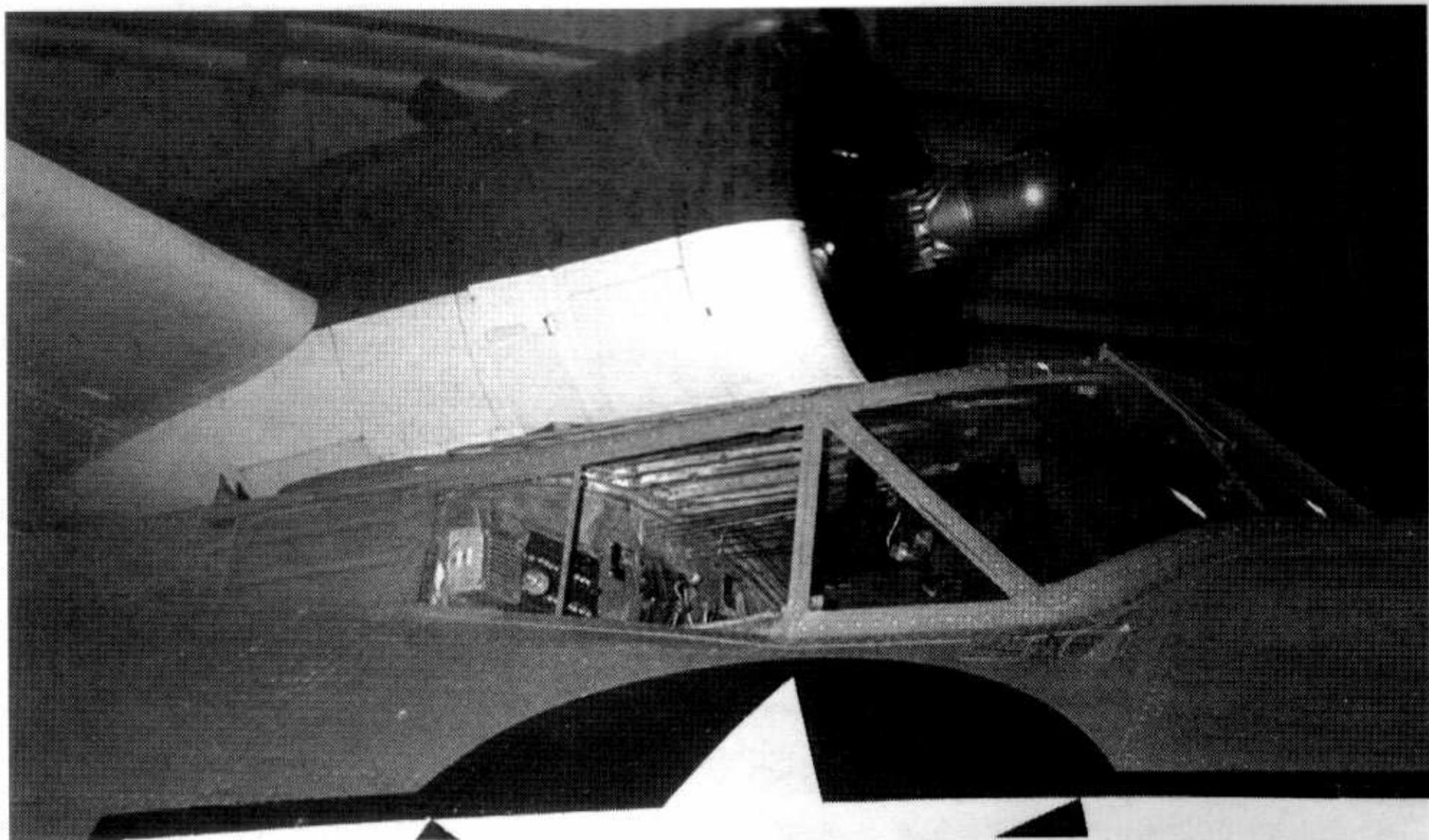
(National Archives)



The torpedo is shown here secured to its rack. Although no hits were scored, the best known torpedo attack flown by Catalinas occurred on the night of June 3 and 4, 1942, when four PBY-5As attacked the Japanese fleet as it approached Midway Island.

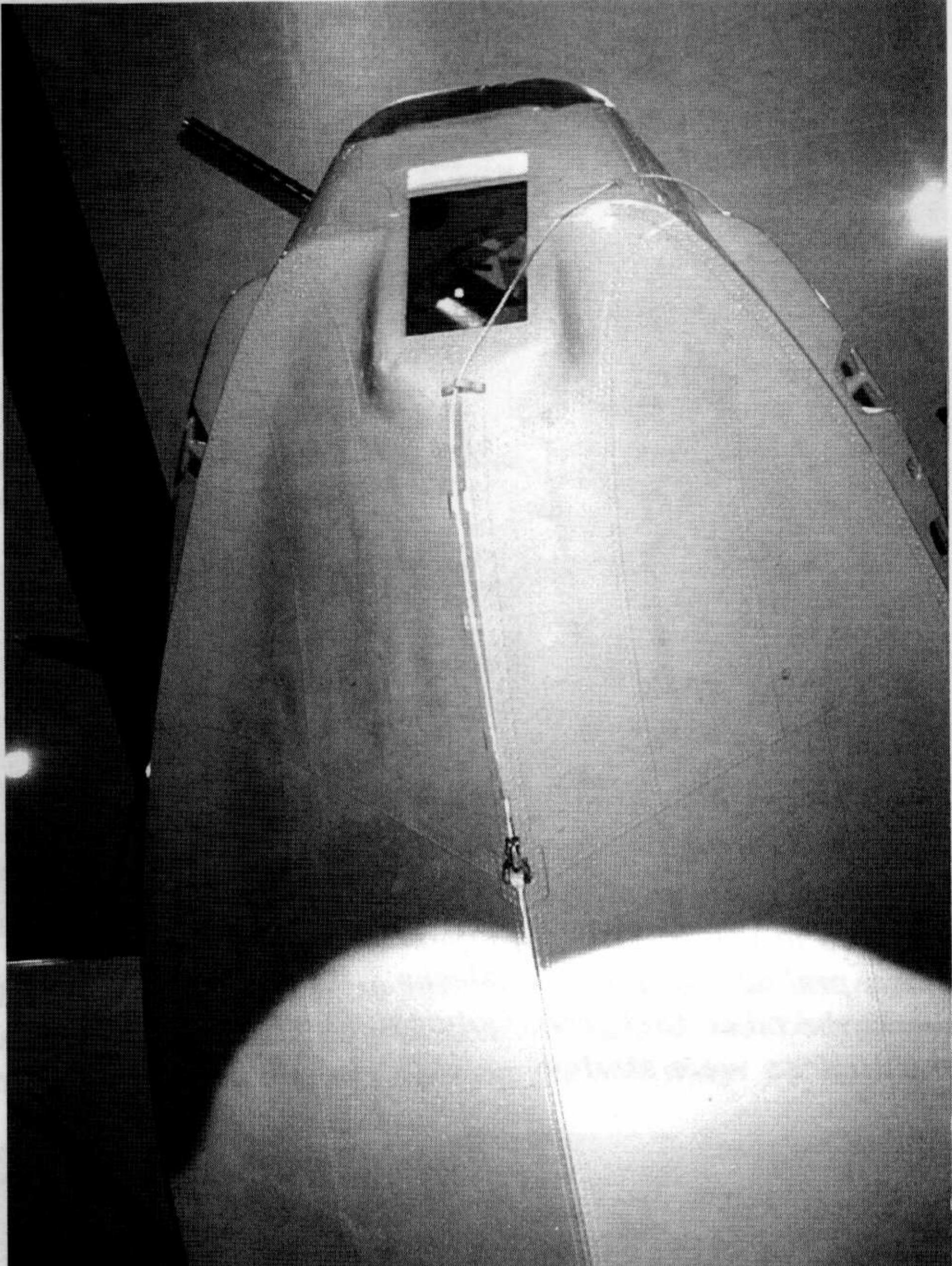
(National Archives)

## FUSELAGE DETAILS

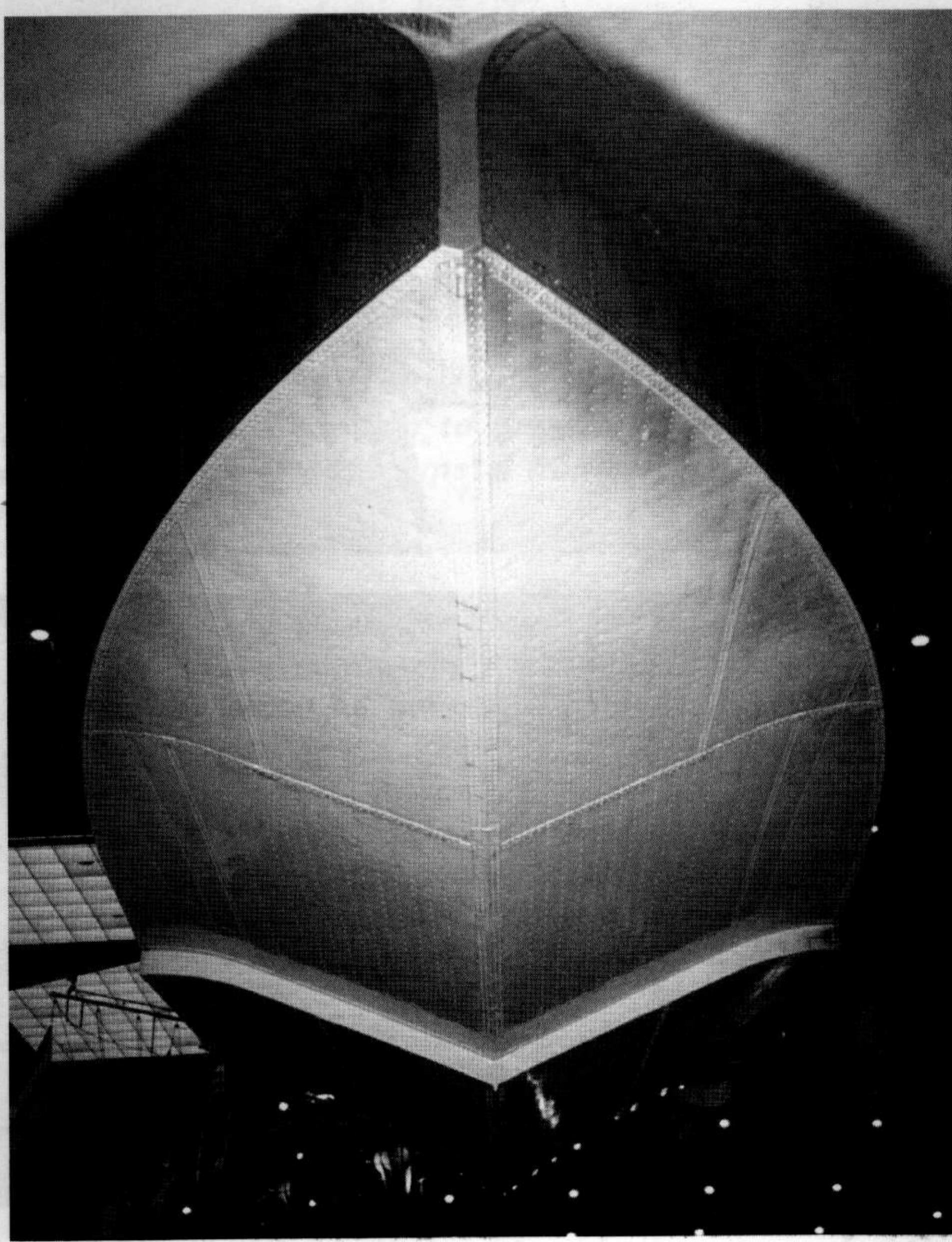


*Above: A right side view of the cockpit enclosure shows how it was tapered along the side of the fuselage. Each side window could be opened by sliding it aft. Also note the windshield wiper in front of the co-pilot's position.*

*Above right: The pendant was attached to a point beneath the bow of the aircraft. The other end was fastened near the anchor compartment so that it was ready for use when the anchor was dropped.*



*Catalinas were usually boarded and exited through one of the waist positions, and a small ladder was kept ready for this purpose inside the compartment.* (NMNA)



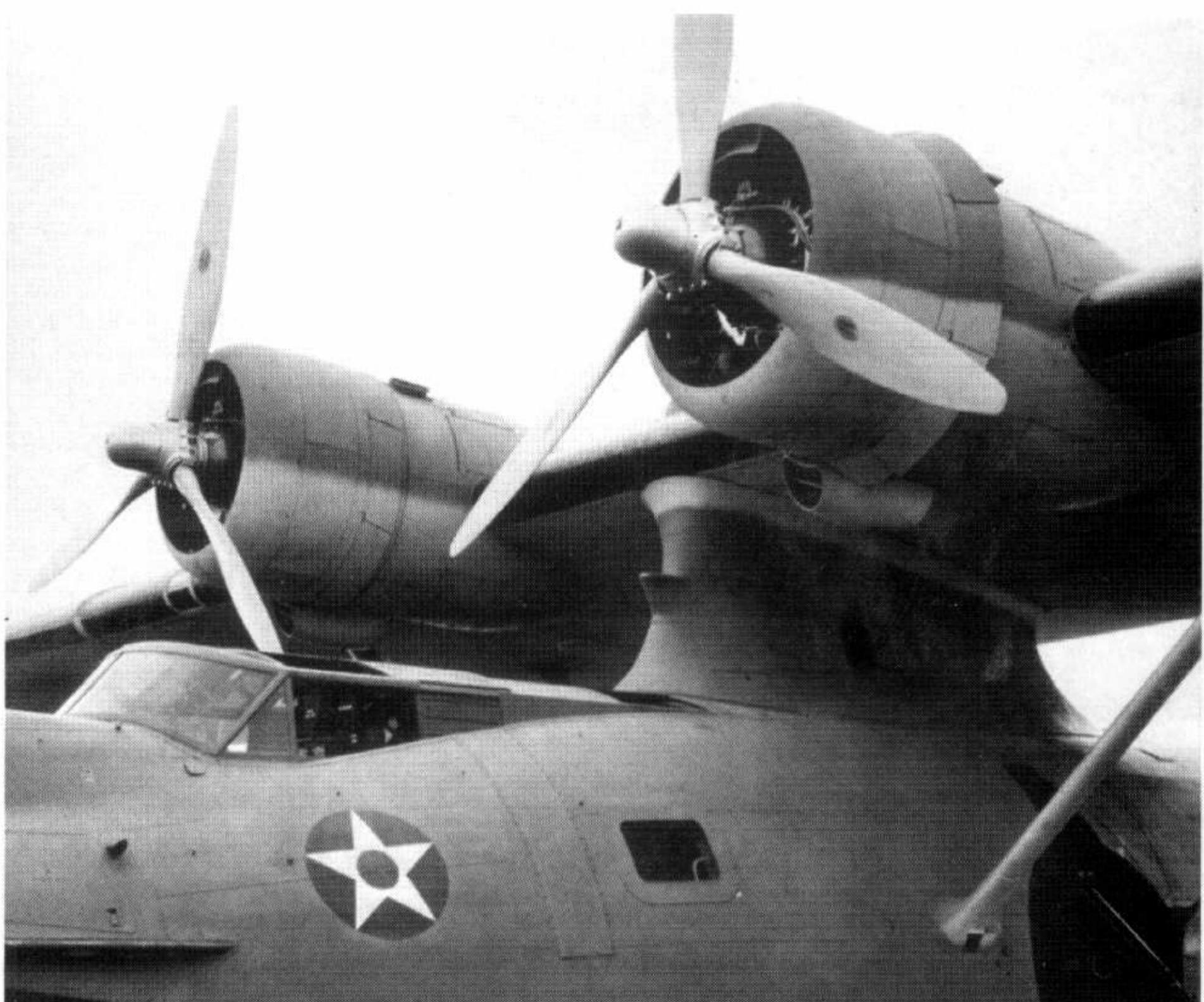
*This view looks forward from beneath the tail and reveals the step in the underside of the hull. This suspended aircraft is a PBY-5, but all Catalinas would look the same.*

## ENGINE DETAILS



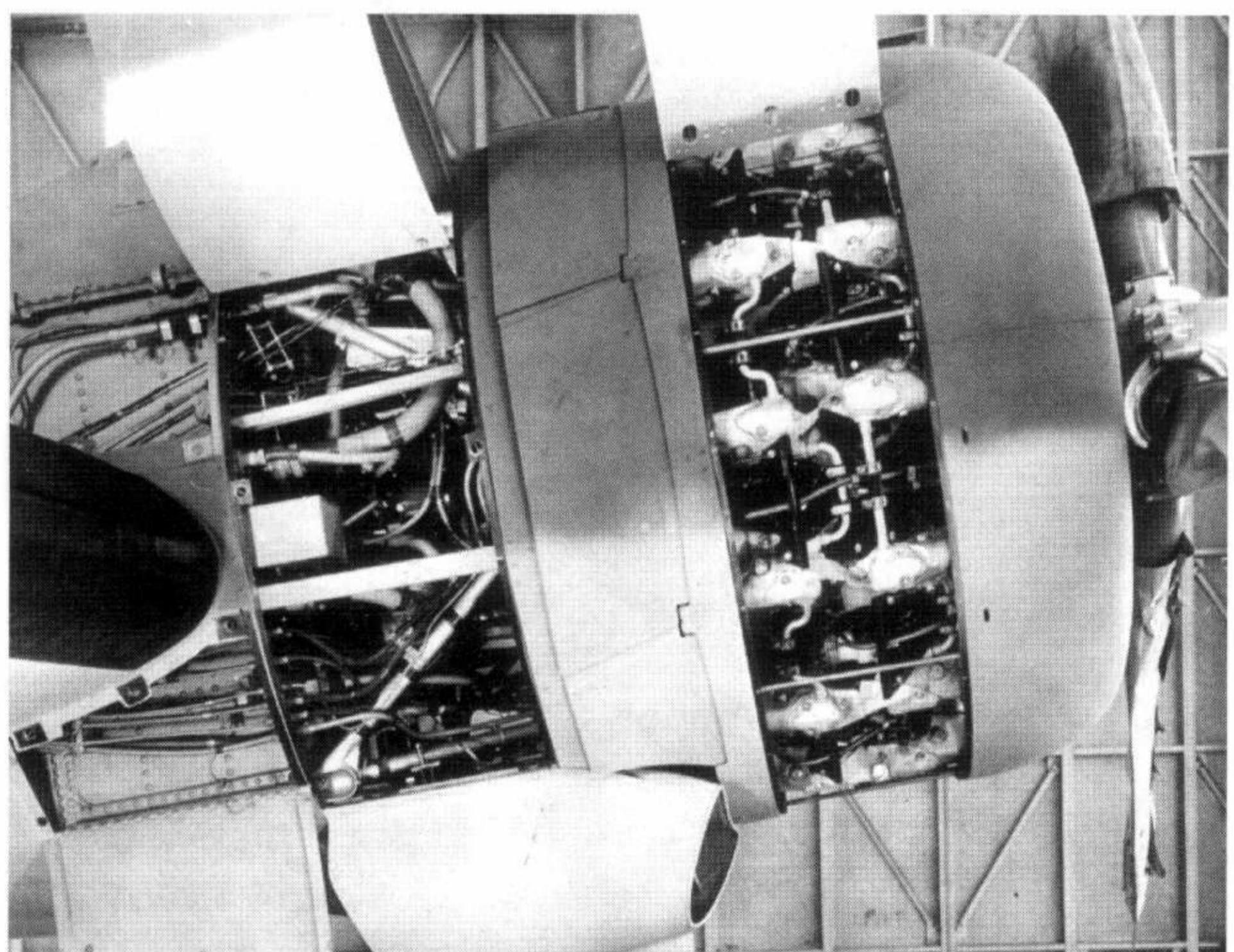
PBY-5As were powered by two R-1830-92 engines, and these had the same external appearance as the R-1830-82 used in the PBY-5. The engines on this Catalina are being preheated at Adak, Alaska. It was necessary to warm the oil so that proper lubrication would occur when the engines were started.

(National Archives)



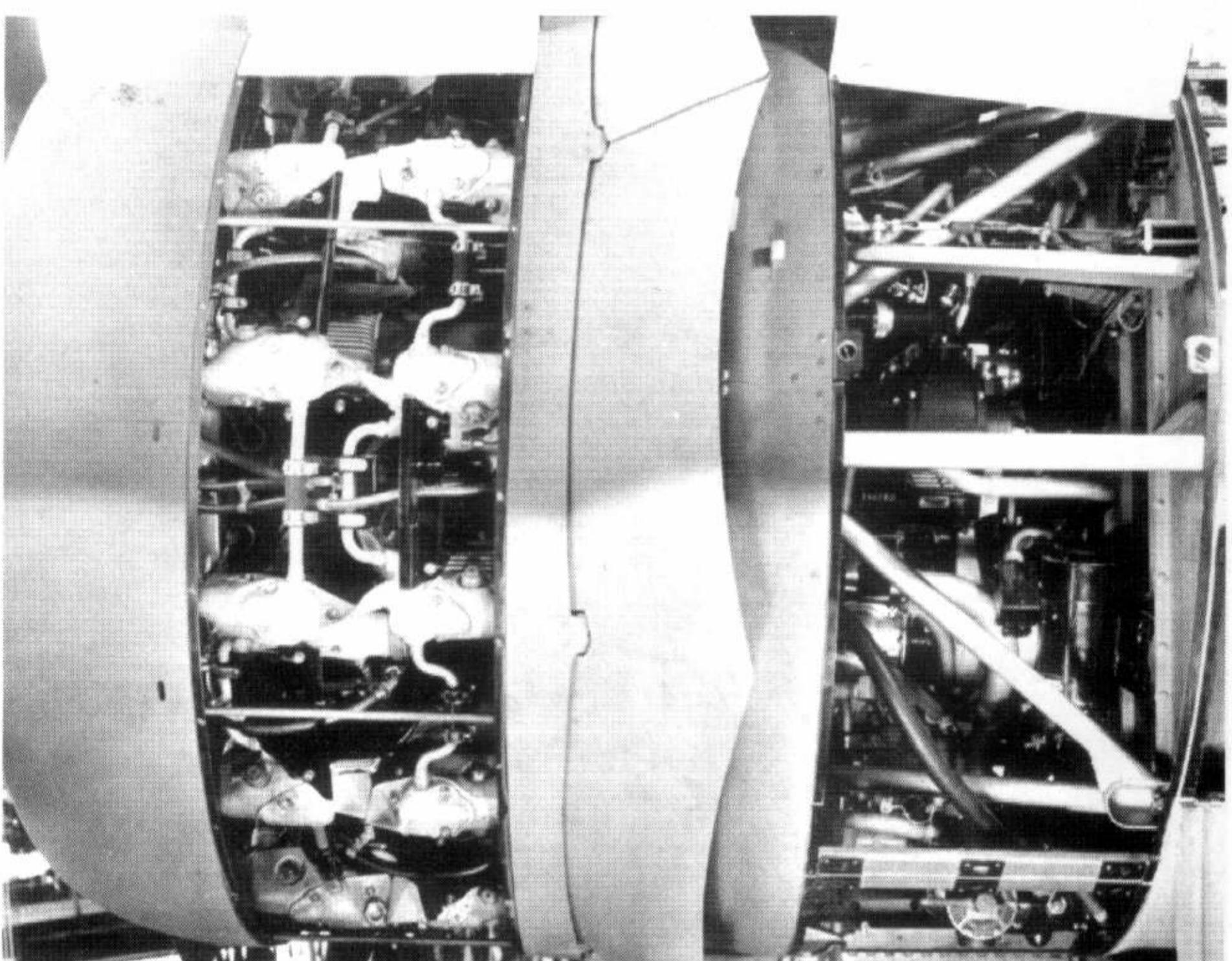
The intakes for the carburetors were located inside the top of the cowl ring. Also notice the small step that has been added on the front of the structure that supports the wing. This first appeared on the PBY-5, and it permitted easy access to the top of the wing from the area just aft of the cockpit.

(National Archives)



Center left: Details of the inboard side of the port engine are revealed in this factory photograph taken with the panels open. The scoop for the oil cooler is apparent beneath the nacelle.

(National Archives)

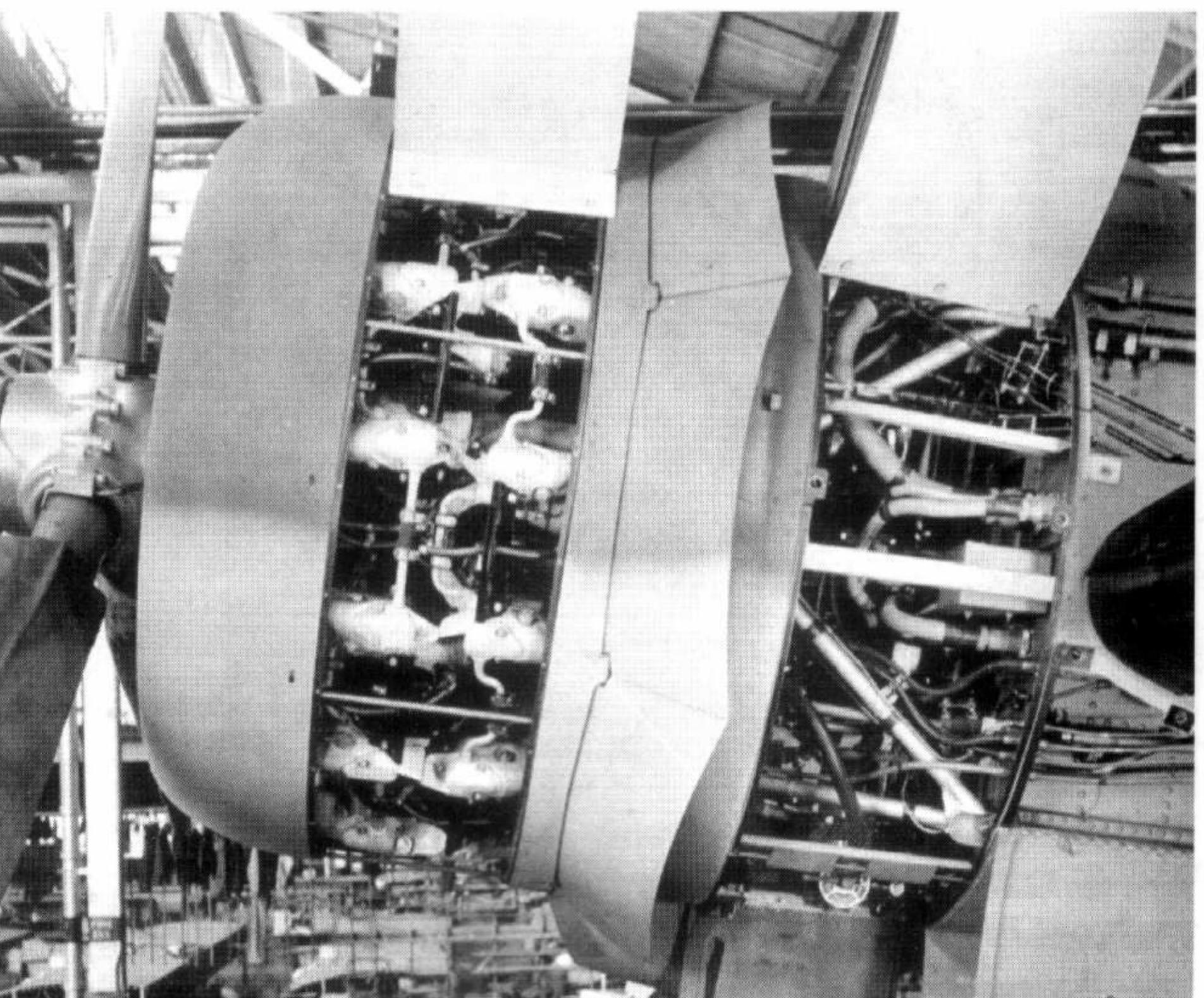


Center right: The outboard side of the port engine is shown here. The twin rows of fourteen cylinders are visible in the forward part of the nacelle, and the engine accessories are in the aft section.

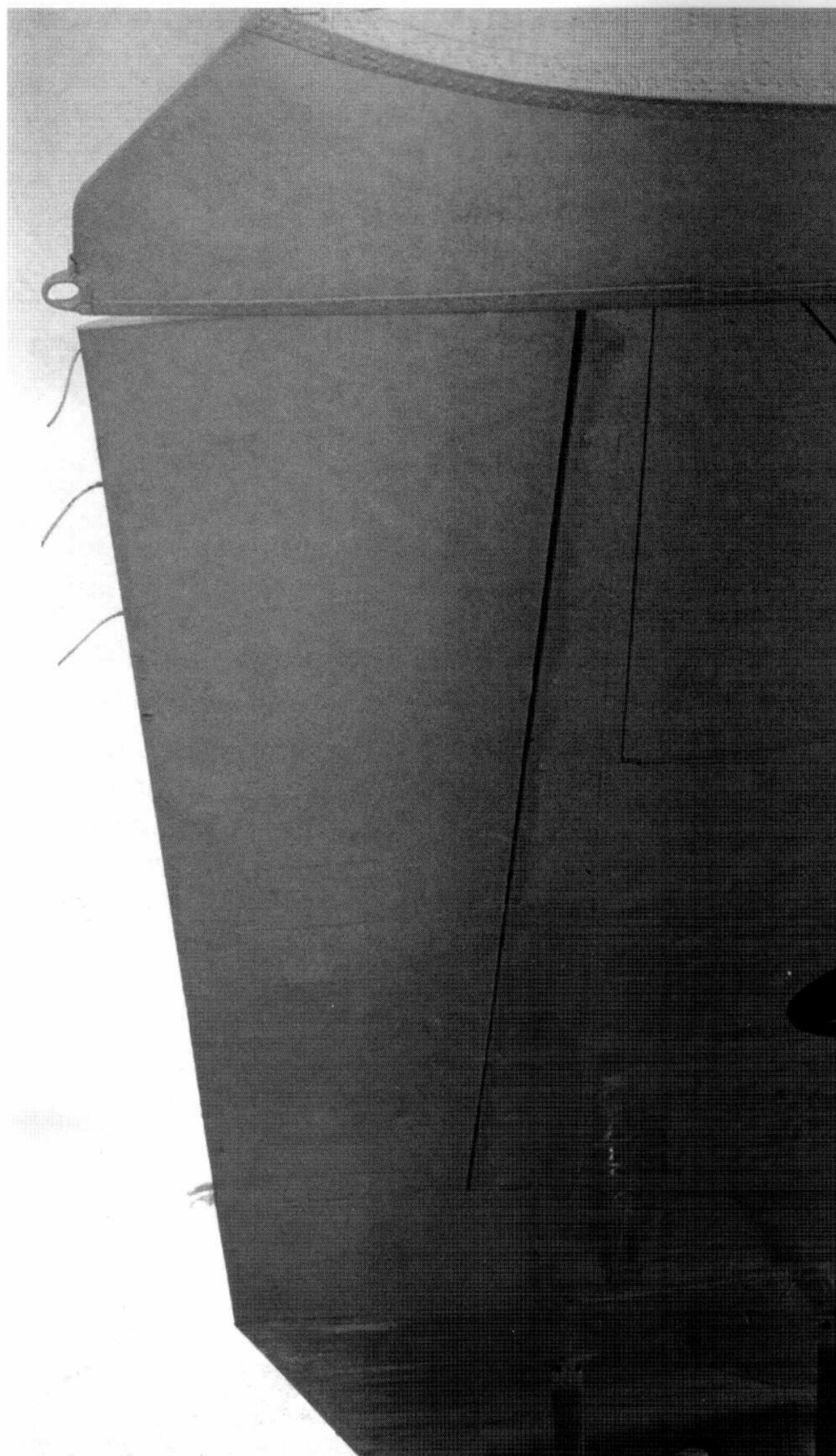
(National Archives)

Right: Features on the inboard side of the starboard engine are revealed in this close-up. It was said that the only time a Pratt & Whitney engine did not leak oil was when there was no oil in it, but they were very reliable powerplants. The air-cooled radials often continued to run in spite of battle damage that would have destroyed a liquid-cooled inline engine like the Allison V-1710 or Rolls Royce Merlin, and this was reassuring to the crews that flew in the Catalinas.

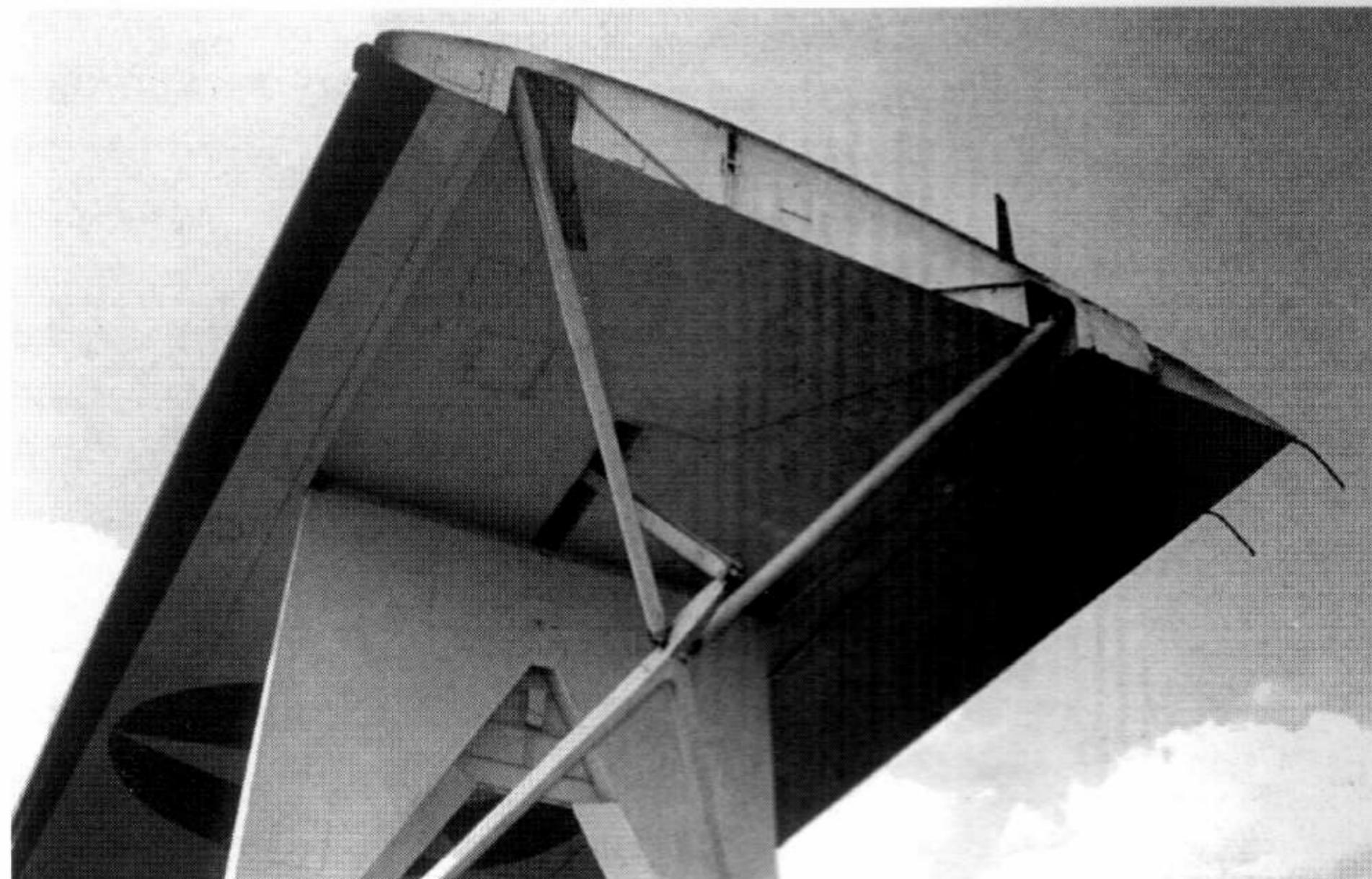
(National Archives)



## WING DETAILS



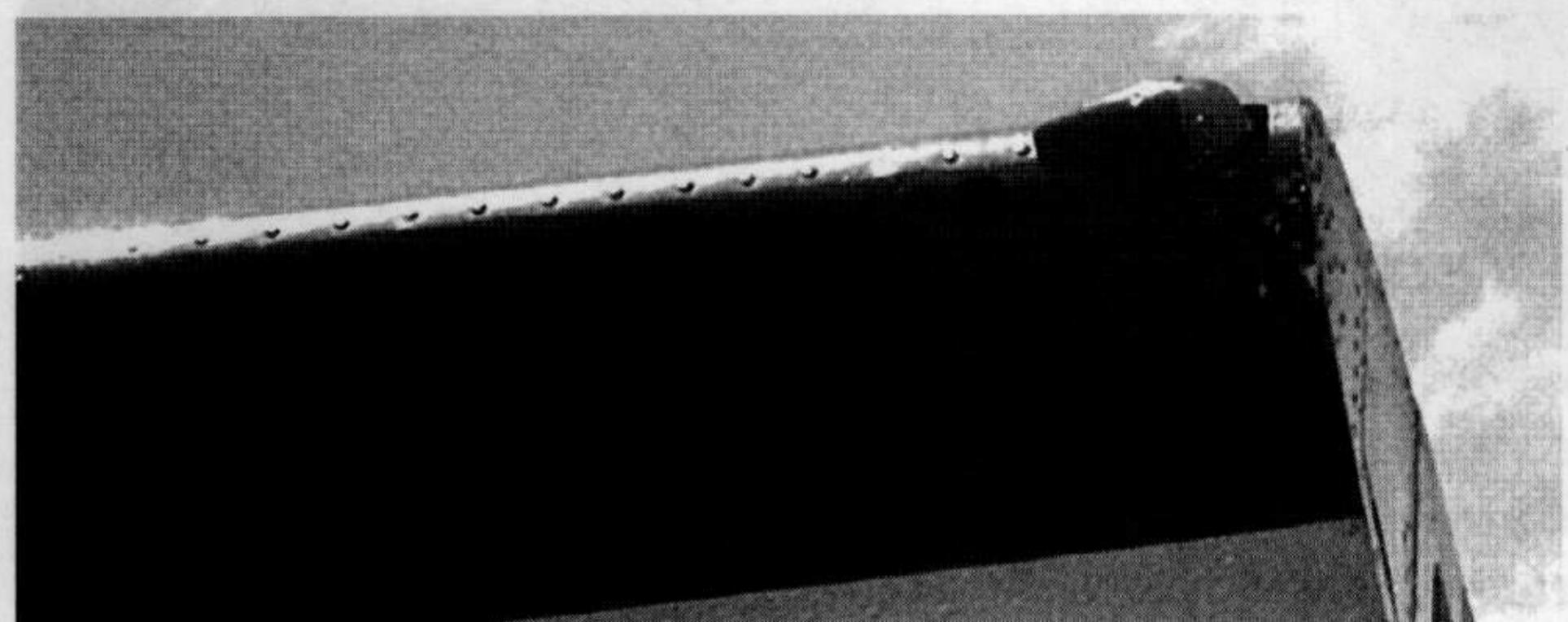
PBYs did not have flaps, but fabric covered ailerons, each twenty feet in span, extended across most of the outer wing sections. The left aileron had a moveable trim tab. This is an underside view of the right aileron.



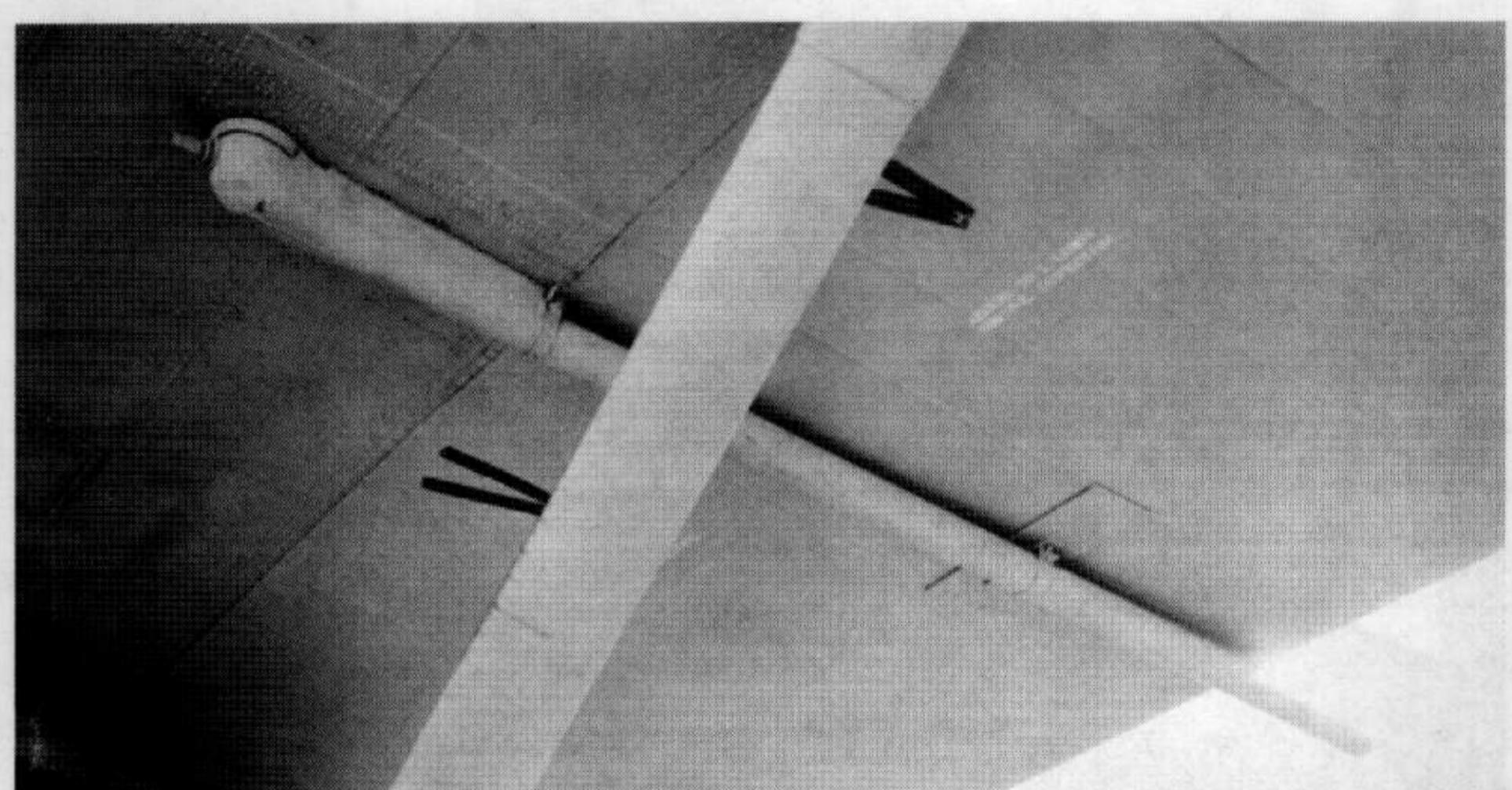
The strut, braces, and retraction arm for the left outrigger float and the well into which they retracted are visible here. Also note the details on the end of the wing where the float retracted.



Catalinas had a landing light in the leading edge of each wing outboard of the engines. This is the light on the right wing of a PBY-5A.



The wing tip navigation lights were located on the leading edge as close as possible to where the floats retracted. This is the red light on the left wing.

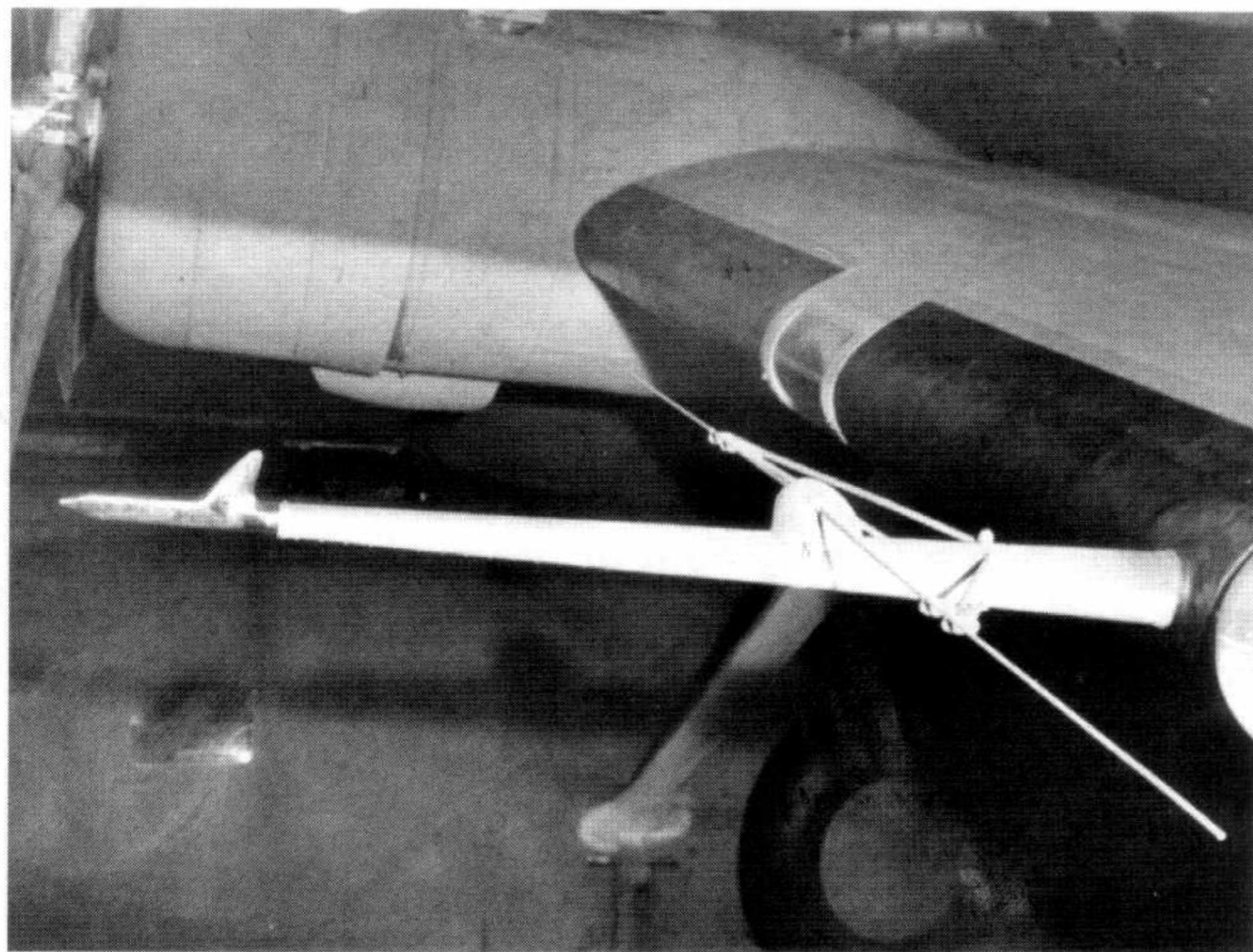


Fuel dump tubes were situated under the center section of the wing. In addition to the ailerons, the entire aft section of the wing was metal framework covered with fabric.  
*(National Archives)*



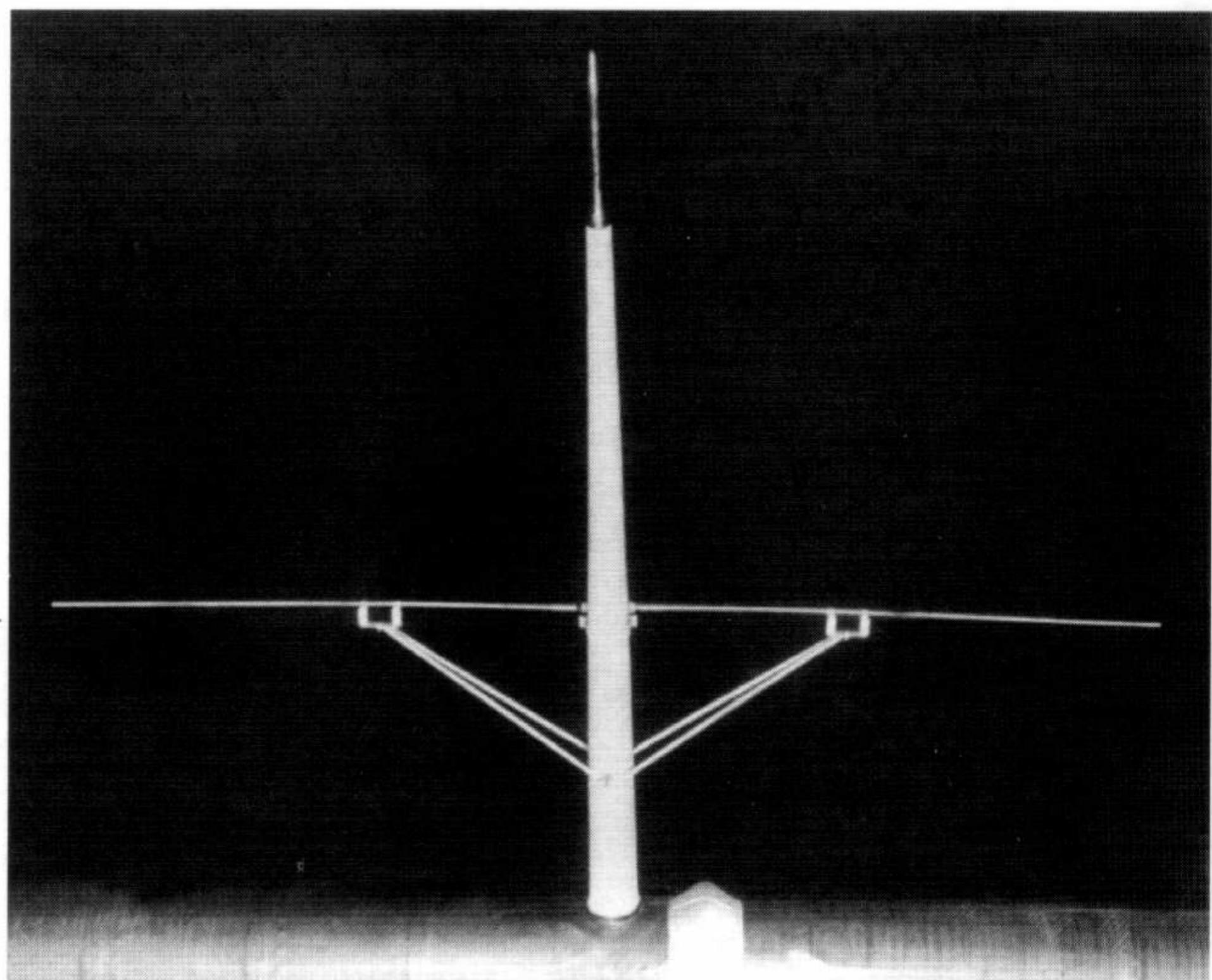
The left outrigger float is seen here in the retracted position where it doubled as the wing tip. The retracting floats eliminated a significant amount of drag when the aircraft was in flight or operating on land.

## RADAR INSTALLATIONS



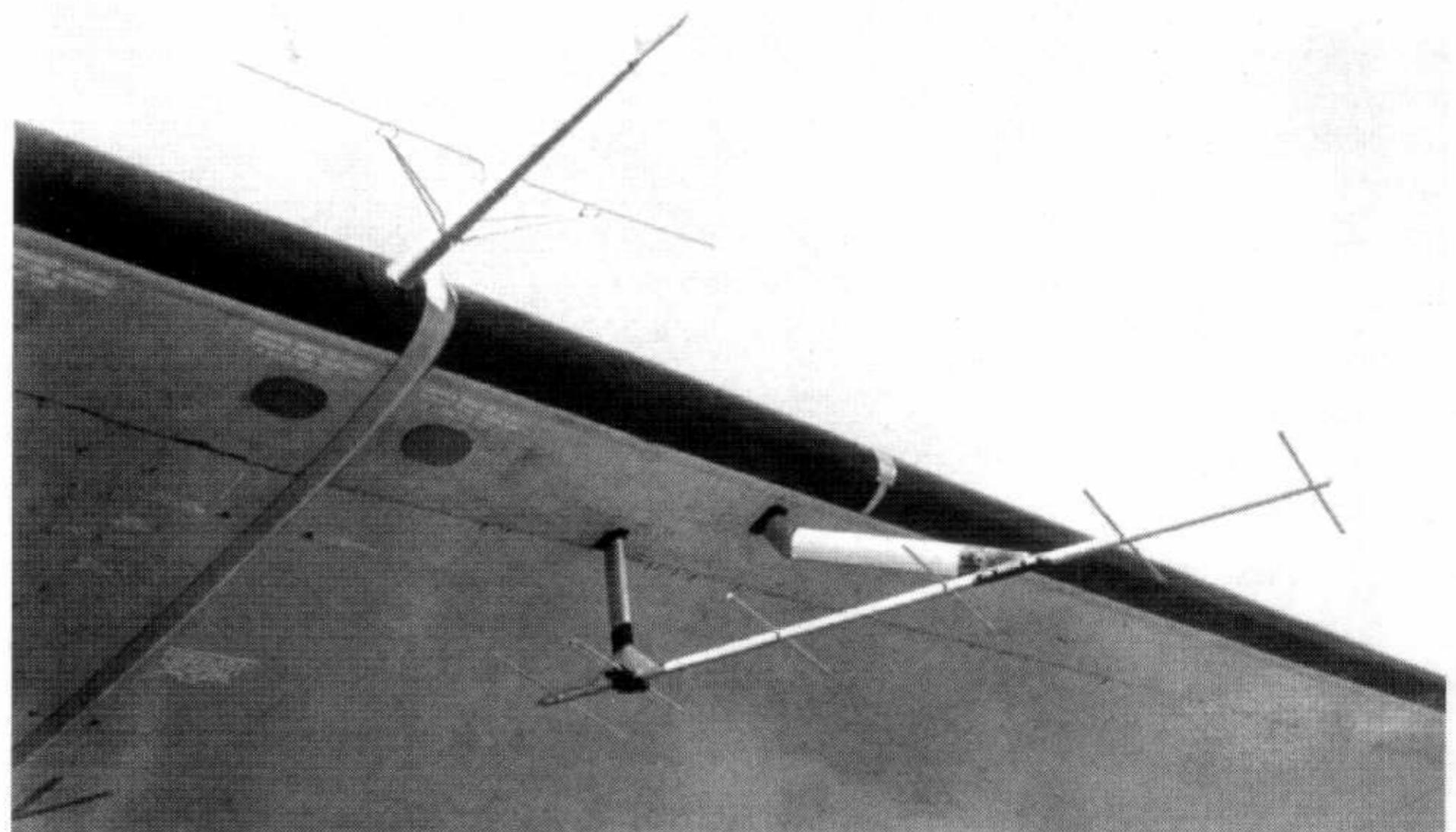
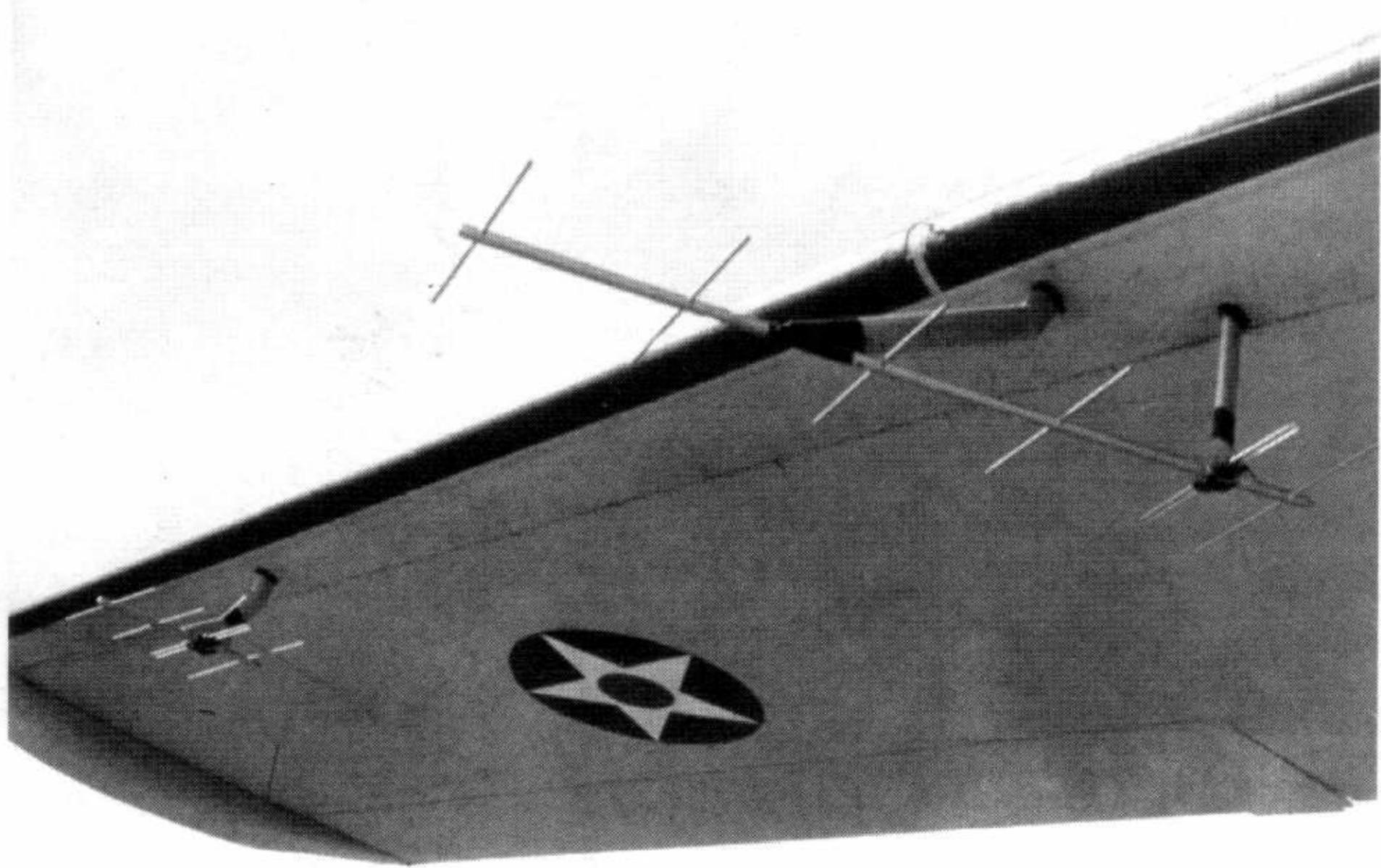
As the war progressed, additional radar and radio antenna arrays sprouted from the wings and fuselages of Catalinas. In this case, a radio antenna has been attached to the pitot boom on the leading edge of the left wing. Also note the details of the pitot boom itself and the landing light on the leading edge of the wing in the background.

(National Archives)



This bottom view shows the radio antenna mounted on the pitot probe from a different angle. Photographs indicate that this radio antenna was fairly common on U. S. Navy PBY-5s and PBY-5As, but it was not always present.

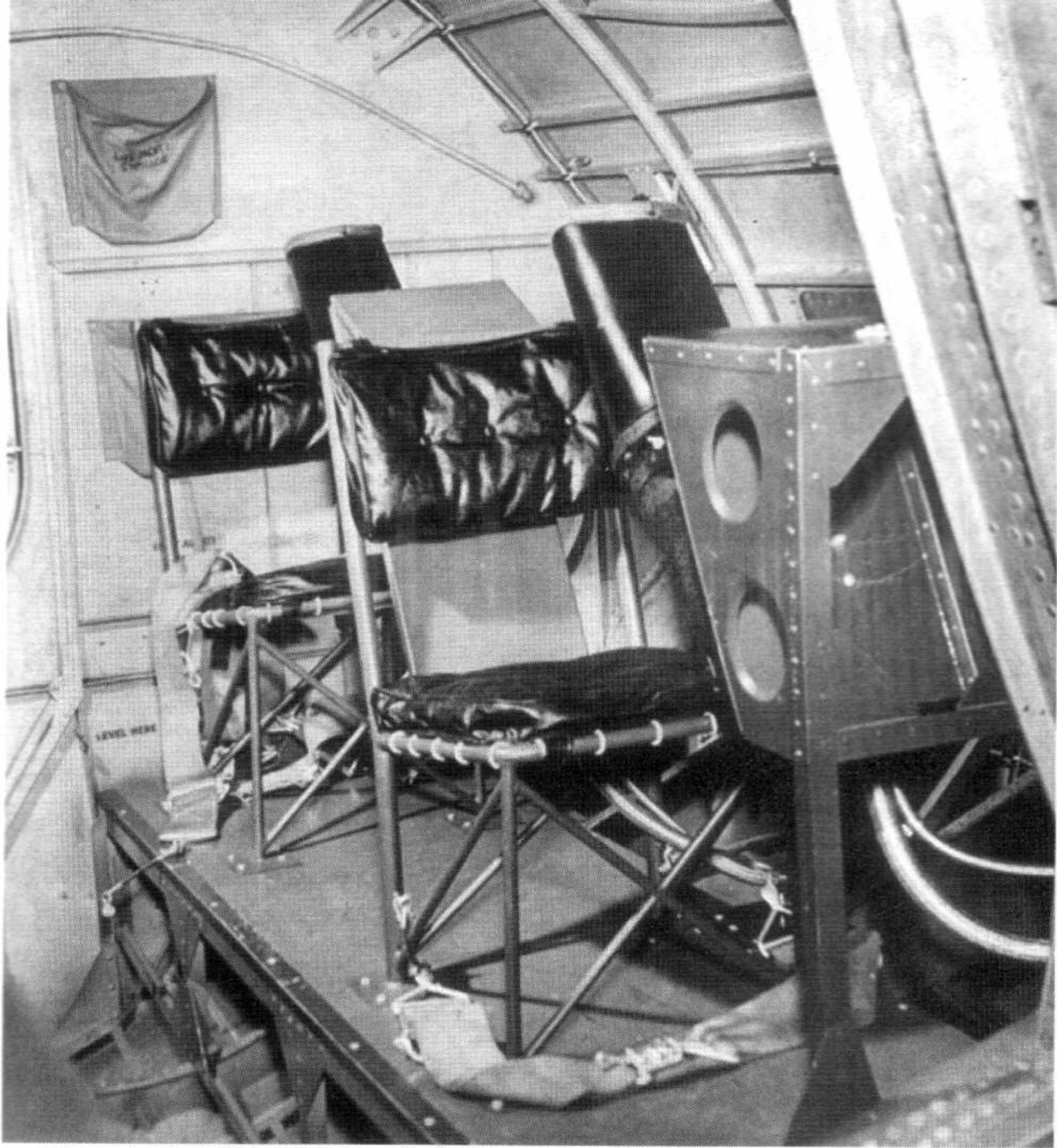
(National Archives)



Center left and right: Yagi antennas were often carried under the wings of Catalinas. In the left center photograph, the smaller antenna mounted outboard under the right wing is the homing transmitting array, and the larger one further inboard is the homing receiving array. In the right center photograph, a second homing receiving array is shown under the left wing. Again note the radio antenna mounted on the pitot probe in the picture at right.

(Both National Archives)

Left: Additional broadside transmitting and receiving arrays were sometimes installed on the sides of the forward fuselage, however these were not carried as often as the arrays under the wings. (National Archives)



*Above left: Whenever a Catalina was fitted with extra radar equipment, space had to be provided inside the aircraft for the operators and their equipment. It was usually added in the section of the aircraft normally used as the living quarters. This view looks back into that part of the aircraft and shows chairs for two operators on the port side.*

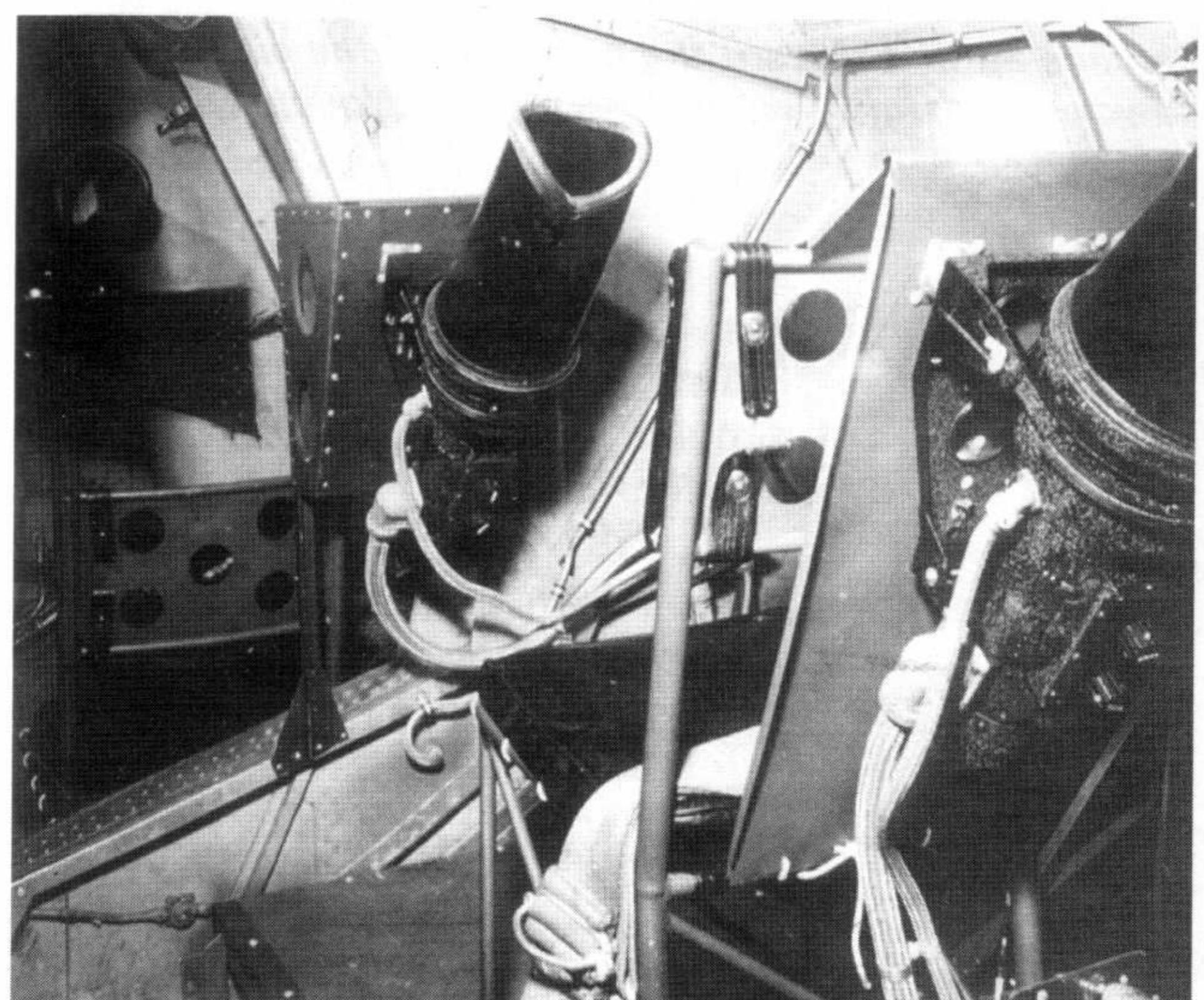
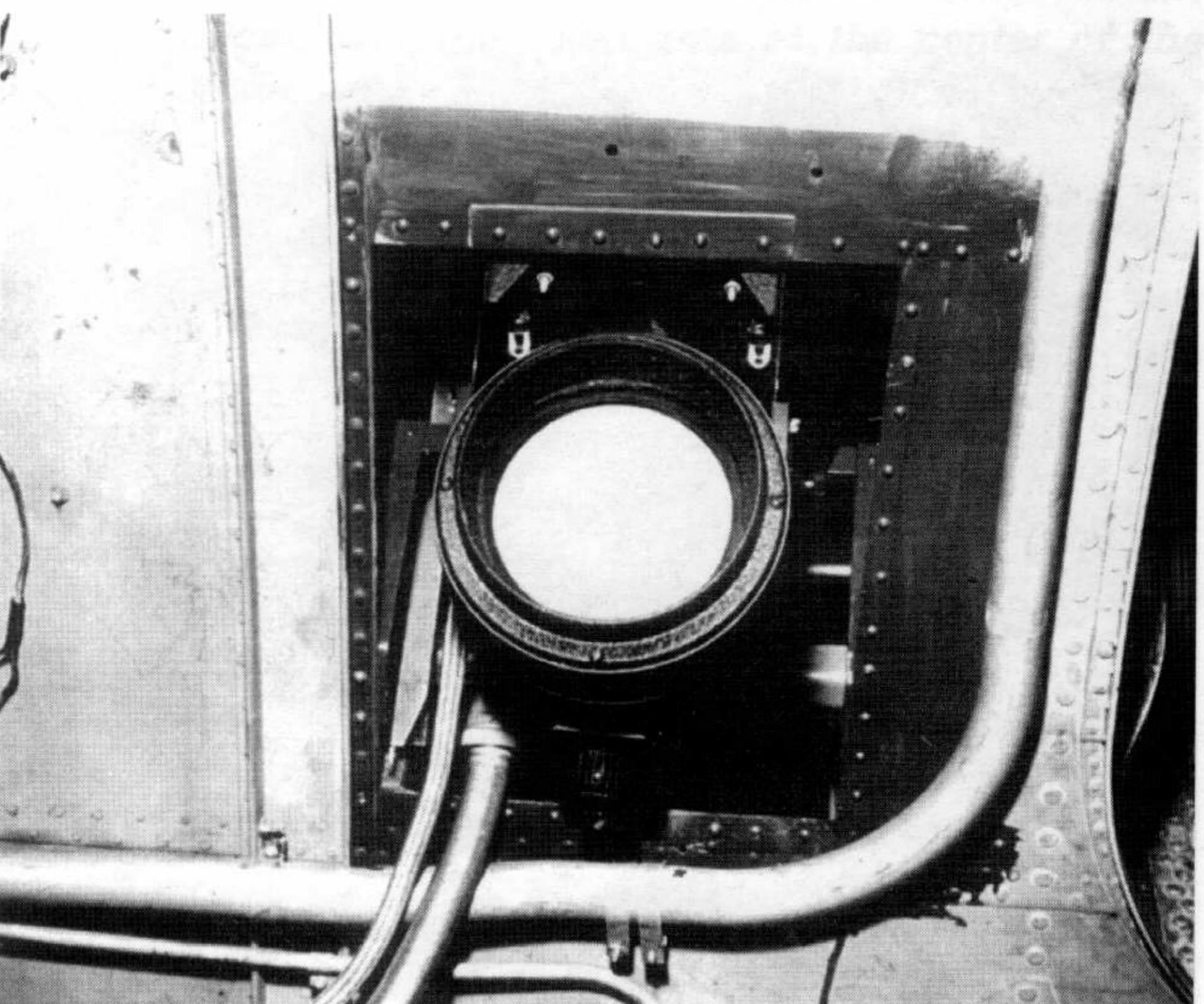
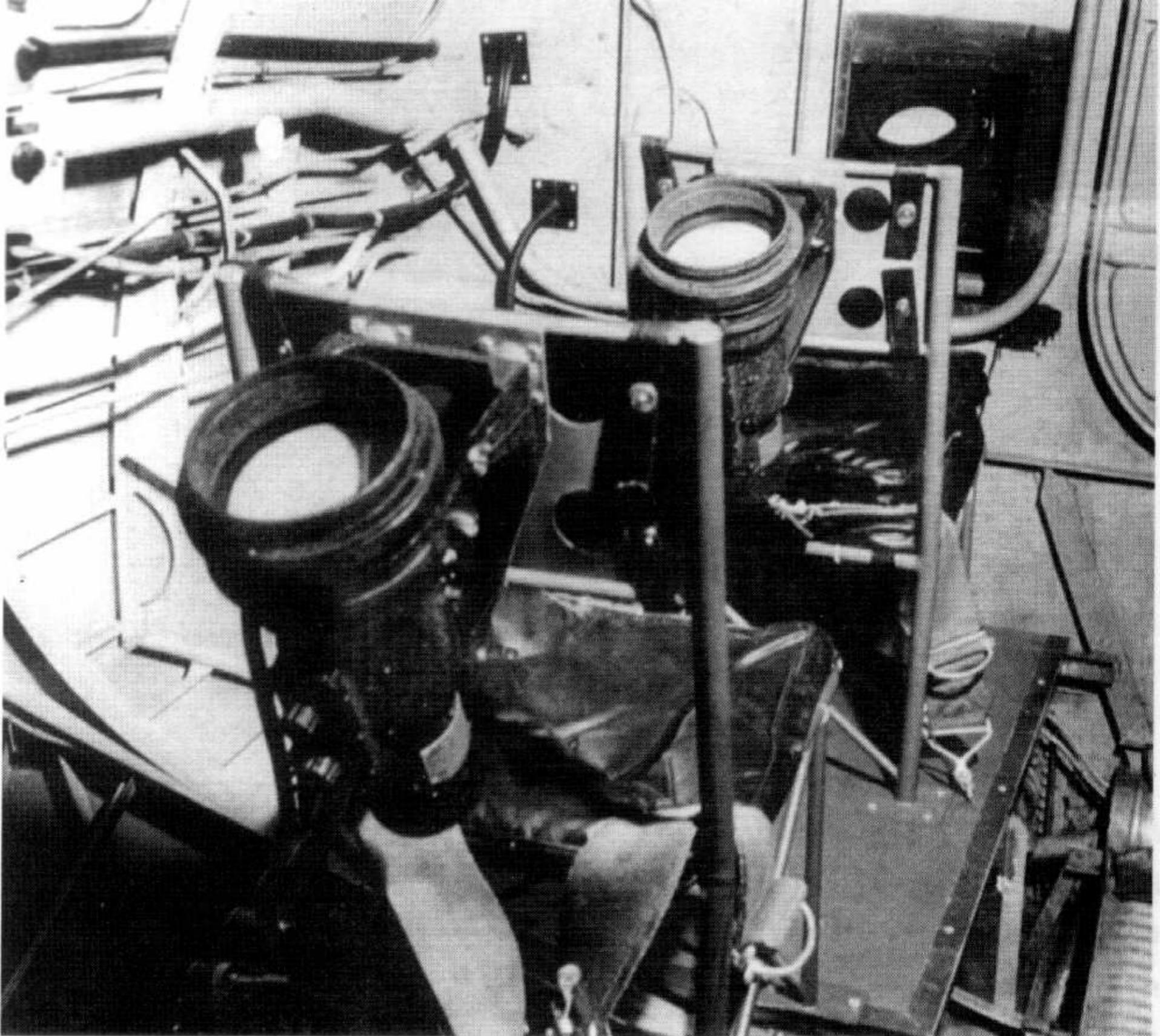
(National Archives)

*Above right: Taken in another aircraft, this view looks forward at three radar scopes that have been added on the port side in the living quarters.*

(National Archives)

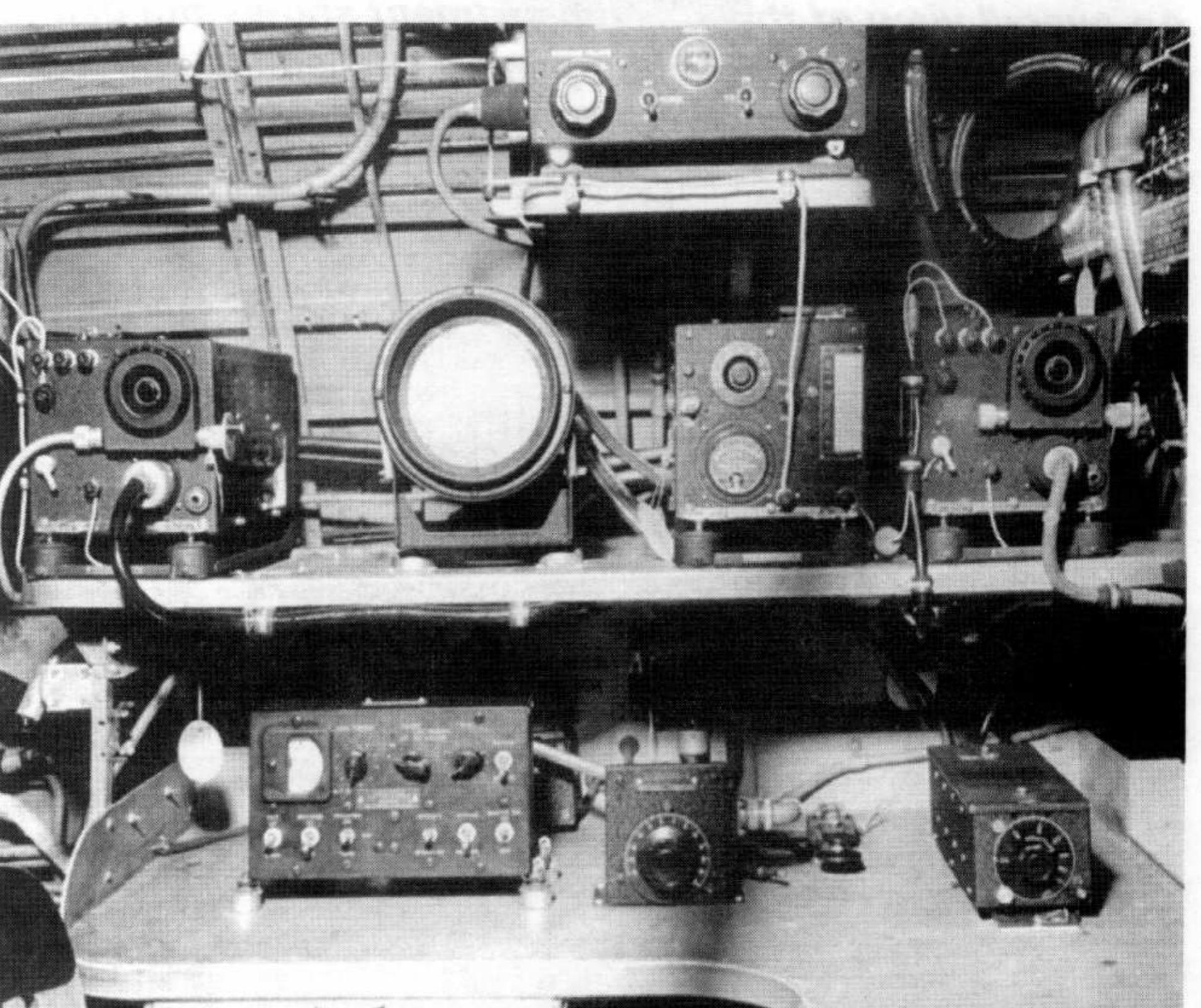
*Right: This close-up shows details of the forward scope seen in the top right photograph.*

(National Archives)



*Radar scopes were often covered with hoods so their displays could be seen even in bright daylight conditions. This radar equipment is located on the starboard side of the living quarters in a PBY-5A.*

(National Archives)



*Radar scopes associated with homing equipment were sometimes located on the shelf at the radio operator's station. These allowed the operator to know from which direction a signal was coming.*

(National Archives)

## TUNNEL GUN & MAD BIRD EQUIPMENT

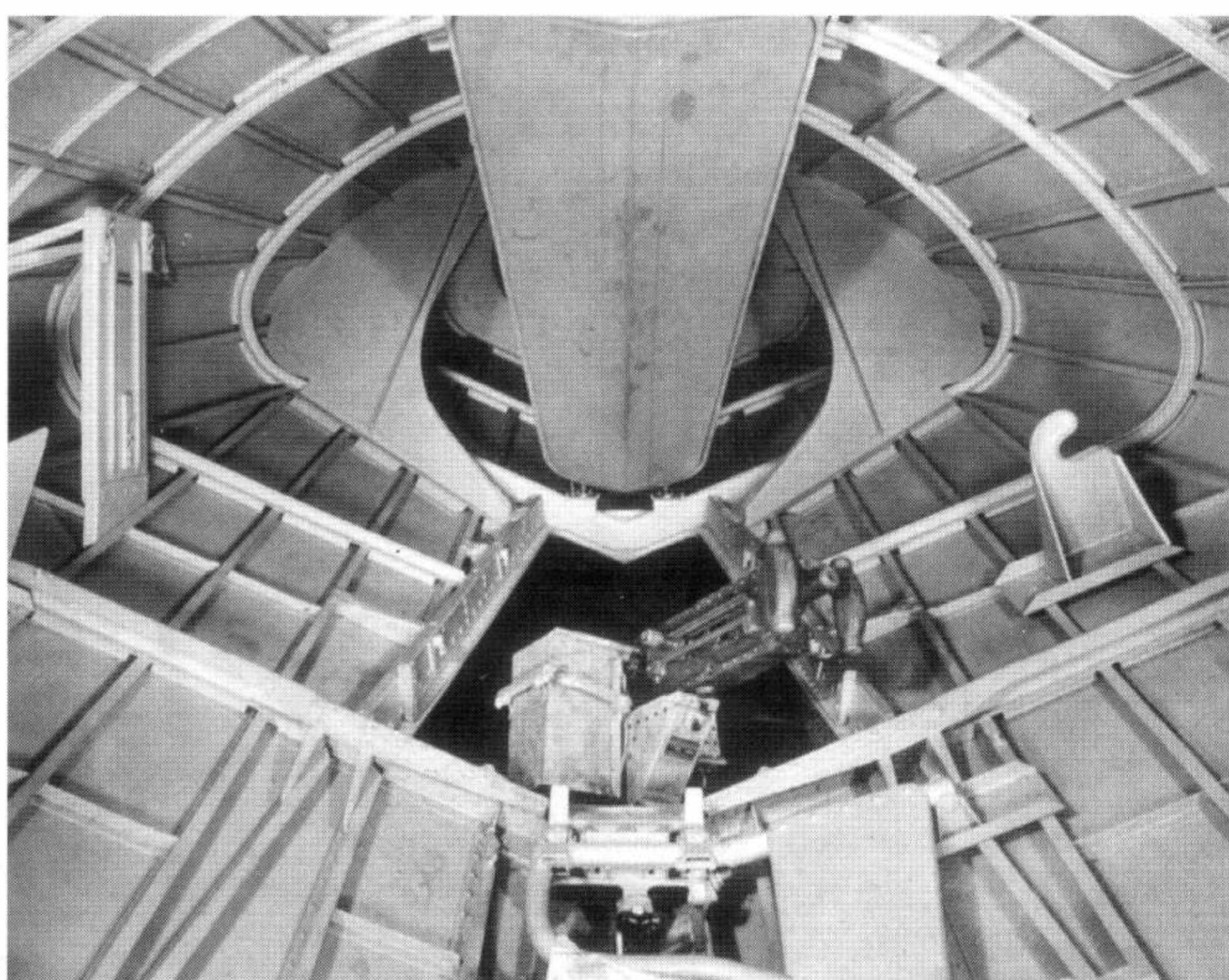


*From the PBY-1 through the PBY-6A, the tunnel gun remained a standard feature on all versions of the Catalina, however it was not installed on the PBN-1 Nomad. This is the tunnel gun on a PBY-5A in the firing position.*



*An inside view shows the gun with its two shields of armor plate in place. As with the bow gun, the top shield was often removed to save weight and increase visibility for the gunner. At times the forward plate of armor was also removed.*

(National Archives)



*An overall view of the aft compartment shows the gun in place and the hatch for the opening suspended above it.*

(National Archives)



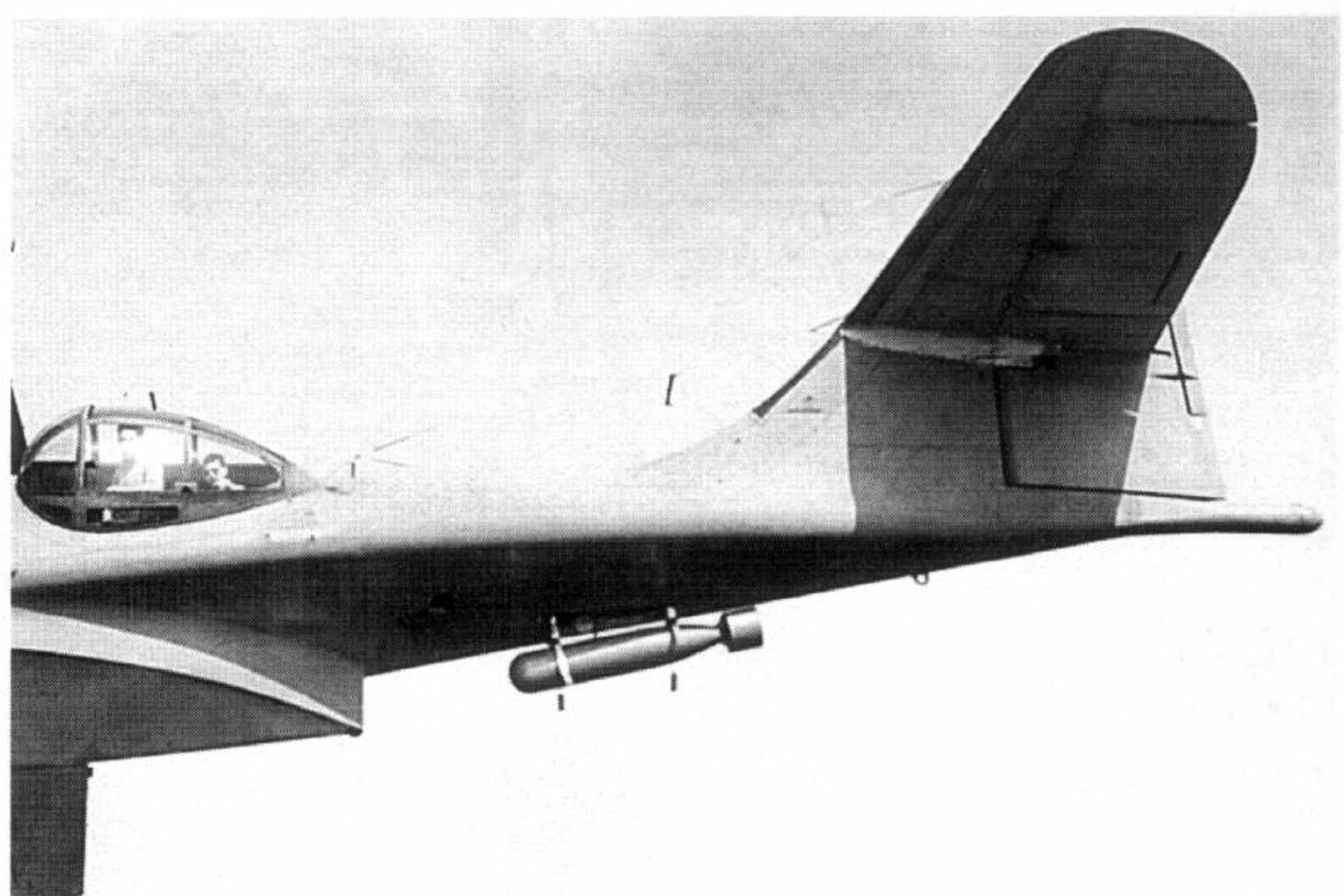
*When not in use, the gun mount rotated about ninety degrees up and toward the port side of the aircraft.*

(National Archives)



*Some Catalinas were fitted with magnetic anomaly detectors (MAD) in tail booms. The torpedo-like device hanging from the tunnel gun position is part of the MAD Bird mine detection system.*

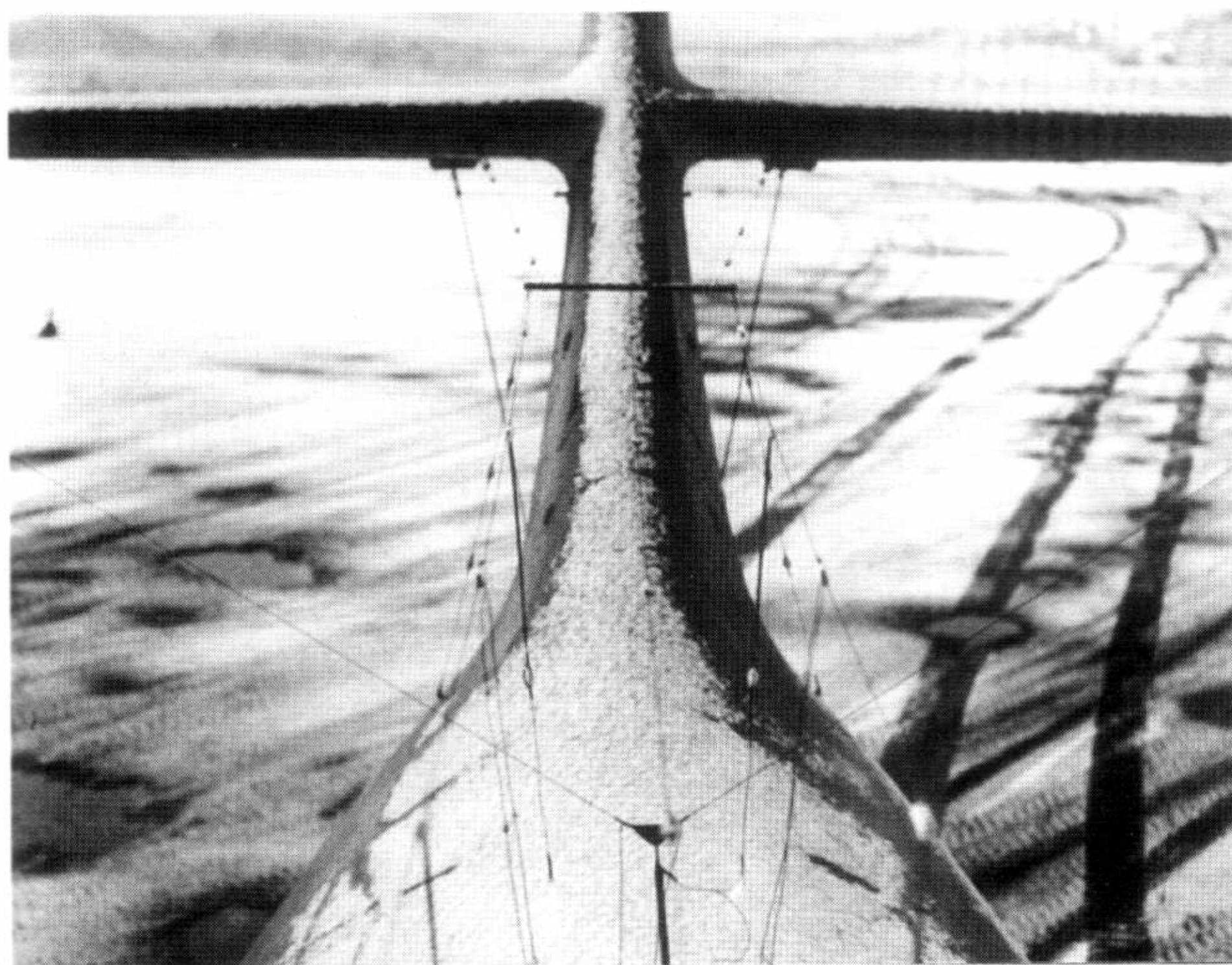
(National Archives)



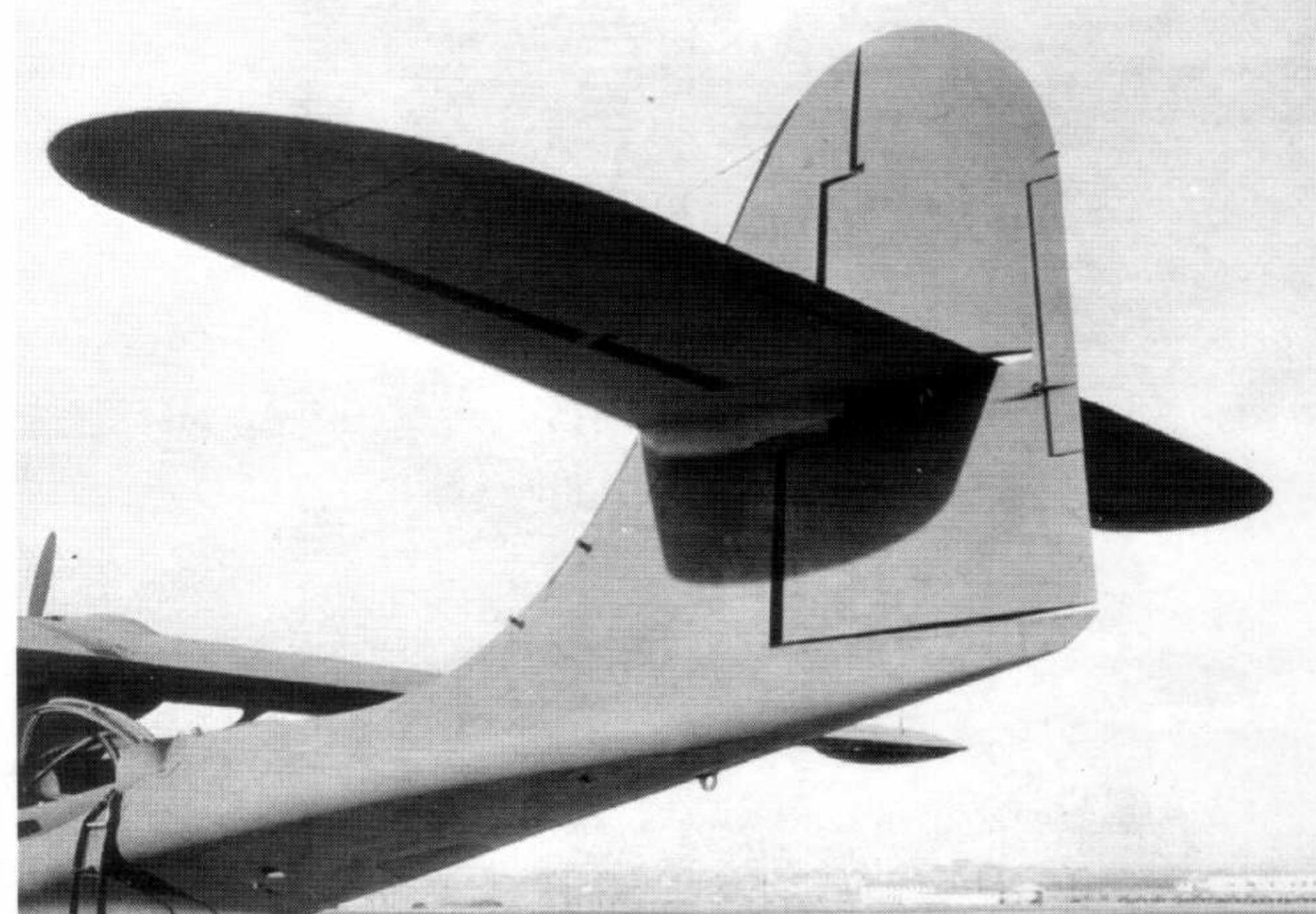
*When not in use, the MAD Bird sensing unit was carried beneath the aft fuselage of the aircraft, but the tunnel gun could not be used when it was in place. Again note the MAD boom on the tail.*

(National Archives)

## TAIL DETAILS



*The complex rigging of antenna wires used on many PBY-5As is evident in this view that looks aft at the tail section. The number and arrangement of antenna wires varied depending on the radio equipment carried in the aircraft.*



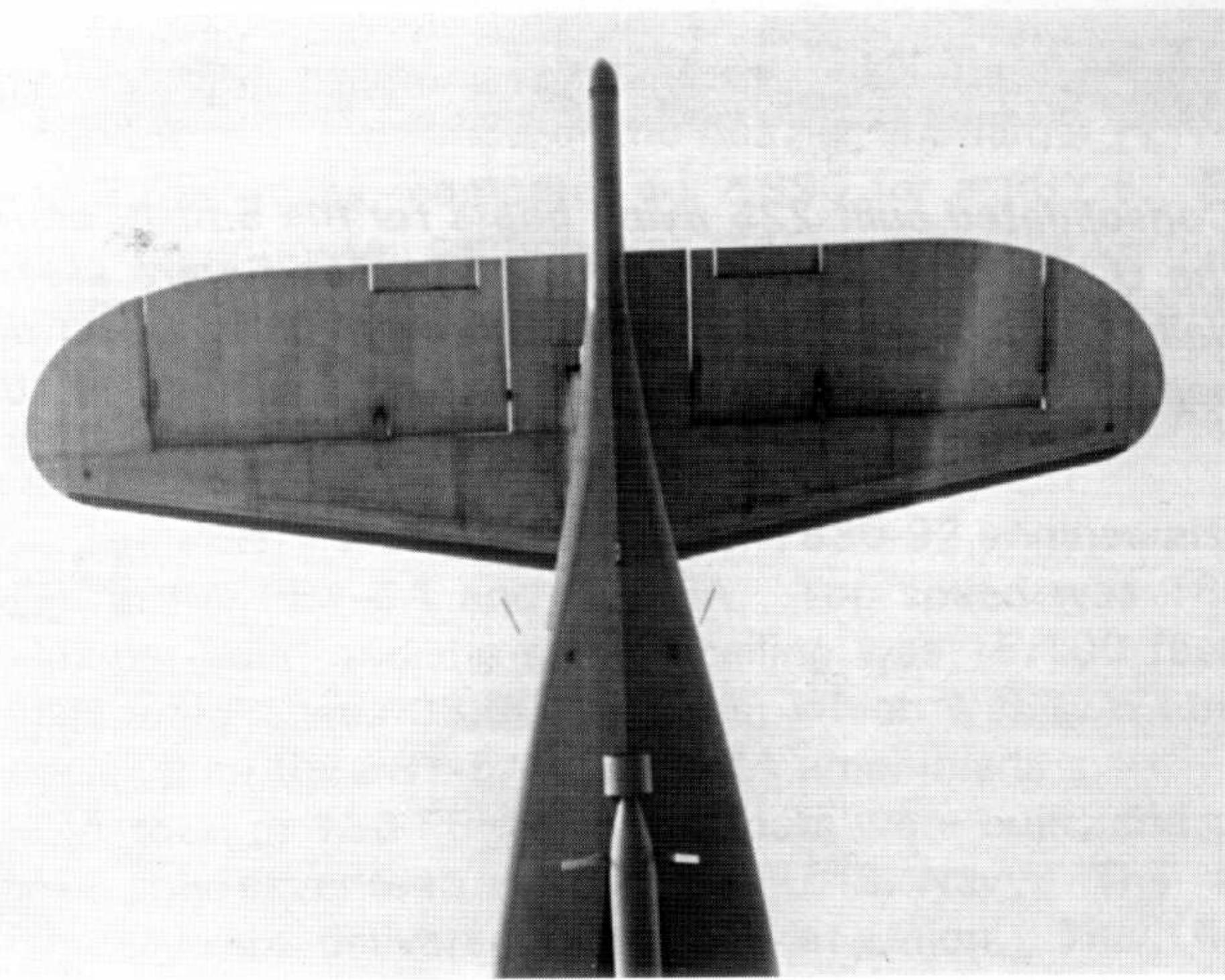
*The rudder design as used on PBY-5s and PBY-5As is illustrated in this view. Note the straight trailing edge, the large trim tab, and the cutout that allows movement of the rudder over the fixed area at the center of the horizontal tail.*

(National Archives)



*Center left: A crewman sweeps snow off the fabric covered elevators of a PBY-5A in Cold Bay, Alaska. Note the actuator for the trim tab on the left side of the rudder and the small white position light on the trailing edge of the rudder just above the trim tab.*

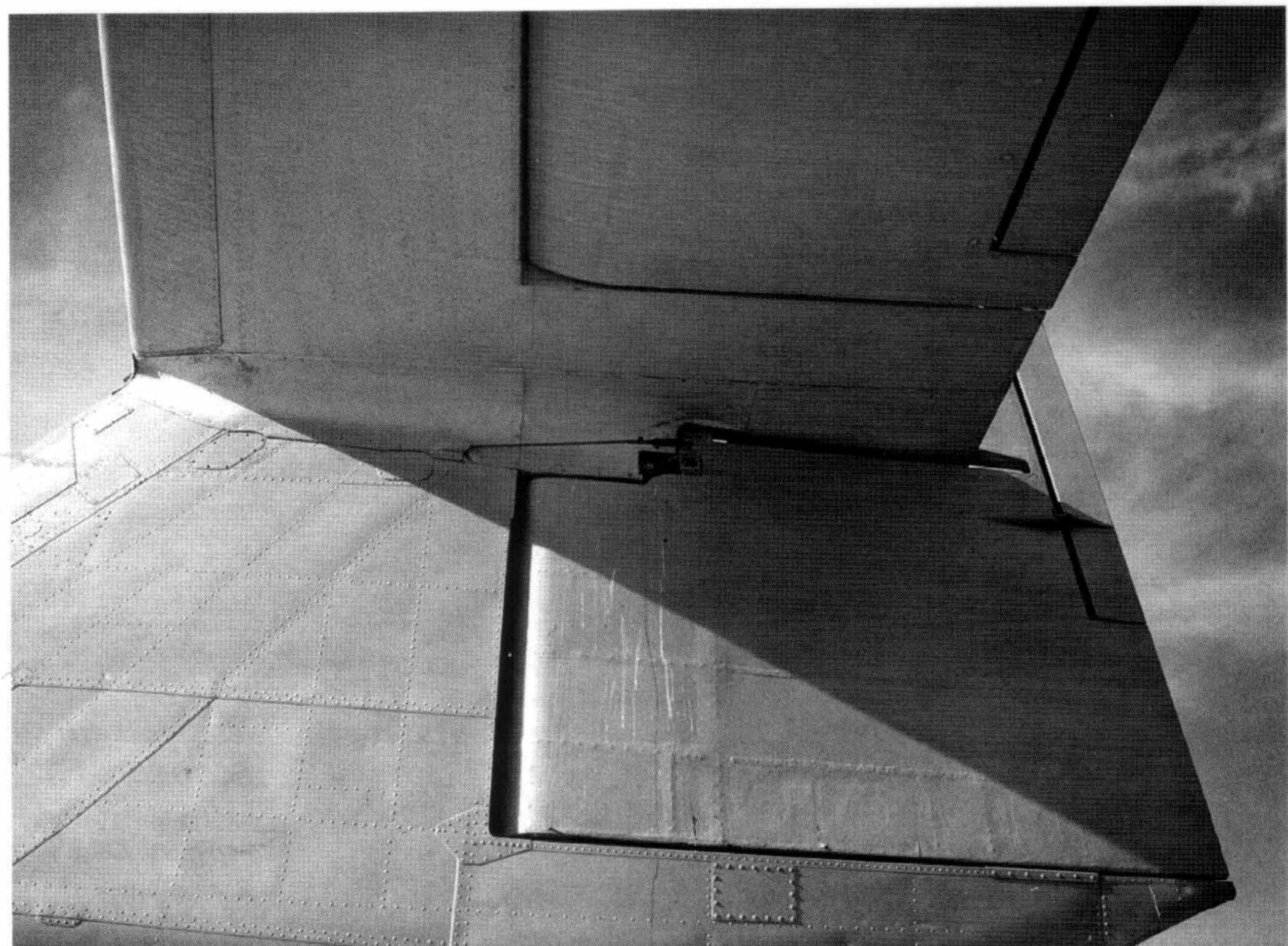
(National Archives)



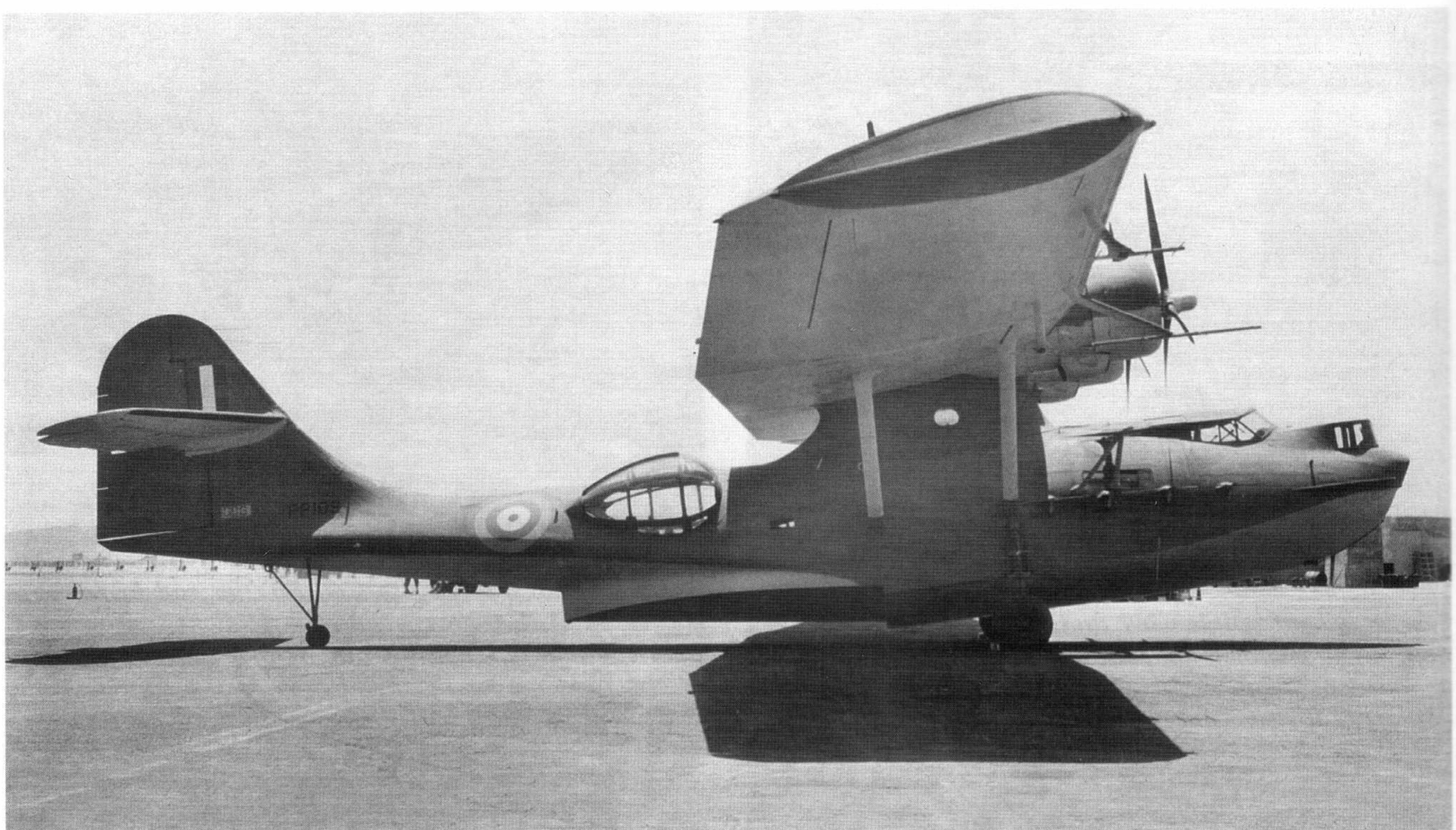
*Center right: An underside view shows the shape of the horizontal stabilizer and the elevators. Notice that each elevator has a small trim tab near its inboard end. The fixed center section of the horizontal stabilizer, over which the cutout in the rudder moved, is also visible between the two elevators.*

(National Archives)

*Right: The left control cable for the rudder can be seen just below the horizontal stabilizer.*



## PBY-5B



Consolidated built 225 flying boats for the British, under the U. S. Navy designation PBY-5B. They were essentially comparable to the PBY-5, and they were given the name Catalina IB by the RAF. British serials FP100

through FP324 were assigned, and sixty were used by the U. S. Navy while retaining their British serial numbers. Note the Yagi antenna arrays under the wings and on the forward fuselage of FP109. (National Archives)

## PB2B-2



Boeing of Canada produced PB2B-2 flying boats that were basically comparable to the PBY-5, except that they had the redesigned tail section used on the PBN-1 Nomad and PBY-6A Catalina. They also had the eyeball bow turret and the radome above the cockpit. Fifty-nine were delivered to the British, given the name Catalina VI, and

assigned Royal Air Force serial numbers JX618 through JX662 and JZ828 through JZ841. Of these, forty-seven were provided to the Royal Australian Air Force. Fifty other PB2B-2s, like the one shown here, were acquired by the U. S. Navy and assigned BuNos. 44228 through 44277. (NMNA)

# PBN-1



*The Naval Aircraft Factory produced 156 PBN-1 Nomad flying boats. They were a slightly larger derivative of the Catalina and had several noticeable design differences. Only seventeen served with the U. S. Navy with the rest being supplied to the Soviet Union.* (NMNA)

In addition to ordering various aircraft from the aviation industry, the U. S. Navy had been engaged in designing and building some of its own aircraft as early as 1916. In 1917, the Naval Aircraft Factory was established in Philadelphia, Pennsylvania, to test and manufacture these aircraft. During World War I, and for several years thereafter, the Naval Aircraft Factory also produced designs that had originated from other aircraft companies. The first of these was the Curtiss H-16 flying boat. Among the designs that originated at the Naval Aircraft Factory were several seaplanes including large flying boats, and one of these was used by Consolidated to build the XPY-1 Admiral as discussed on page 9.

In 1941, the Navy ordered the Naval Aircraft Factory to set up a new production line for Consolidated's PBY flying boat, but the NAF revised the design and produced a slightly larger derivative that became known as the PBN-1 Nomad. Although the order was placed in July 1941, the first PBN-1 was not delivered until February 1943.

Engineers at the NAF made several notable changes to the PBY-5 then being built by Consolidated. They extended the bow and enclosed the bombardier's aiming window with clamshell doors instead of the single door used on all Catalina variants. The bow turret was replaced with a retractable enclosure that housed a .50-caliber machine gun. The aft fuselage was extended fifty-six inches, and the lower aft hull was also lengthened. As a result, the overall length of the PBN-1 was 64 feet, 8 inches. A small breaker step was added on the underside of the tail section, and the tunnel gun position was deleted. The outrigger floats were redesigned to be more streamlined, and this was particularly beneficial during takeoffs. The size of the wing remained un-

changed, but it was strengthened to carry more fuel. A total of 2,095 gallons could be carried internally, meaning the fuel load weighed well over six tons. But even with the extra fuel, the range of the heavier and larger PBN-1 was 2,590 miles, compared to 2,990 for a PBY-5. Finally, the entire tail section was redesigned. The vertical stabilizer and rudder were twenty-six inches taller than that used on the PBY-5, and the chord of the vertical tail was decreased. The elevators were enlarged and had overhanging counterbalances.

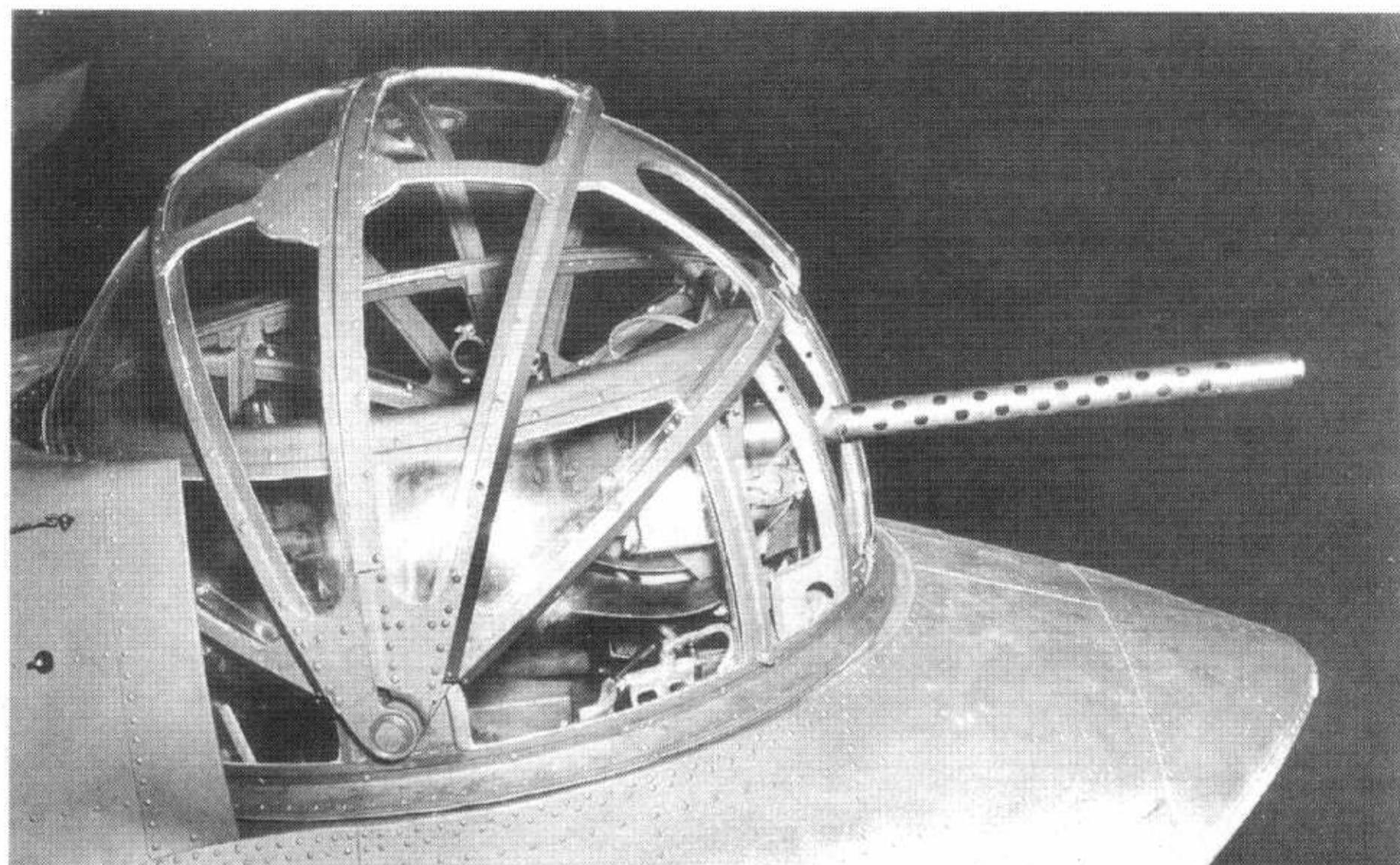
The PBN-1 was powered by R-1830-92 engines also used in the PBY-5A and PBY-6A. Top speed was 186 miles-per-hour, and the service ceiling was 15,100 feet. Gross weight was 38,000 pounds, which was two tons heavier than the PBY-5A or PBY-6A amphibians.

A total of 156 PBN-1 flying boats were built, and of these only seventeen went to the U. S. Navy. The remainder were delivered to the Soviet Union. The 156 PBN-1s were assigned Navy BuNos. 02791 through 02946.



*The extended hull and aft fuselage are visible in this underside view. Other differences found on the PBN-1 are also evident including the small beaker step beneath the tail, the longer outrigger floats, and the redesigned larger elevators with the counterbalances at the tips.* (NMNA)

# PBN-1 DETAIL DIFFERENCES



*Left: PBN-1s had an unusual bow turret that was different from any other used on Catalinas. It was power operated and mounted a single .50-caliber machine gun. Its visibility was not as good as the eyeball turret used on late Catalinas, but it was better than the standard turret installed in most PBYs.*

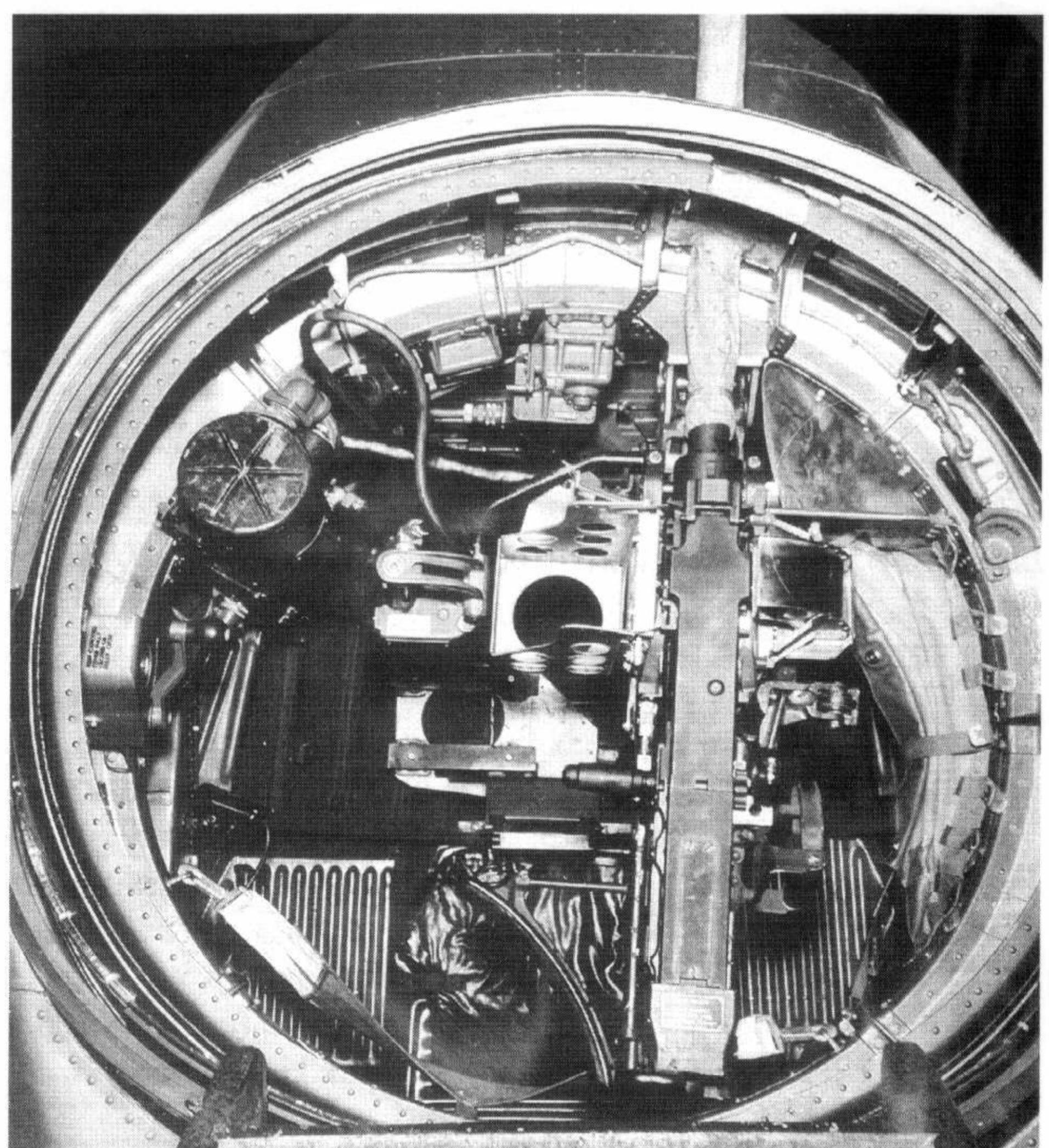
(National Archives)

*Below left: When not in use, the bow turret could be collapsed as seen here.*

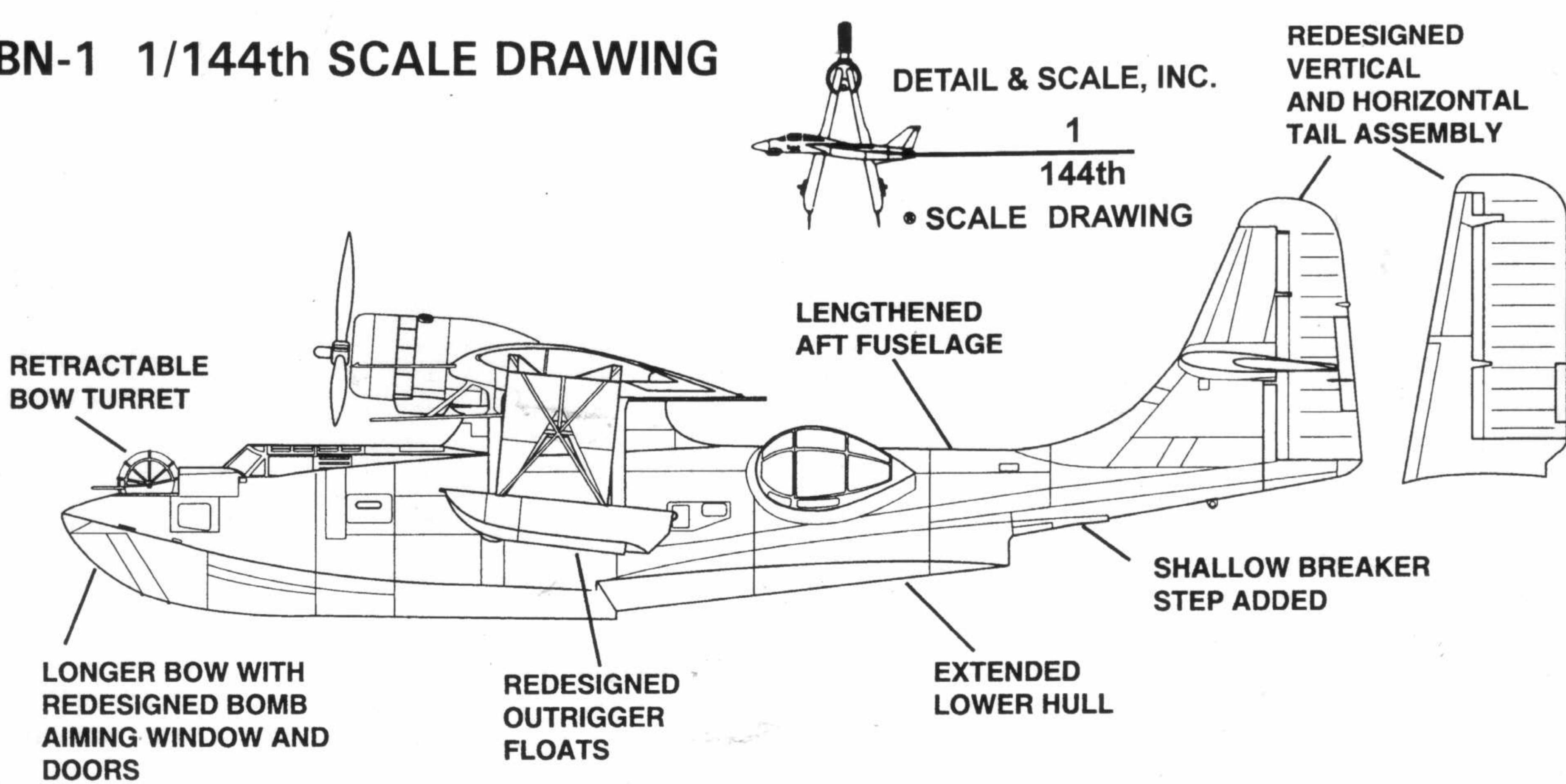
(National Archives)

*Below right: The top has been opened so that this photograph can reveal the details inside the bow turret on a PBN-1. Note that the gun is offset slightly to the right side.*

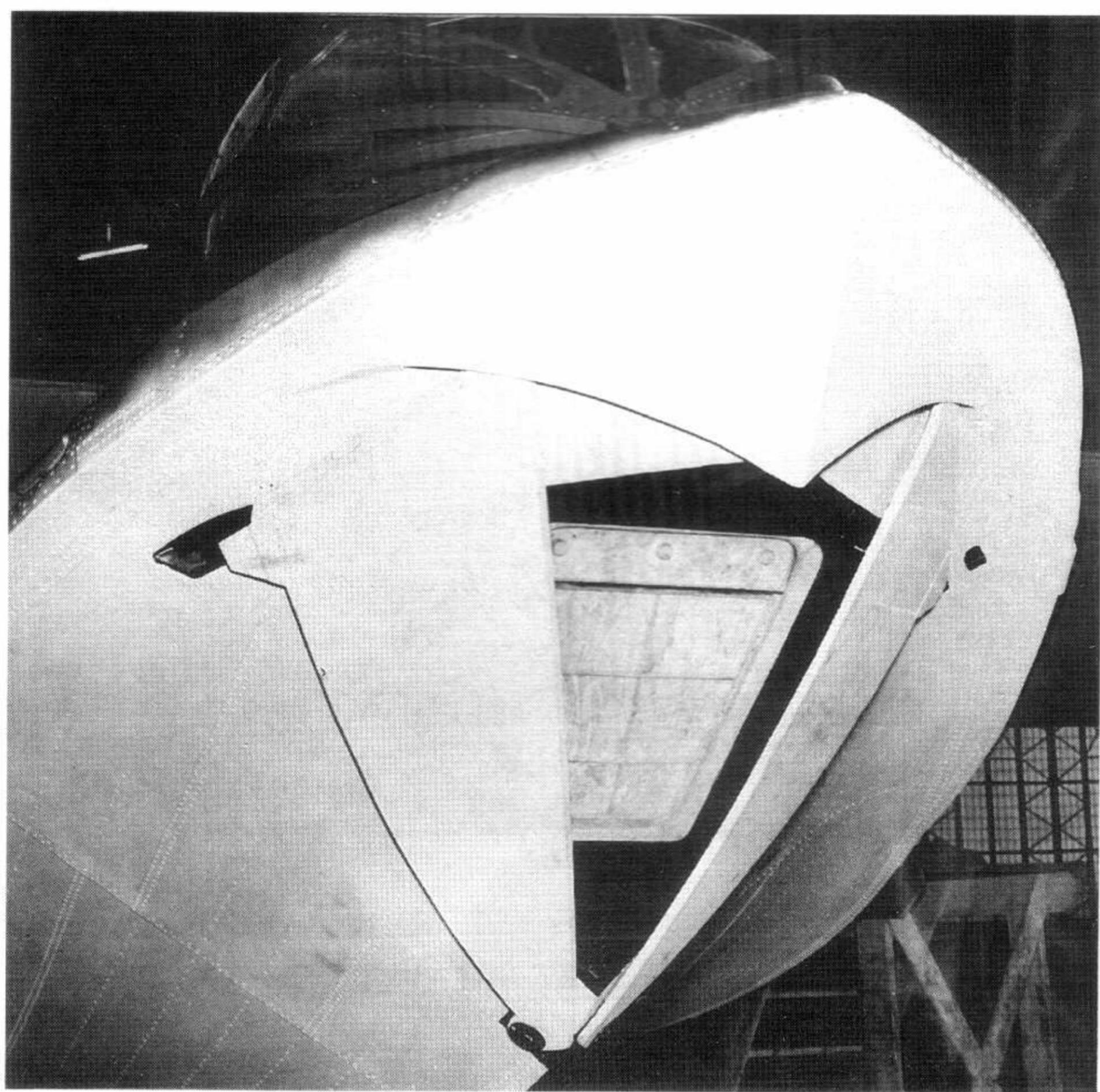
(National Archives)



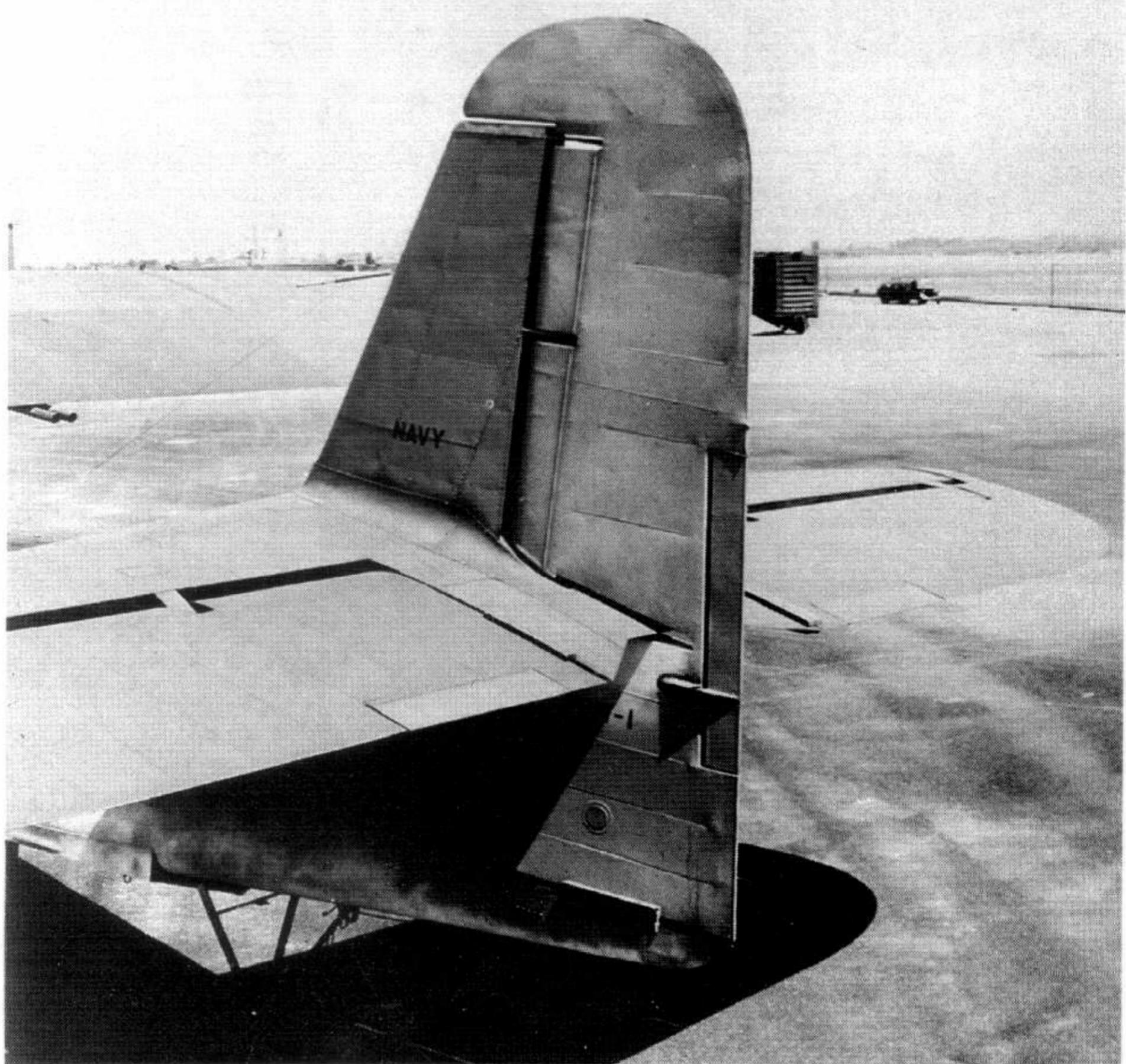
## PBN-1 1/144th SCALE DRAWING



DETAIL & SCALE, 1/144th SCALE, © COPYRIGHT DRAWING BY LLOYD S. JONES

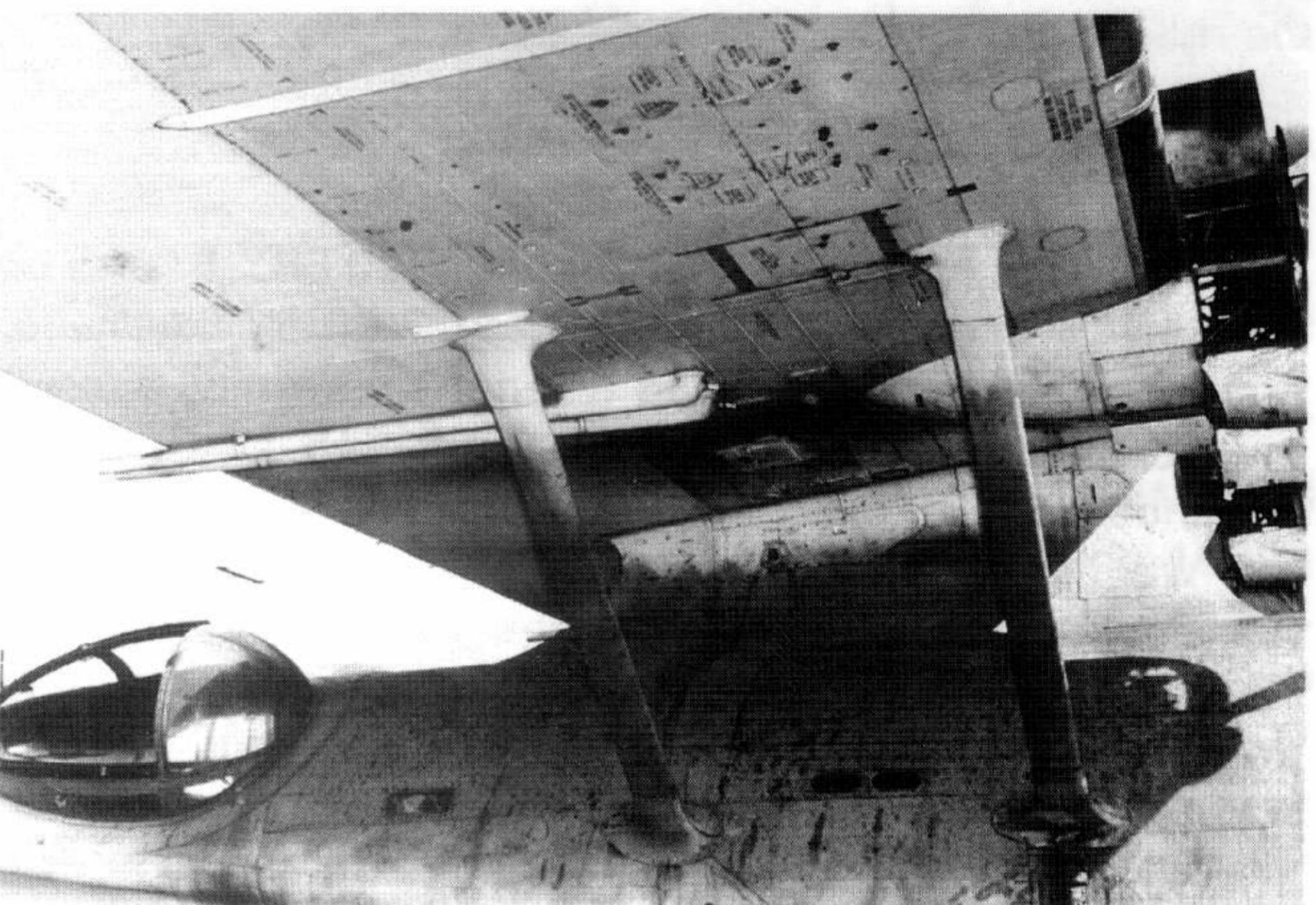


**Above left:** The elongated bow of the Nomad had clam-shell doors that covered the bomb aiming window. They were hinged at the bottom and opened at the top to permit sighting through the window. (National Archives)

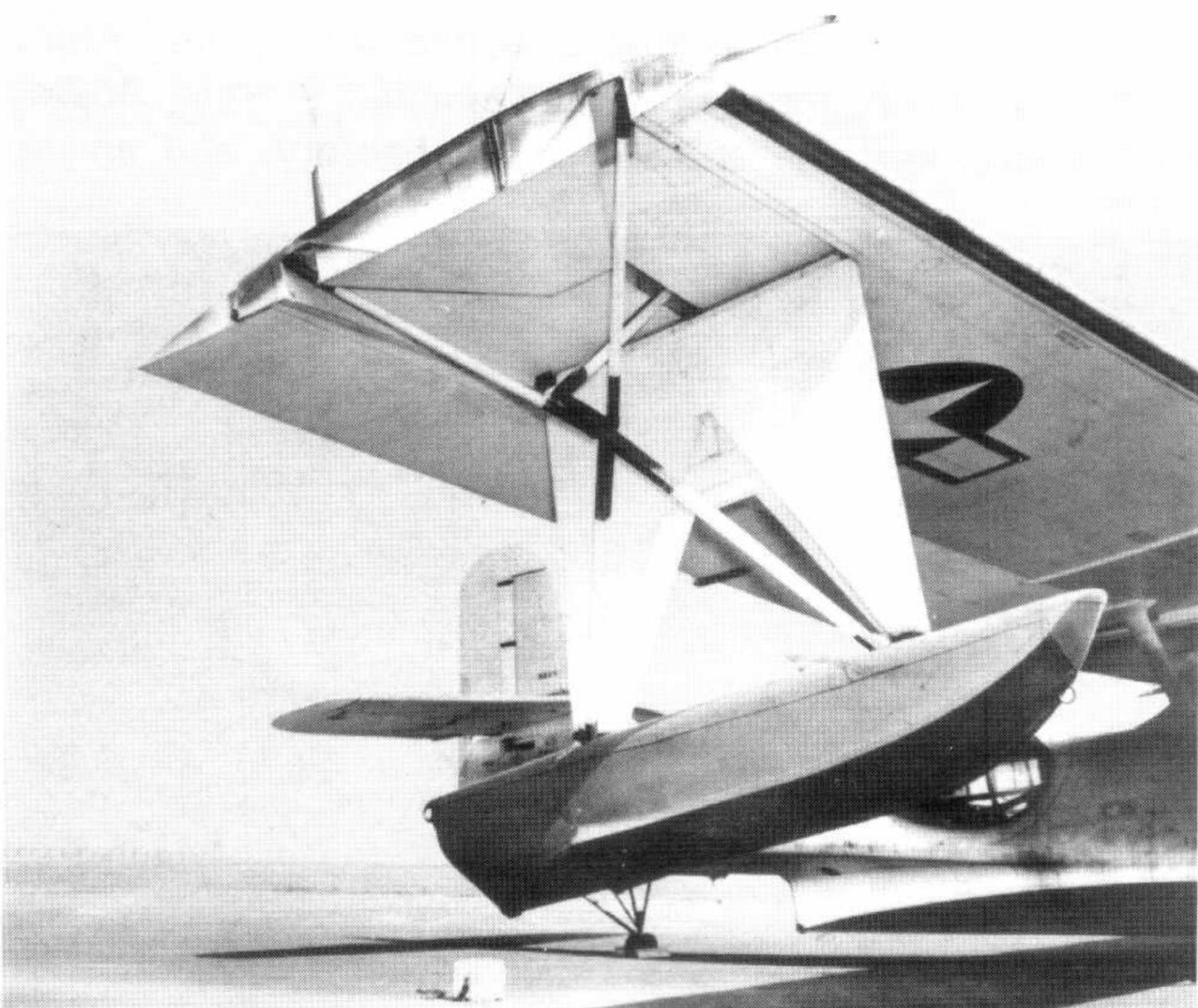


**Above right:** The PBN-1 had a vertical tail that was over two feet taller than those used on the PBY-5 and PBY-5A. It also had a decreased chord when compared to all Catalina variants except the PBY-6A. Note the different design of the fixed portion of the horizontal stabilizer where the cutout in the rudder moves over it.

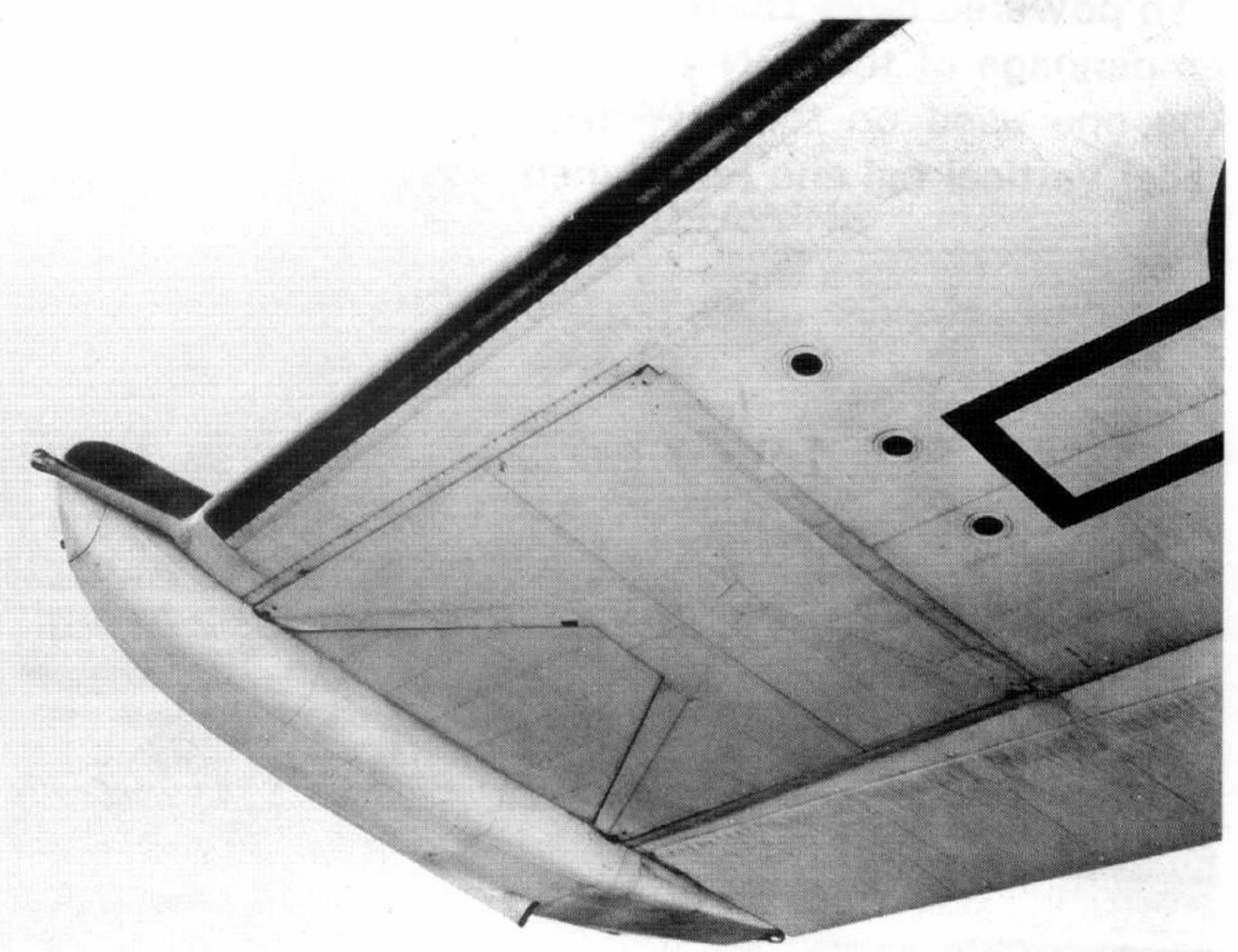
(National Archives)



**Right:** This close-up of the underside of the right wing reveals that the PBN-1 had two fuel dump tubes just inside each aft strut. (National Archives)

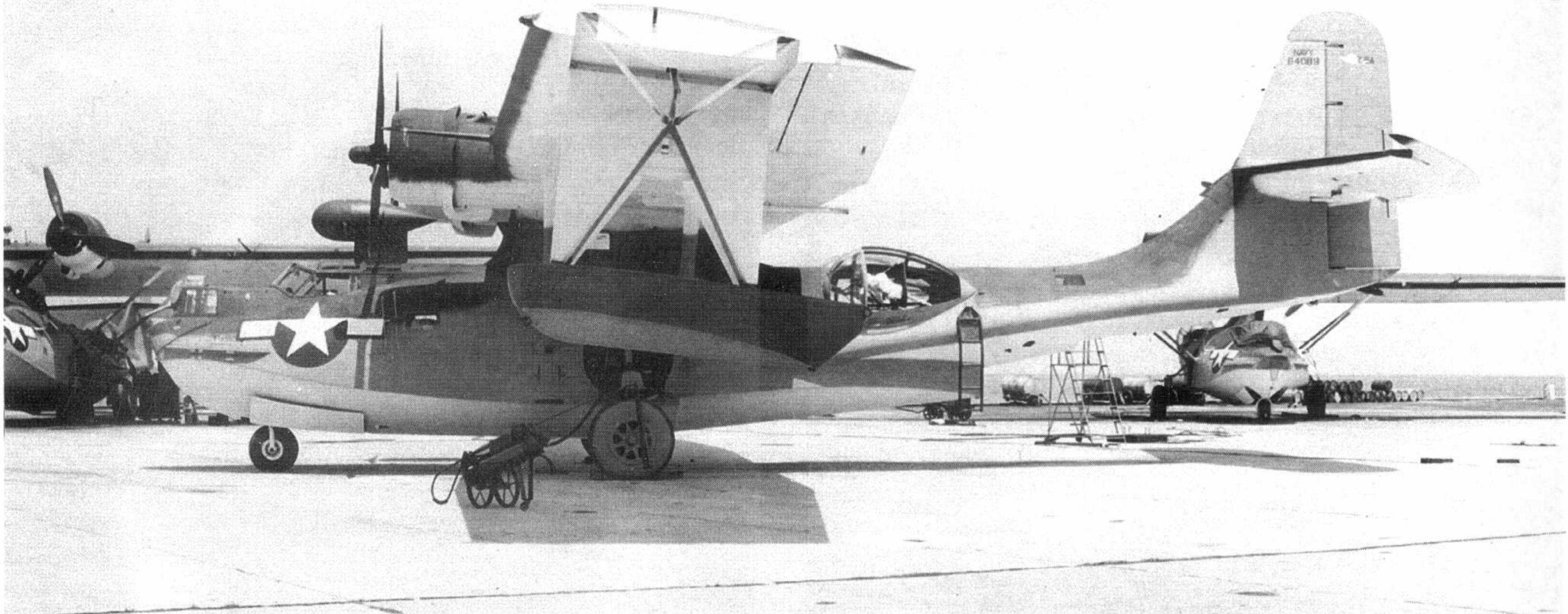


The outrigger floats on the Nomad were redesigned so that they were longer and more streamlined. The main strut, the retraction arm, and the braces remained the same as they had been on the standard Catalina variants. (National Archives)



The right outrigger float is shown here in the retracted position. Because the float was longer, the navigation light had to be mounted on a probe so that it could be seen when the float was retracted. Also note the three identification lights under the wing. (National Archives)

# PBY-6A



**The PBY-6A was the final variant of the Catalina. It was generally the same as late production PBY-5As, but it had the redesigned tail section used on the PBN-1 Nomad.**

(National Archives)

The U. S. Navy originally ordered 900 PBY-6As to be built at Consolidated's plant in New Orleans, Louisiana, but only 175 were completed when the remaining aircraft on the order were canceled in April 1945 as Germany surrendered. Of the 175 that were delivered, seventy-five went to the U. S. Army Air Forces as OA-10Bs and the Soviet Union received forty-eight. The remaining PBY-6As all served with the U. S. Navy. None were provided to Canada or the British, and no similar version was produced by any company other than Consolidated.

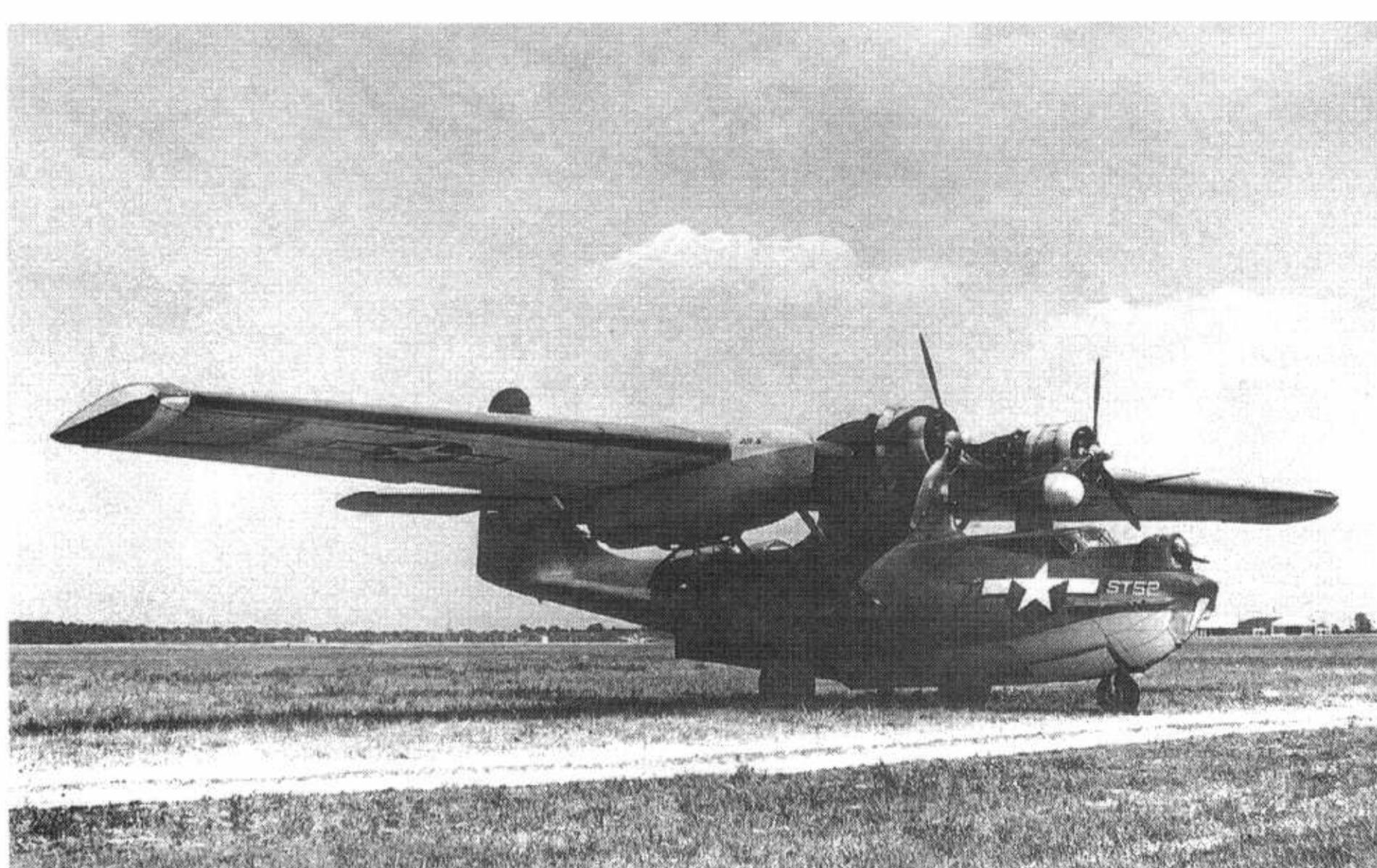
The PBY-6A was an amphibian with the same retractable landing gear as used on the PBY-5A, and it was also powered by R-1830-92 engines. But the redesigned empennage of the PBN-1 Nomad had proven superior to the one used on the PBY-5A, so the PBY-6A had the taller vertical tail and redesigned elevators and horizontal

stabilizers as the PBN-1. Top speed of the PBY-6A was 185 miles-per-hour, and the service ceiling was 19,000 feet. Gross weight was 34,000 pounds which was essentially the same as for the PBY-5A.

The eyeball bow turret, the radome for the search radar above the cockpit, and the side blister mounts for the tunnel gun had all first appeared on late production PBY-5As. These three features became standard on the PBY-6A.

The first flight by a PBY-6A was made in January 1945, and by the time they were entering operational service in numbers, the war ended. As a result, this final version of the Catalina flew most of its missions in the post-war years with the Navy, U. S. Army Air Forces, and later, the U. S. Air Force. For the most part, these aircraft performed search and rescue duties or were used in utility roles.

When the last PBY-6A rolled off the assembly line in New Orleans, Consolidated had produced 2,398 PBYs of all types over a period that spanned ten years. Along with almost 900 more built by Canadian Vickers, Boeing of Canada, and the Naval Aircraft Factory, and an un-



**Some Navy PBY-6As were used for search and rescue duties in the post-war years. Note the life boat under the right wing of this Catalina. In spite of its peaceful role, this aircraft retains its armament and carries no distinctive rescue markings.**

(National Archives)



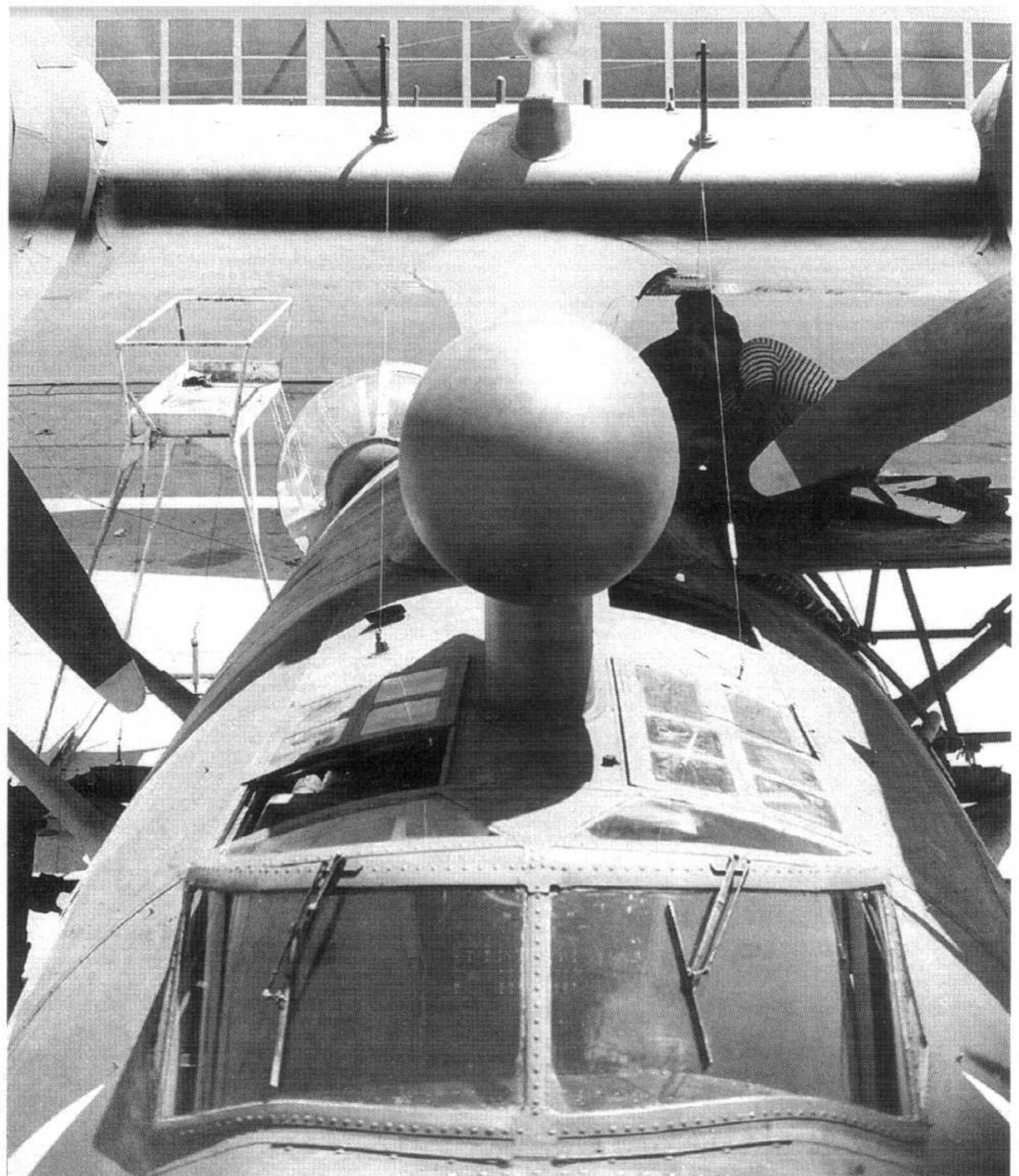
**This PBY-6A was used after the war for search and rescue duties out of NAS Pensacola, Florida. It is painted in the overall Sea Blue scheme with high visibility yellow markings on the wings and aft fuselage.**

(National Archives)



*Above left: An overall Sea Blue PBY-6A makes a rocket assisted takeoff from the naval base at Guantanamo, Cuba.*  
*(National Archives)*

*Above right: The large radome above the cockpit was a standard feature on PBY-6As. It had first appeared on late production PBY-5As, and it was also on some PBY-5s.*

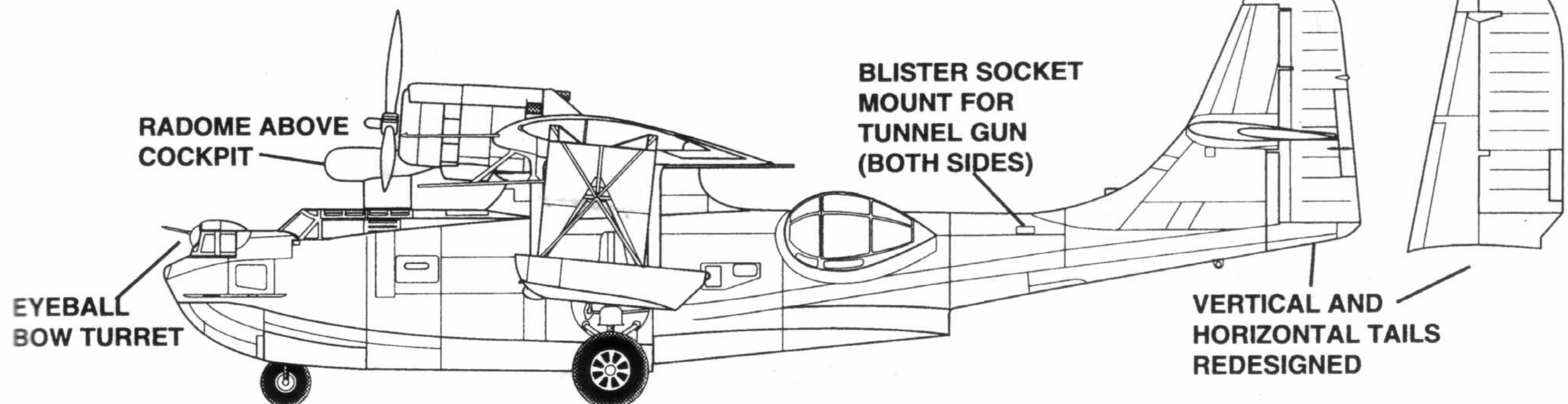
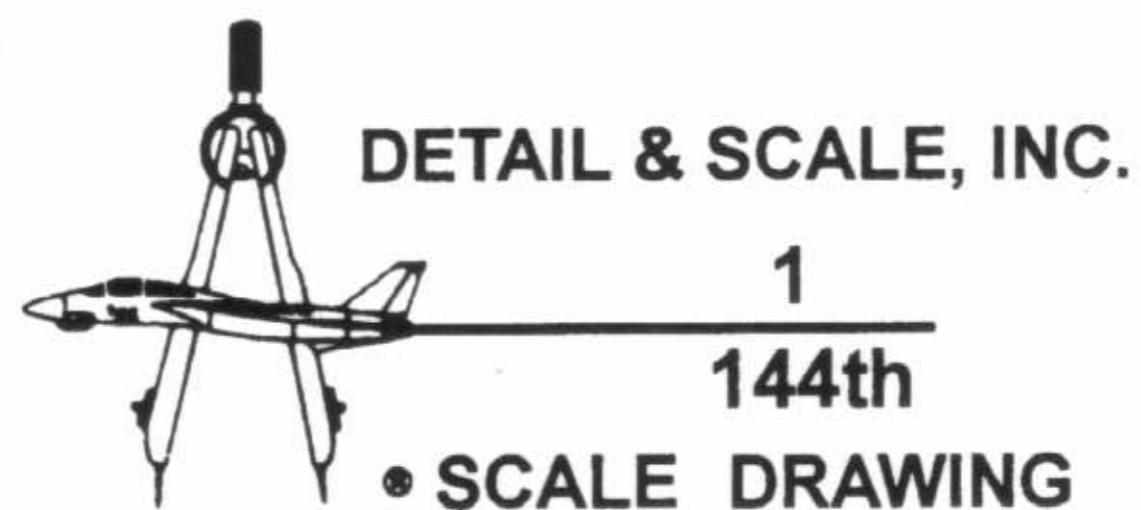


known number built in the Soviet Union under the GST designation, the last PBY-6A marked the end of the largest production run of any flying boat or amphibian ever designed. Since military services no longer operate flying boats or amphibians, it is certain that this record will always belong to Consolidated's PBY series of aircraft.

The 175 PBY-6A were assigned Navy Bureau Numbers as follows:

NUMBER	BUREAU NUMBERS
60	46639 through 46698
1	46724
107	63993 through 64099
<u>7</u>	64101 through 64107
<b>175</b>	

## PBY-6A 1/144th SCALE DRAWING



**NOTE: THE EYEBALL TURRET, THE RADOME ABOVE COCKPIT, AND THE BLISTER SOCKETS FOR THE TUNNEL GUN FIRST APPEARED ON LATE PRODUCTION PBY-5As.**

# USAAF OA-10



*The U. S. Army Air Forces operated 335 OA-10s and OA-10As for search and rescue duties. These were comparable to the Navy's PBY-5A. During World War II, they were usually painted in the Navy's standard Blue Gray over Light Gray scheme. Seventy-five OA-10Bs, which were the same as the PBY-6A, were also acquired by the Army.*  
*(USAM)*

During World War II, most of the air war in the Pacific was spent flying over vast expanses of water. In many cases, aircraft damaged over land limped out to sea before the pilot and crewmen parachuted into the water. At other times, a successful ditching was made, and

crew members got safely out of the aircraft before it sank. As a result, it was quite common to have men floating in rafts on the sea where they were relatively safe from direct enemy action. The Navy used surface ships, submarines, small observation seaplanes, as well as flying boats and amphibians to rescue its downed fliers throughout the Pacific. But the U. S. Army Air Forces also needed a way to retrieve airmen from the sea, and the Catalina seemed to be the logical answer.

To perform this mission, forty-nine PBY-5As were initially acquired by the USAAF and redesignated OA-10-COs, although the name Catalina was retained. These were followed by fifty-six additional PBY-5As which were designated OA-10A-COs by the Army. Canadian Vickers



*This OA-10A was assigned to the 2<sup>nd</sup> Emergency Rescue Squadron which was part of the 13<sup>th</sup> Air Force. A Catalina, now on display at the United States Air Force Museum at Dayton, Ohio, is painted to represent an OA-10A from this squadron. A color profile of the aircraft appears on page 34.*  
*(USAFM)*



*This close-up shows the SNAFU SNATCHERS nose art painted on the OA-10A seen at left. SNAFU stood for "Situation Normal, All Fouled Up," although another word was usually used for the F. Rafts with numbers were painted on the opposite side of the fuselage to indicate the crewmen rescued by the aircraft.*  
*(USAFM)*



**An OA-10A in colorful post-war markings makes a rocket assisted takeoff as it departs on a mission. (USAFM)**

then built an additional 230 OA-10A-VIs that had originally been designated PBV-1As by the Navy. During 1945, seventy-five OA-10B-CNs were delivered to the USAAF, and these were PBY-6As that came from the Navy's contract to Consolidated.

OA-10s were usually assigned to Emergency Rescue Squadrons in the Pacific, and they covered the routes flown by Army aircraft as they attacked the Japanese. Even when the B-29s flew all the way to Japan, OA-10As were on station along the route where they monitored assigned emergency rescue frequencies used by the bombers and their escorting fighters. When an aircraft ditched due to battle damage or from running short of fuel, the nearest Catalina would head directly for the spot the aircraft went down. Literally hundreds of pilots, co-pilots, navigators, bombardiers, and gunners were saved from the sea by the Army's Catalinas. Their presence also had a positive effect on the morale of crews aboard every aircraft that took off on long flights over the water, because these men knew that any ditching at sea would

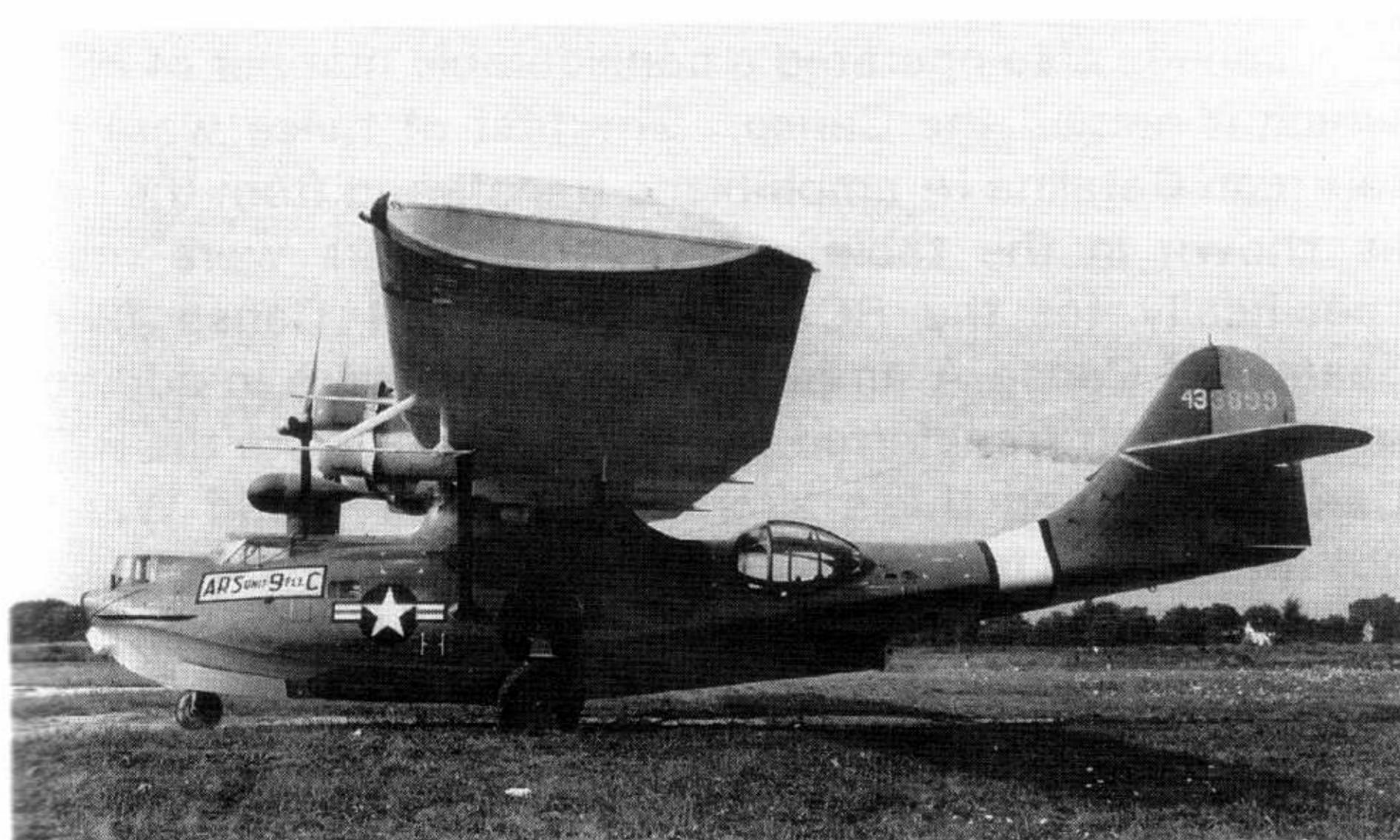
most likely result in a rescue by the OA-10As.

In the post-war years, The USAAF retained OA-10As and OA-10Bs in service for air-sea rescue work. Some of these were still in service when the United States Air Force was formed in 1947, and they flew in USAF markings until the early 1950s.

USAAF designations, numbers built, and serial numbers were as follows:

TYPE	NUMBER	USAAF SERIAL NUMBERS
OA-10-CO	6	42-109020 through 42-109025
OA-10-CO	12	43-3259 through 43-3270
OA-10-CO	25	43-43839 through 43-43863
OA-10-CO	6	43-47956 through 43-47961
OA-10A-CO	56	Various, non-sequential
OA-10A-VI	230	44-33868 through 44-34097
OA-10B-CN	75	45-57833 through 45-57907
	410	

Notes: CO was the USAAF designator for Consolidated's plant in San Diego, while CN indicated Consolidated's New Orleans plant. VI designated aircraft built by Canadian Vickers.

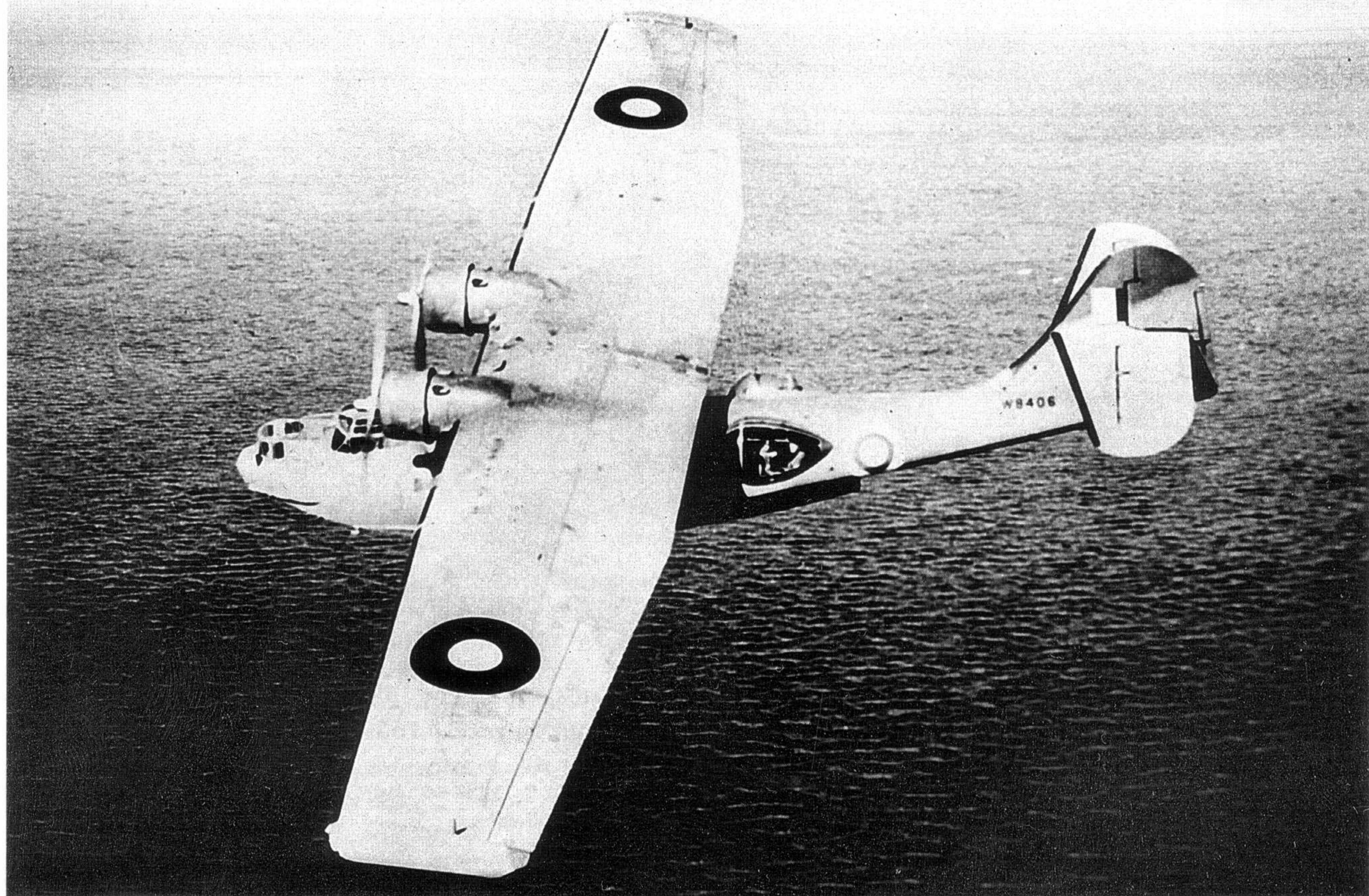


**This OA-10A was assigned to the Air Rescue Service, Unit 9, Flight C. Most post-war Catalinas used by both the Navy and Air Force had the radome above the cockpit. (USAFM)**



**An overall white OA-10B retains its eyeball turret, but the armament has been removed. Yellow bands with black outlines are painted around the wings and aft fuselage. (USAFM)**

# FOREIGN CATALINAS



**This Catalina I, RAF Serial Number W8406, was one of the thirty aircraft originally included in the French order that was later taken over by the British after France fell to the Germans.**

(NMNA)

The first foreign contract for PBYs came from the French who ordered thirty flying boats comparable to the U. S. Navy's PBY-5, but France fell to the Germans before these aircraft could be delivered. The British then took over the French order and named the aircraft Catalina Is. Additional orders for the RAF followed, and

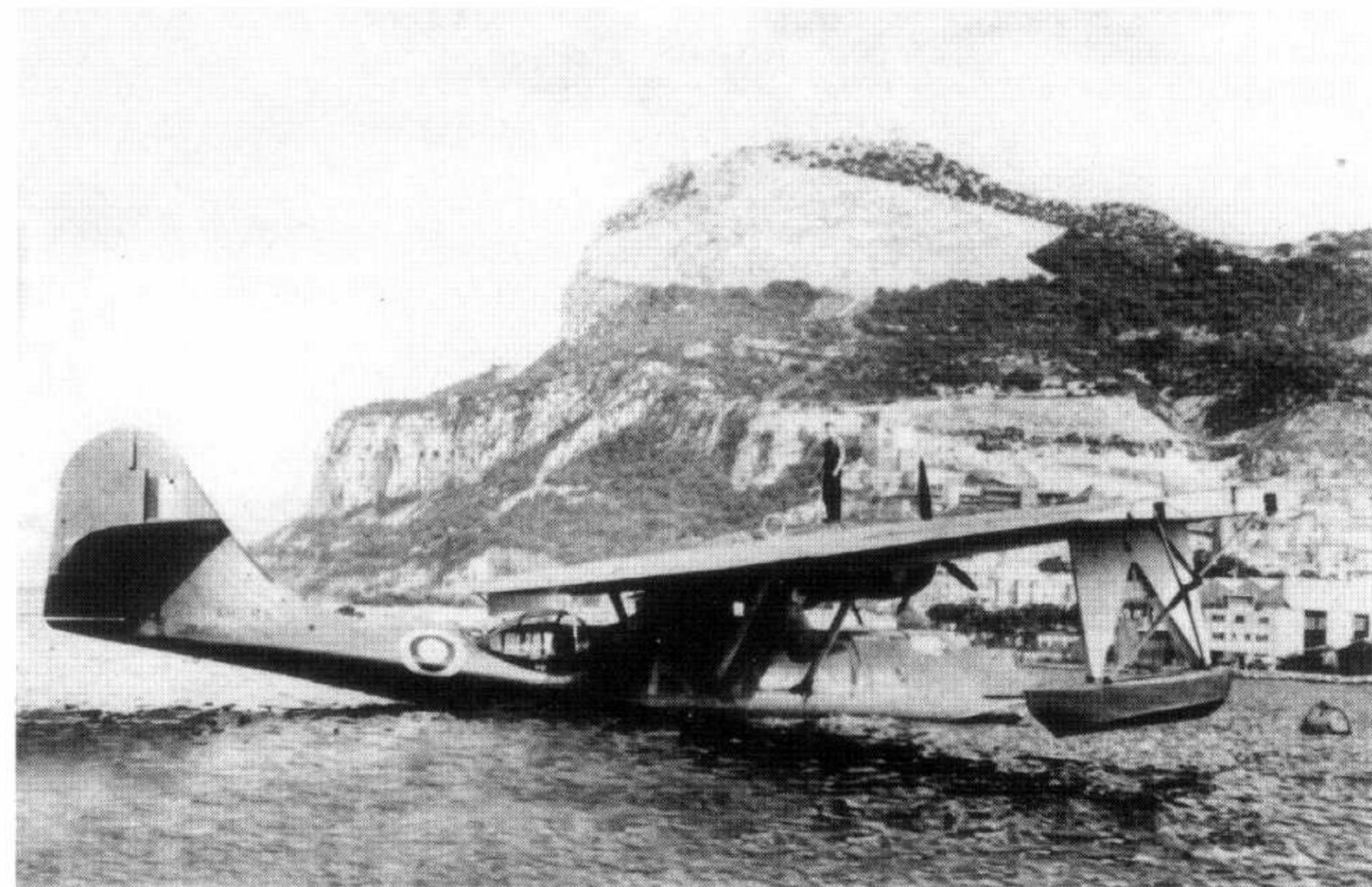
aside from the United States, the British became the largest user of Catalinas. But of all the versions operated by the RAF, only twelve Catalina IIIAs were amphibians, and these were only used for ferry service in the North Atlantic. All of the other Catalinas in British service were flying boats. The table at the bottom of the next page summarizes the Catalinas that were delivered to the British.

British Catalinas were usually armed with Vickers machine guns in the bow, waist, and tunnel positions. Normally twin mounts were used in each waist position, but the caliber of all the guns was standard at .303-caliber.

Canada also operated a considerable number of PBYs which it named the Canso. The first of these were the fourteen Catalina IA amphibians transferred from the RAF as shown in the table. Additional orders were made specifically for the RCAF including 244 Canso flying boats and Canso A amphibians. These were in addition to the aircraft transferred to the Canadians from the RAF. Canada retained these aircraft long after World War II, not retiring the last of them until April 8, 1962.

The Royal Australian Air Force and the Royal New Zealand Air Force also operated Catalinas in the Pacific during World War II, however, both nations quickly retired the type after the war ended.

In the post-war years, many nations received surplus Catalinas which were used for patrol as well as search and rescue duties. Among these were Argentina, Brazil, Chile, Denmark, Dominica, Ecuador, Indonesia, Israel, Mexico, Norway, The Netherlands, and Peru.



**A Catalina I is moored near the Rock of Gibraltar as it awaits its next mission over the Mediterranean Sea.**

(NMNA)



*This amphibian has the serial number 9750 painted on its tail, and this indicates that it was the last of fourteen Catalina IAs transferred from the RAF to the Royal Canadian Air Force and given the name Canso A. This photograph also provides evidence that these aircraft were amphibians rather than flying boats.*

(NMNA)



*This Canso A was photographed at NAS Squantum on July 25, 1942. Like their American counterparts, these aircraft were often fitted with Yagi antenna arrays under the wings and on the sides of the forward fuselage. Also note the DEK codes. These aircraft were usually painted in an olive green and gray camouflage scheme. (NMNA)*

## BRITISH CATALINAS

BRITISH NAME	U. S. NAVY DESIGNATION OR EQUIVALENT	REMARKS
Catalina I	PBY-5	Initial 30 from French order assigned RAF Serials W8405 through W8434 18 to Australia, A24-1 through A24-18 RAF Orders: Z2134 through Z2153 (20) AH530 through AH569 (40) AJ154 through AJ162 (9)
Catalina IA	PBY-5A	All 14 to Canada as Canso A with RCAF Serials 9737 through 9750
Catalina IB	PBY-5B	Comparable to PBY-5 flying boat RAF Serials FP100 through FP324 (225)
Catalina II	PBY-5	RAF Serials AM264 through AM270 (7)
Catalina IIA	PBV-1	As PBY-5, built by Canadian Vickers RAF Serials VA701 through VA736 (36)
Catalina IIIA	PBY-5A	Twelve aircraft, only amphibians to British RAF Serials FP525 through FP536 (12)
Catalina IVA	PBY-5	RAF Serials JX200 through JX269 (70) JX570 through JX585 (16) JV925 through JV935 (11)
Catalina IVB	PB2B-1	As PBY-5, built by Boeing of Canada RAF Serials JX270 through JX437 (168) JX586 through JX610 (25) 41 of these to Royal New Zealand Air Force
Catalina V	PBN-1	None built
Catalina VI	PB2B-2	As PBY-5 but with tail of PBN-1, built by Boeing of Canada RAF Serials JX618 through JX662 (45) JZ828 through JZ841 (14) 47 of these to Royal Australian Air Force Fifty other PB2B-2s to U. S. Navy

# MODELERS SUMMARY

Note: Each volume in Detail & Scale's "In Detail" Series of publications has a Modelers Summary in the back of the book. The Modelers Summary discusses the injection molded plastic model kits of the aircraft covered by the book, and all common modeling scales from 1/144th through 1/32nd scale will be included. Highlights of the better kits in each scale will be discussed, and recommendations will be made with respect to which kit or kits in each scale are the best for the serious scale modeler to use. Once a kit has been purchased, the modeler should compare the various features of the kit to the drawings and photographs in the book to determine how accurately and extensively they are represented. He can then decide what, if any, correcting or detailing work he wants to do to enhance the appearance of the model.

## GENERAL COMMENTS

Plastic scale model kits of the PBY Catalina have been released in 1/144th, 1/72nd, and 1/48th scales, but no injection molded kit of this aircraft has been produced in 1/32nd scale. One odd scale kit has been released, and it was an old issue from Monogram that dates back to the 1950s. It represented a PBY-5A, and if one can be found now, it would be of value only to collectors.

### 1/144th SCALE KIT

The only 1/144th scale model of the Catalina that has been released is a PBY-5A from Minicraft, a company that has specialized in 1/144th scale kits of large aircraft. The model is nicely molded in light gray plastic, and it features engraved panel lines. The outline and shape of the parts are correct, and the fit is generally good, except that several modelers have reported that the wing struts are too short.

The model comes with several options including both the standard bow turret and the later eyeball design. For the standard turret, be sure to use part C 4 and not C 13, because the latter is too tapered. Both the landing gear and the outrigger floats can be assembled in the extended or retracted position, but if the landing gear is extended, be sure to assemble the nose gear doors correctly. They do not hinge at the outer edge like most nose gear doors on other aircraft. Instead they opened out and upward as illustrated on page 46.

Cockpit detailing leaves a bit to be desired. The seats are too large, and therefore they are too close together, leaving no room for the entry into the cockpit through the bulkhead. There are two separate control columns with yokes instead of the correct inverted U-shaped assembly that joins the two wheels together. Some scrap plastic will correct this problem, and the effort should be made to do this, since the yoke assembly will be visible through the large greenhouse enclosure. Only a basic machine gun and its mount are included to go inside each waist blister.

There are some missing smaller parts that should be added to the exterior of the model. These include the pitot probe and the landing lights in the leading edge of the wing. The long fuel dump tubes under each wing are



Paul Gold used the Minicraft 1/144th scale kit to build this model of a PBY-5A in early war markings. (Gold)

also missing, but all of these can easily be added by the average modeler. There are also no Yagi antennas to go under the wings, but these were not on all aircraft.

The engines are separate pieces and are nicely molded for this small scale. The carburetor intake scoops at the top of the cowl rings are represented, but they are a bit oversized. Decals are provided for an early war Navy PBY-5A and a very colorful postwar USAF OA-10A.

Overall, this is a very good 1/144th scale model, and with a little detailing inside the cockpit and waist gun positions, and the addition of a pitot probe, landing lights, and fuel dump vents, it can be used to build an excellent model of a PBY-5A or OA-10A.

### 1/72nd SCALE KITS

Early 1/72nd plastic scale models of the Catalina were issued by Airfix and Revell. The Airfix kit, which represented a PBY-5A, is still available in England. It has toy-like working features like waist blisters that open and control surfaces that move. Revell released its 1/72nd scale Catalinas several times as PBY-5s and PBY-5As, and there was also a special issue of Jacques Cousteau's civil PBY-6A. Each of these were covered with rivets, and they lacked detailing. Today, neither the Airfix nor Revell kits should be considered by the serious scale modeler. They have value only for kit collectors.

Clearly the best 1/72nd scale models of the Catalina were originally released by Academy-Minicraft, but they are now available under the Academy label after the two companies ceased working together several years ago. Issues include the PBY-2, PBY-4, PBY-5, and PBY-5A. Although they are significantly better than the Airfix or Revell 1/72nd scale Catalinas, they still have a number of problems with respect to accuracy and detailing.

None of the four kits has very much in the way of interior detailing, and what is provided is often inaccurate. There are no details for the interior of the bow turret, and very little is included for the cockpit. The control yoke assembly is simply a straight piece that extends from one fuselage side to the other rather than being the inverted U-shaped design it should be. The floor and aft bulkhead for the cockpit are incorrect and lack even the basic details. The large levers for the engine and propeller controls are not represented. The seats are very basic and lack any detailing.

The interior detailing for the waist gun positions is

the same in all four kits, and this is not as it should be. They all have the C-shaped areas for the gunners to stand on, and these did not appear until the PBY-5. Variants up through the PBY-4 had a stair step arrangement instead. The gun shields are also provided for the earlier versions, but again, these did not come into use until the PBY-5. Each waist gun mounts on a horizontal shelf molded to the side of the fuselage. In the real aircraft, each gun was mounted on a vertical pedestal next to the window.

Although the waist gun compartment is very visible on all four models, large basic details like the chemical toilet are missing. When assembled, the center walkway in this area slopes upward toward the rear, and this is incorrect. The aft end needs to be repositioned so that the walkway is level.

In the PBY-2 and PBY-4 kits, the openings for the waist windows are not the correct shape, nor are the sliding panels that cover them. They should be rectangular, but Academy has represented them so that they are larger at the rear than at the front. This is very noticeable, and the shape must be corrected. In the PBY-5 and PBY-5A kits, the framework for the side blisters is inaccurate in that the lower windows are not represented. After studying the photographs in this book, the correct framework can be painted on the blisters. In the PBY-5A kit, the small inspection windows in the main wheel wells are missing.

Externally, the models are much better. The correct engines are provided for each variant including the proper carburetor intakes, propeller hubs, and oil cooler scoops. Likewise the tail sections are also accurate for the particular version being represented. The surface detailing consists of recessed lines, and the fabric areas are nicely honed to represent the real thing.

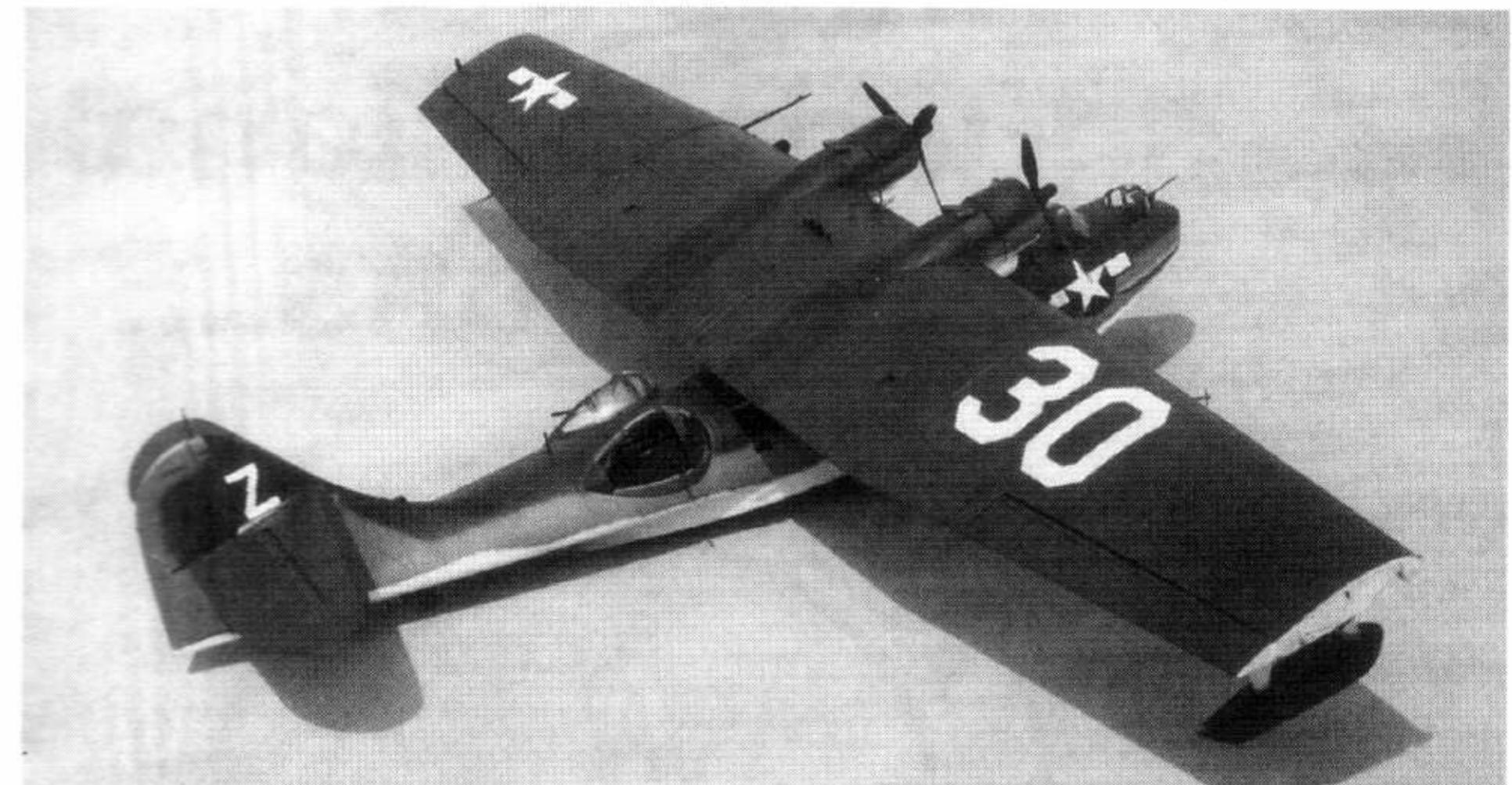
The wing has six major parts including upper and lower halves to the center, left outboard, and right outboard sections. We recommend gluing the top three parts to each other to form the wing top, using a flat surface to keep the parts properly aligned. Then glue the bottom three parts together, also using the flat surface to keep them straight. Finally, glue the assembled top and bottom halves together, but insert a brass tube to prevent the large wing from drooping at each end.

The PBY-5 and PBY-5A kits come with both the standard and eyeball bow turrets as well as Yagi antennas. The modeler needs to check and make sure which of these parts are appropriate for the aircraft he is representing. All four kits come with four 500-pound bombs, but unfortunately, this is the only ordnance represented.

Overall, these are nice models with excellent surface detailing. But many significant interior details are lacking, and what is provided is often noticeably inaccurate. By taking time to add interior details and making necessary corrections, any of these four kits can be used to build a very good model of the Catalina.

## 1/48th SCALE KITS

In the 1950s, Aurora issued a 1/48th scale kit of a PBY-5A, but like all kits from the early days of plastic modeling, it was very simplistic and lacked even the most basic detailing. Today, it has value only to collectors.



*The Monogram 1/48th scale PBY-5 was used by Bob Bartolacci to build this model of a Catalina based at NAS Jacksonville, Florida. The decals are from a sheet produced by AeroMaster.*

(Bartolacci)

Monogram has issued two 1/48th scale models of the Catalina, including a PBY-5 in their regular line and a PBY-5A in their ProModeler series of kits. Both kits are quite similar with the PBY-5A having a different fuselage and the appropriate landing gear.

The major problem with both kits is that the shape of the aft fuselage where it meets the base of the vertical tail is noticeably too wide. This is impossible to correct without rebuilding this part of the aircraft from scratch. Fortunately, Belcher Bits of Canada makes corrected tail sections for these kits in resin as well as conversion kits for the PBY-6A, and the PBY-2, -3, and -4. We strongly recommend using the Belcher Bits resin tail section when building either of these kits, because the incorrect shape of the aft fuselage and lower vertical tail is quite obvious.

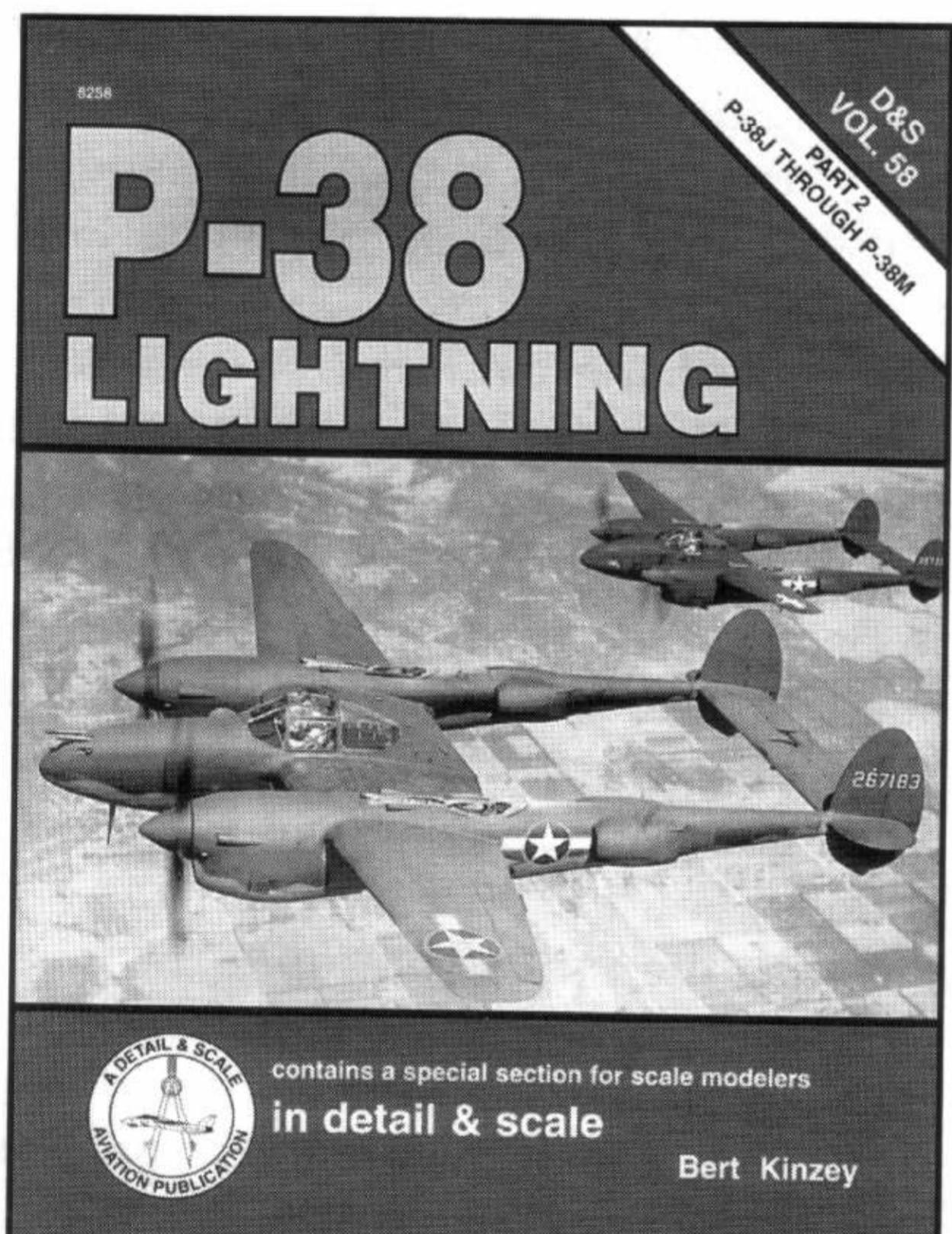
Both kits come with accurate detailing for the cockpit and waist gun positions, and the PBY-5A even has the different rudder pedals with the brakes on top. The control yoke assembly is well done and the engine and propeller controls hang down from the top of the greenhouse enclosure. The gun blisters can be assembled open or closed, and the interior of the compartment includes the large ammunition box at the center as well as the chemical toilet.

The ProModeler PBY-5A comes with figures for the pilot, co-pilot, and two waist gunners. It has the appropriate landing gear details, and even the small inspection window in each main gear well is provided. The PBY-5A kit also has both the standard and eyeball type bow turret as well as the radome that mounts above the cockpit. Both kits have Yagi antennas to go under the wings and an additional antenna array to go on each side of the forward fuselage if they are appropriate for the Catalina being modeled. Both also have the deicing cover for the outboard exhaust stub on each engine, and four depth bombs are provided in each kit as external stores.

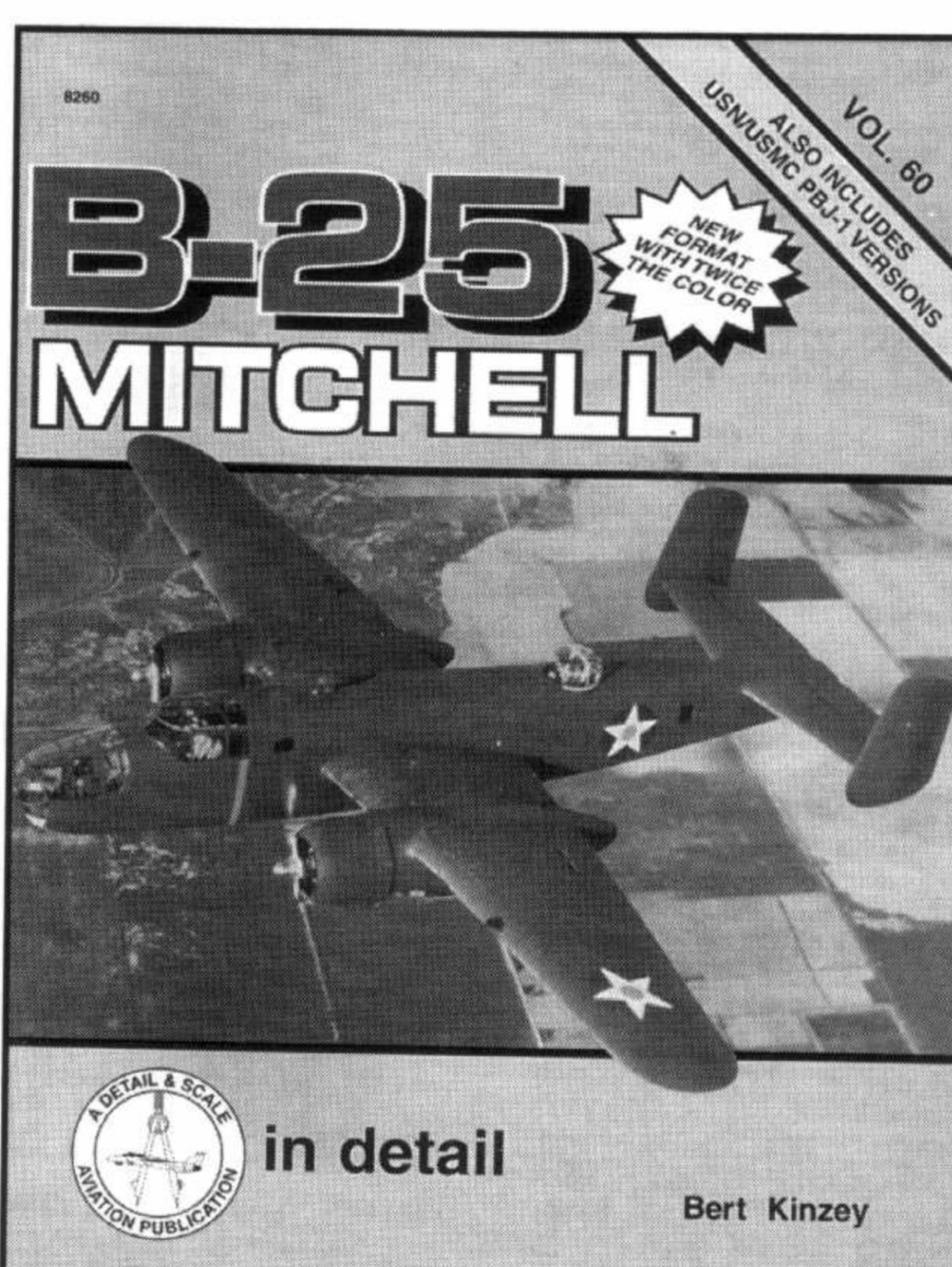
The wing is very large, and it is essential that a strip of brass or a brass tubing be inserted to keep it rigid after assembly. Otherwise, it is almost certain to sag over a period of time.

These 1/48th scale Catalina kits build up into large impressive models that lend themselves nicely to additional detailing. If the error in the shape of the aft fuselage and vertical tail is corrected, a truly outstanding model of the PBY-5 or PBY-5A can be built.

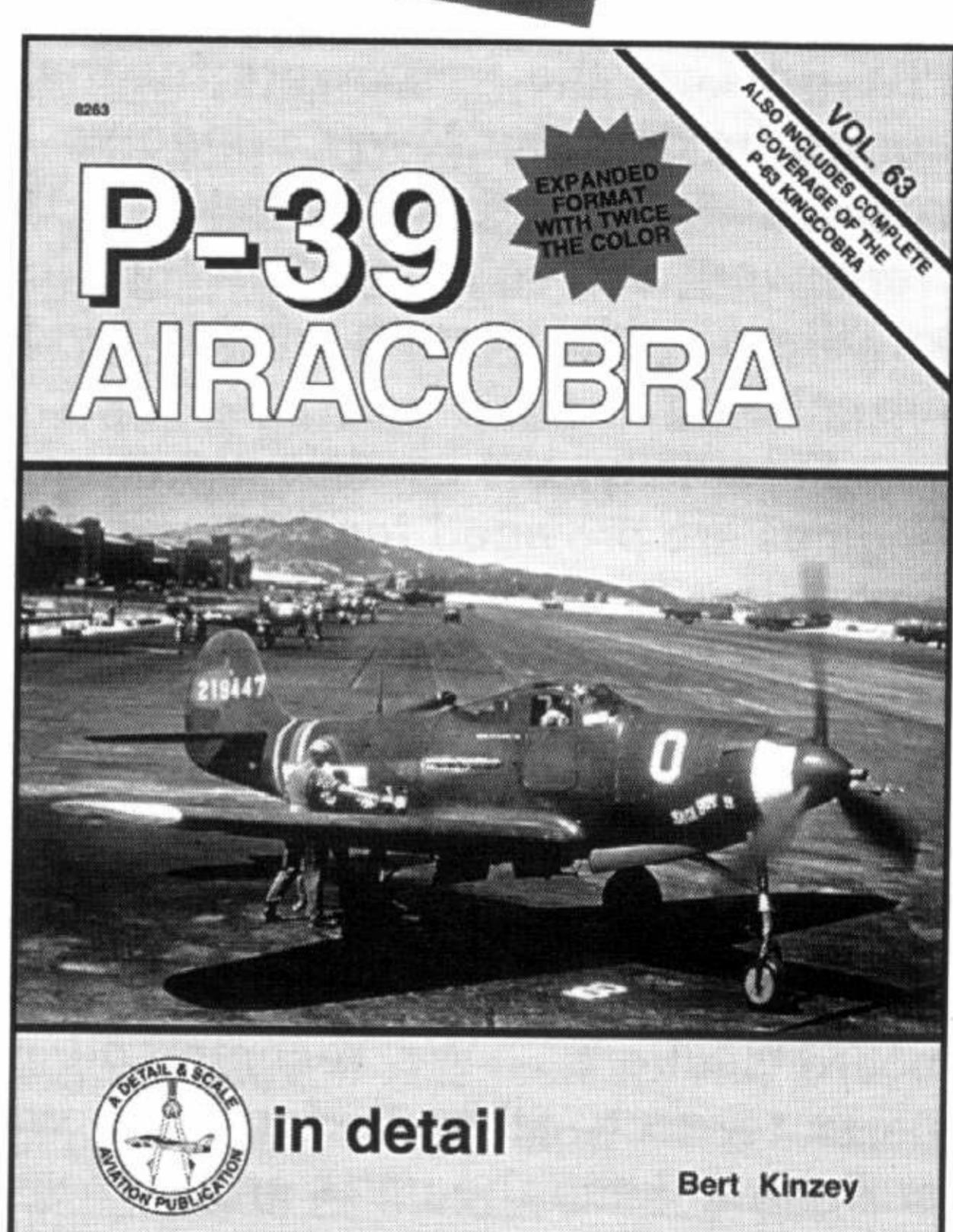
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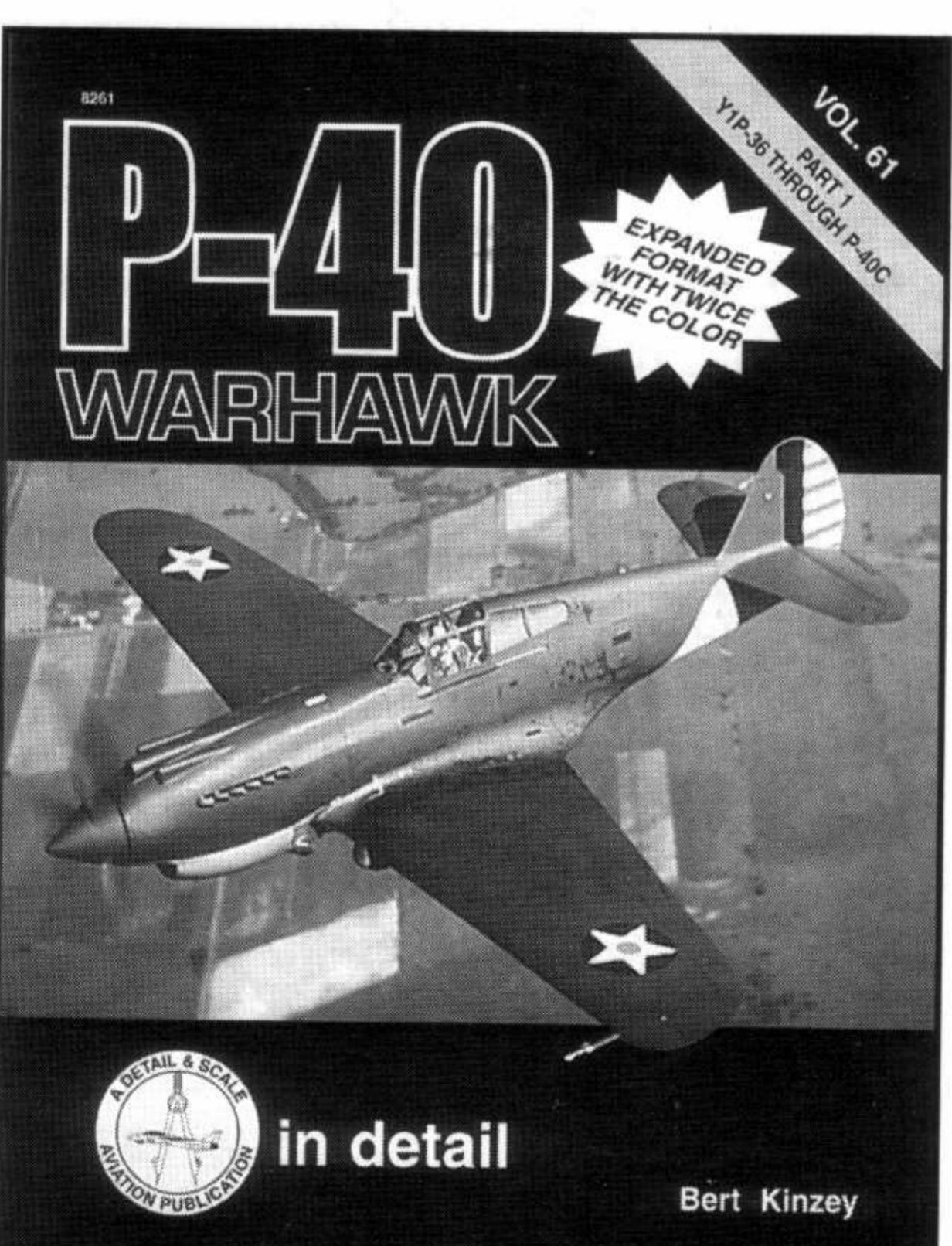
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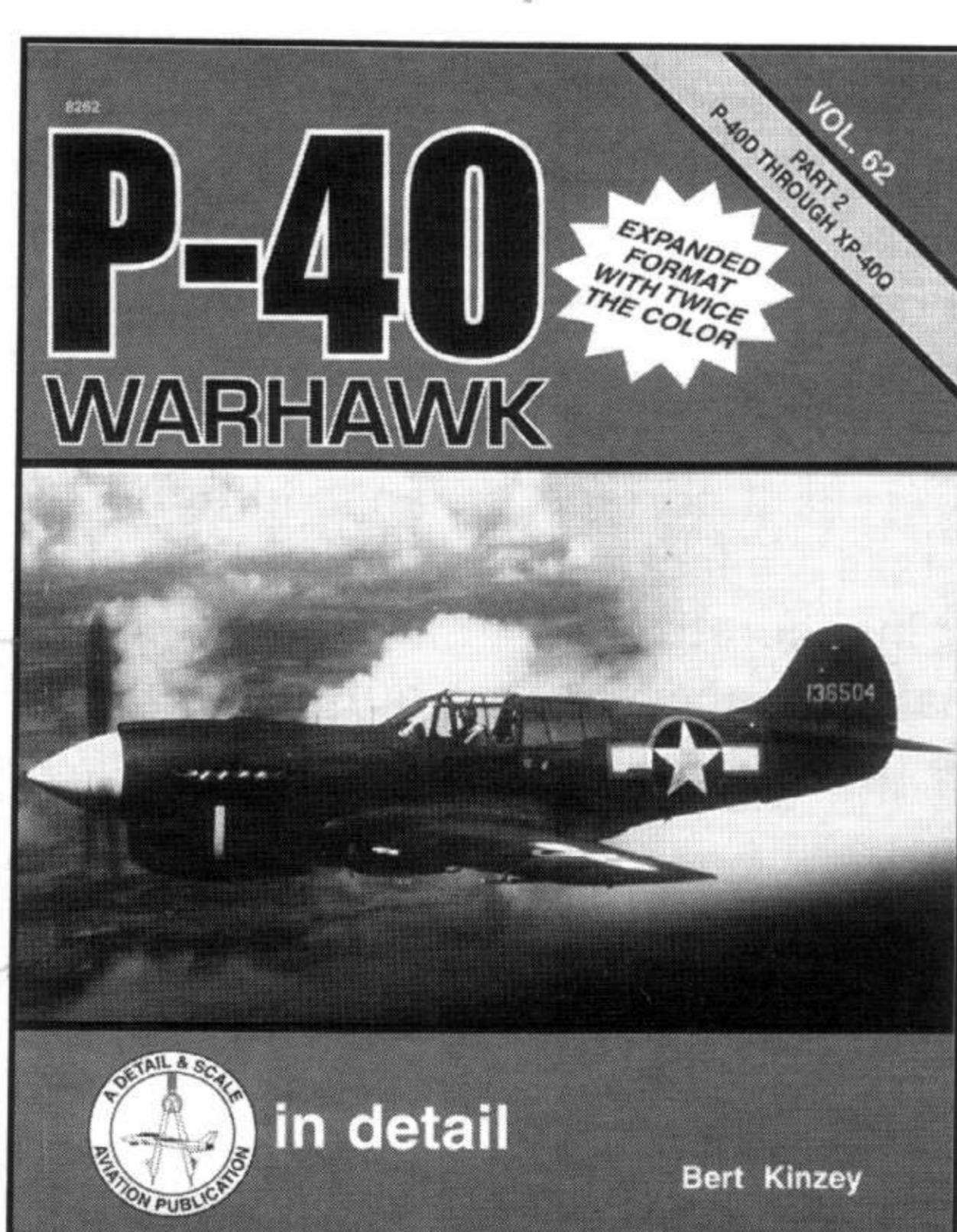
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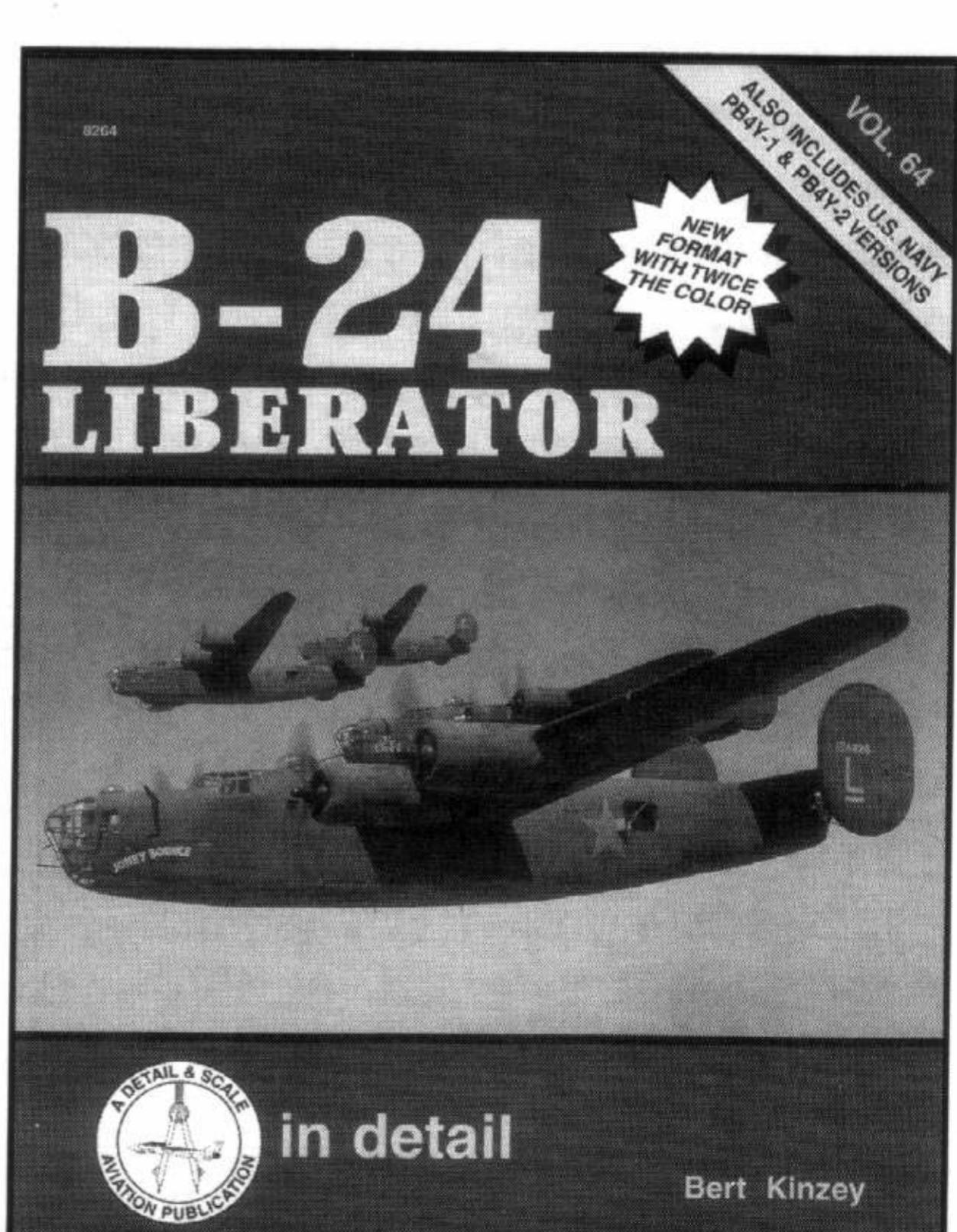
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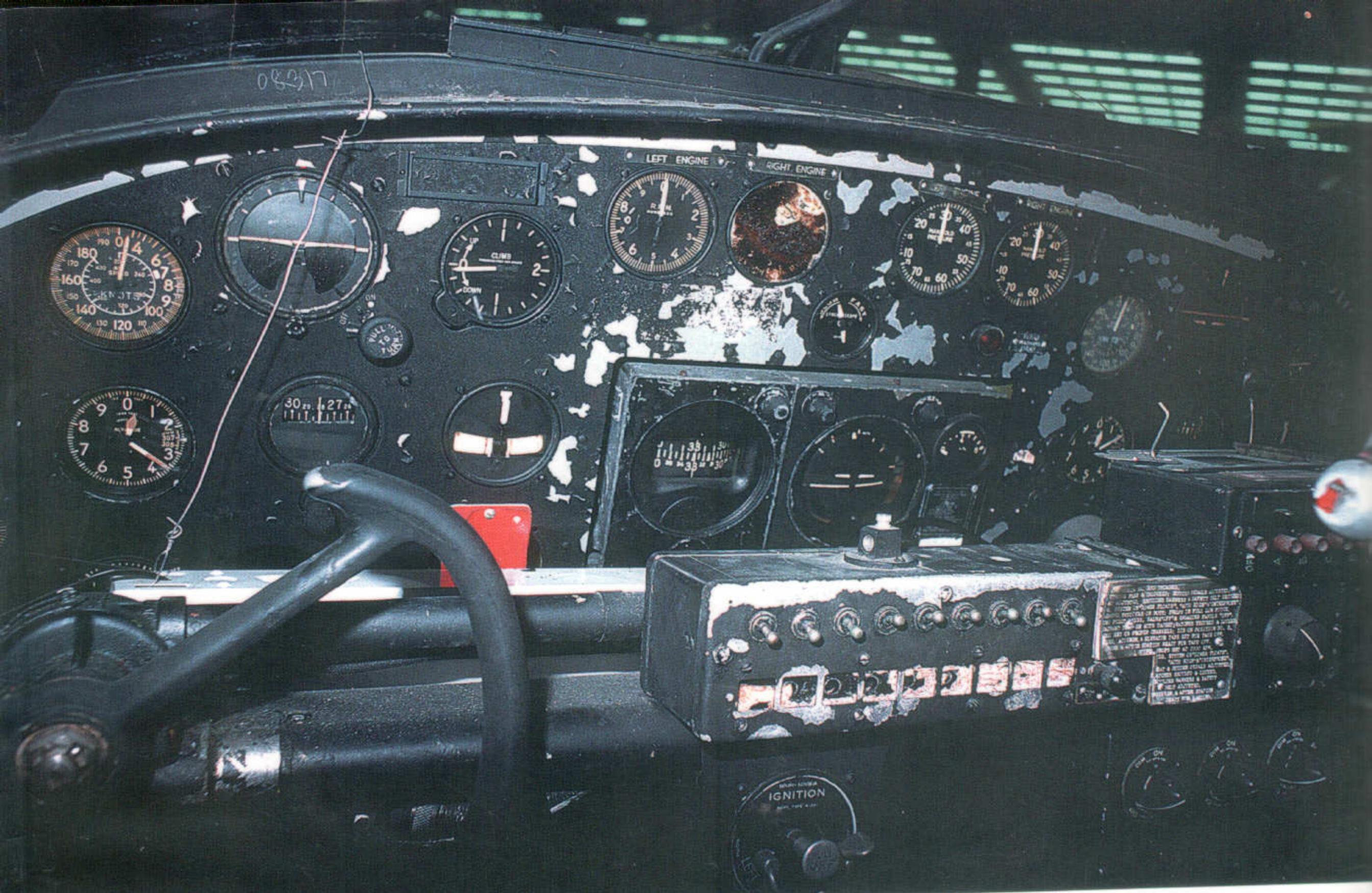
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