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Dakota Territory Air Museum's P-47 Update

by Chuck Cravens



AIRCORPS AVIATION



Aaron and Ester drove down to Fantasy of Flight to pick up the cowl Kermit Weeks lent to AirCorps. In a kind of symbolic homecoming, they stopped on the way back in Evansville and took a photo with the cowl outside the building that was the Republic factory.



www.dakotaterritoryairmuseum.com



Update

This has been an exciting month in the P-47 restoration. The R-2800 has been mounted and work continues on control surfaces, gear doors, and the cockpit enclosure.

Engine and Accessories

The work on installing and connecting all the engine accessories and controls took up a great deal of time in the restoration shop this month.



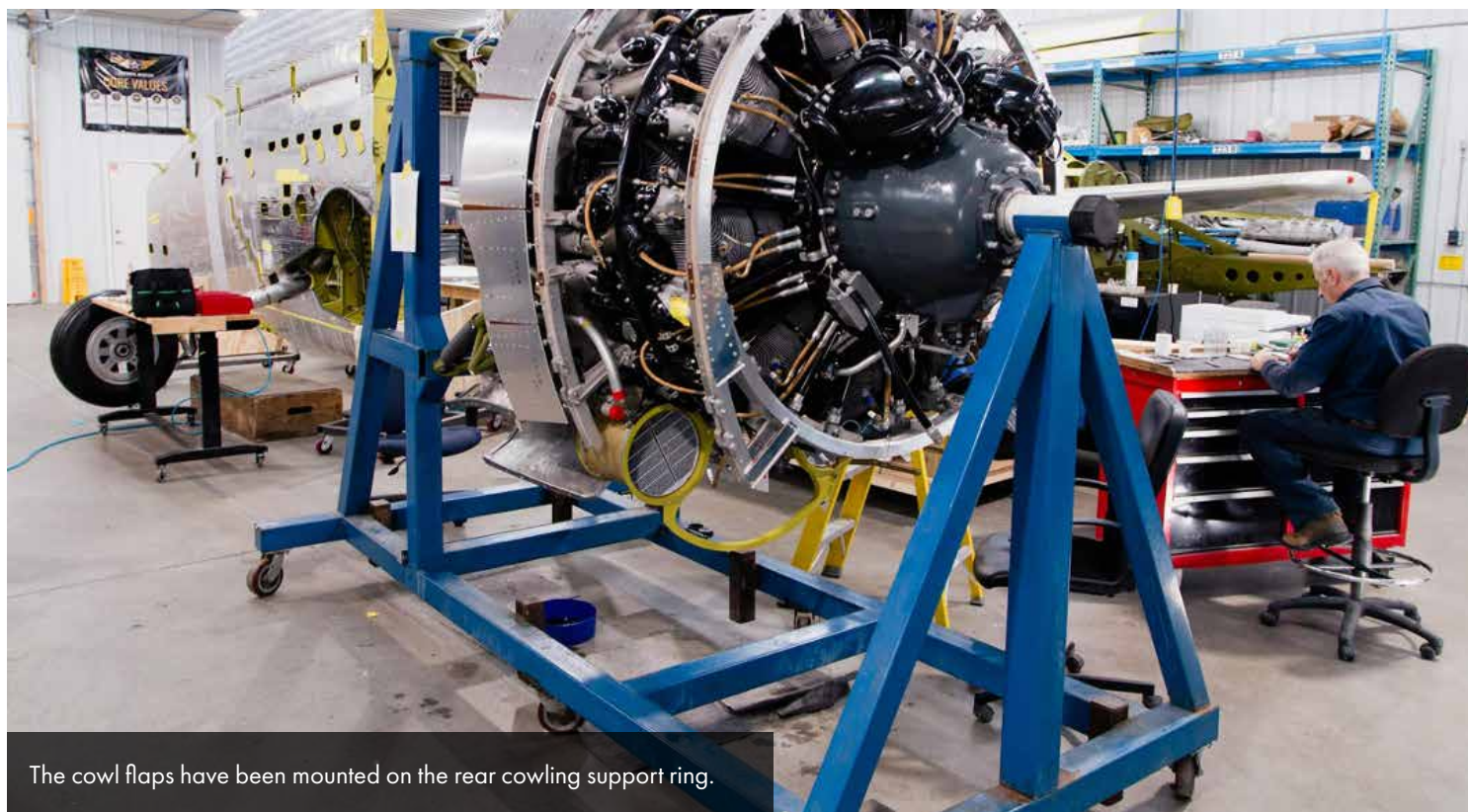
The large black assembly top center in this photo is one of the General Electric magnetos.



The Double Wasp is mounted on a stand as the QEC (Quick Engine Change assembly) is completed.



The oil tank has been mounted, (upper left zinc chromate painted cylinder in this photo).



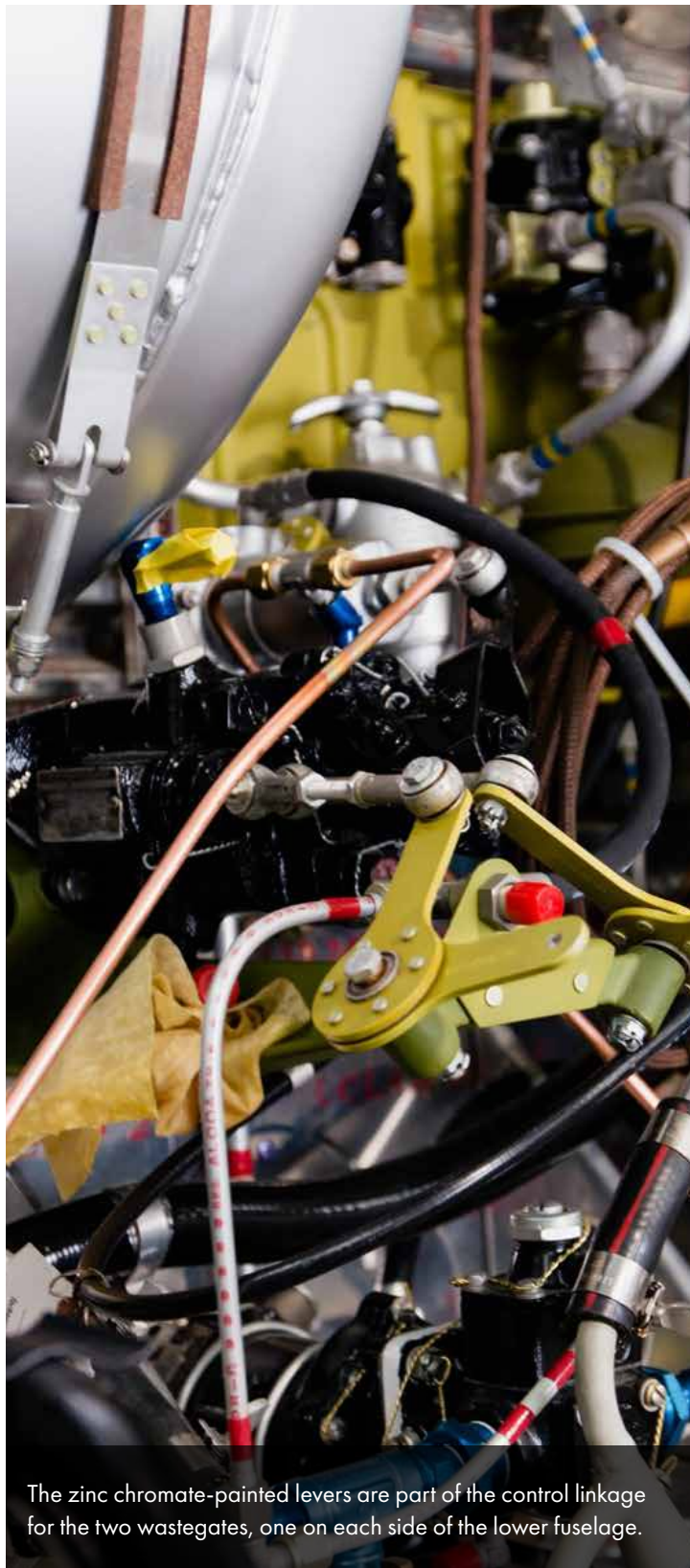
The cowl flaps have been mounted on the rear cowling support ring.



The Pratt & Whitney logo emblem shows clearly on the front of the Double Wasp.



Pratt & Whitney logo, photo Wikipedia.





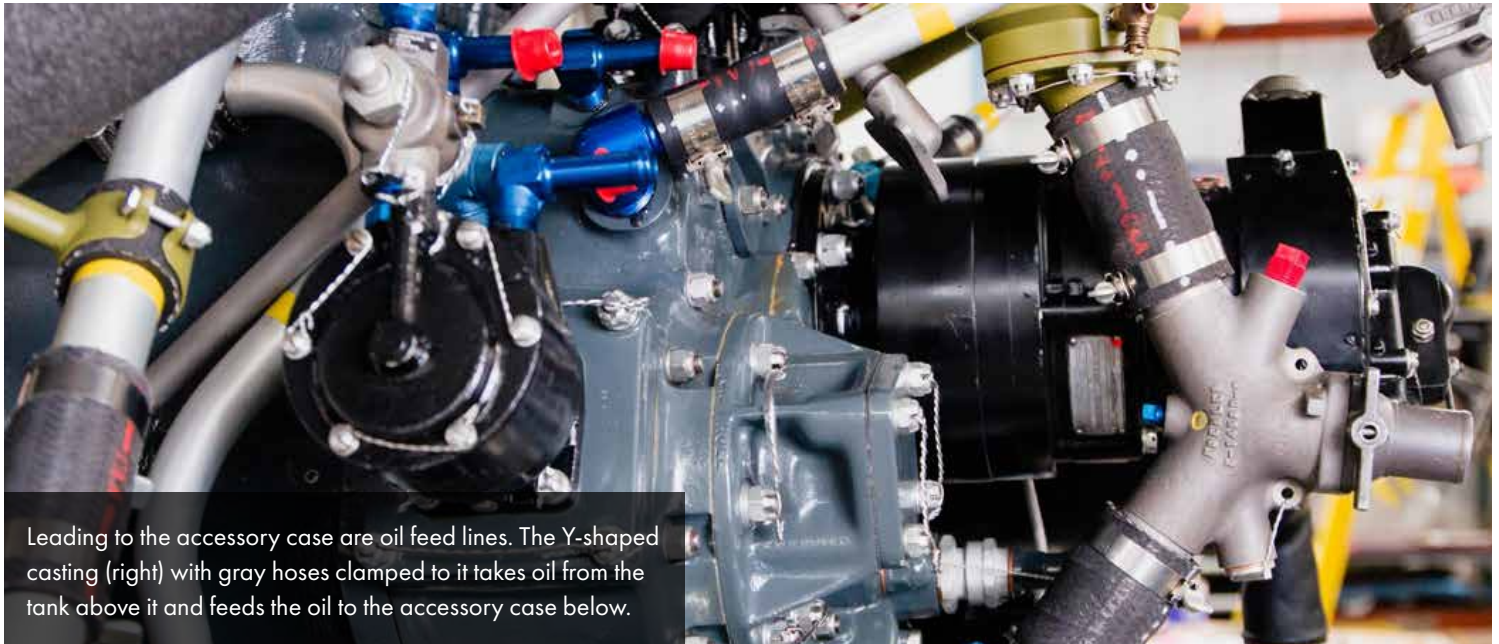
This electrical box contains the solenoid for the battery relay.



The oil coolers are installed in zinc chromate painted mounting frame.



Here is a closer view of the right-side oil cooler.



Leading to the accessory case are oil feed lines. The Y-shaped casting (right) with gray hoses clamped to it takes oil from the tank above it and feeds the oil to the accessory case below.



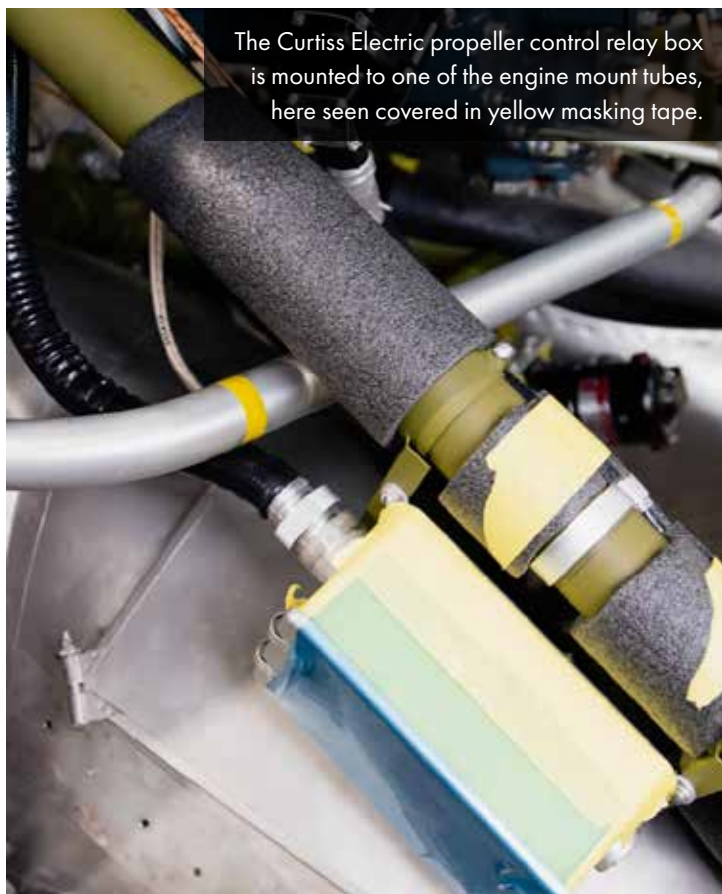
In this view of the gray accessory case, the vacuum pump is visible. It is a black assembly with safety wired cover screws.



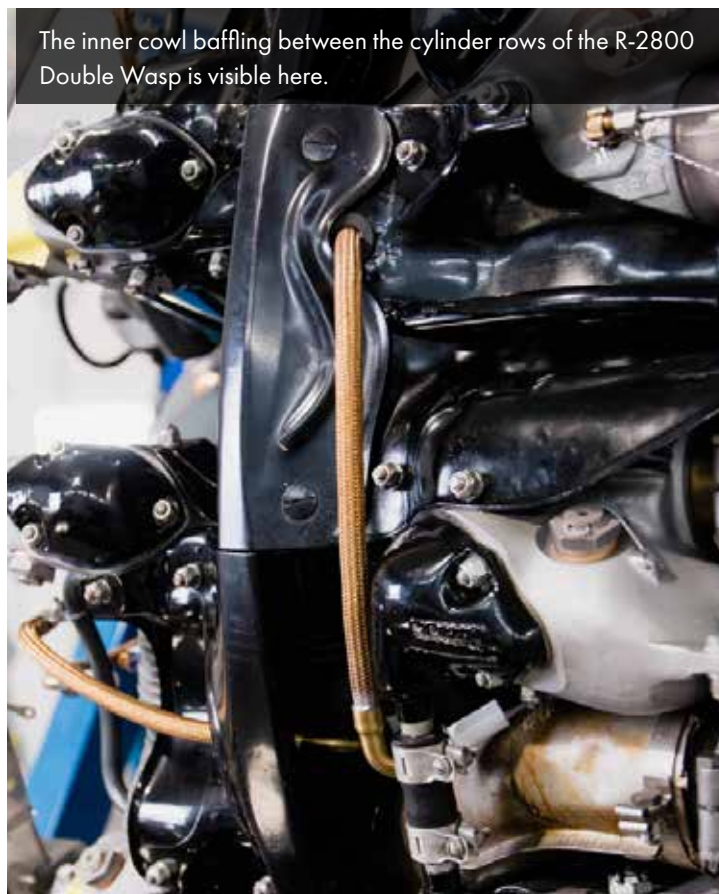
The relative position of the oil tank and the oil lines leading to the accessory case are clear in this image.



Here is a view of the accessory case from behind.



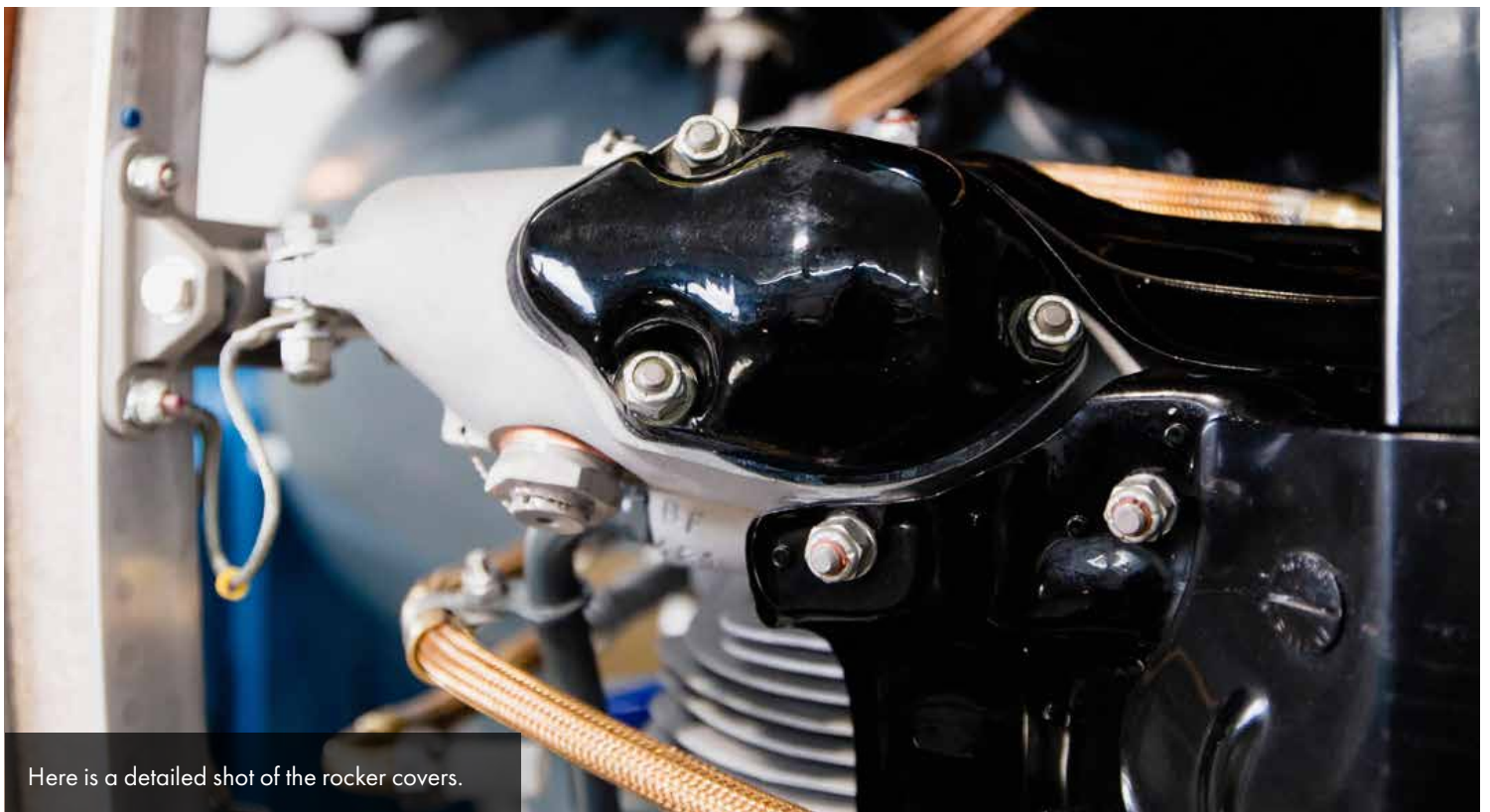
The Curtiss Electric propeller control relay box is mounted to one of the engine mount tubes, here seen covered in yellow masking tape.



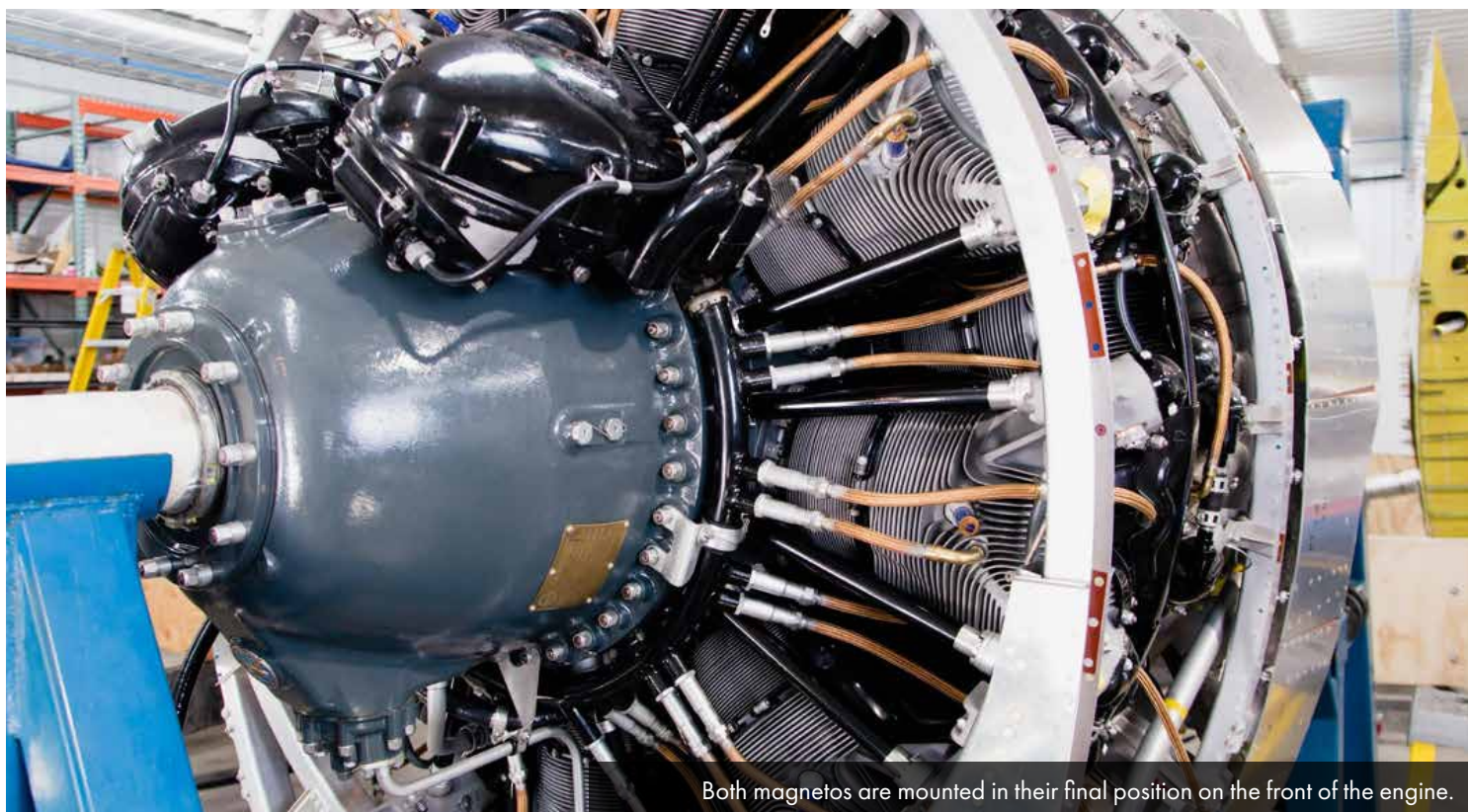
The inner cowl baffling between the cylinder rows of the R-2800 Double Wasp is visible here.



The triangular black accessory is the oil separator that keeps oil out of the vacuum system.



Here is a detailed shot of the rocker covers.





The bare aluminum cowl support rings are prominent in this photo. The cowl flaps are already attached to the rear ring.



As the QEC assembly was done, many connections to engine accessories had to be made. Visible here are hydraulic lines with blue yellow blue tape coding, and the large uncoated metal oil line leading downward from the green painted oil tank in the center of the image



This is the heater muff assembly that mounts to the exhaust manifold on the right side. It takes heat from the manifold and passes it on to the cockpit heater and windshield defroster.



The handle marked "starter" is the manual starter control. It is pulled to engage the starter from outside the cockpit. This particular manual starter control is original new/old stock with the 1944 markings and paint in great shape.



This label on the cable for the manual starter control carries the name of the Shakespeare Products Company of Kalamazoo, Michigan.

If that company name sounds familiar, you may be a fisherperson. This Shakespeare is the familiar fishing tackle company - Shakespeare rods and reels are still a major brand in the fishing tackle industry. Below is a description of some of their activities during the war from online company history¹. It is yet another fine example of American industrial support for the war effort.

1, 1942, when the government issued the order that no metals were to be used for the manufacture of fishing reels.²

Shakespeare then turned over its entire facilities to war production. Its precision machines made possible a quick change-over to the production of such complicated devices as parts for the Norden bomb sight and a very complicated remote fire control device for the Sperry Gyroscope Company. It made other items, like the power take-off shaft and speed reducer shaft for

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1. Catalogue, 1940, in Shakespeare files.
 2. Shakespeare Scrap Book, # 1 General

-15-

aircraft machine-gun-turret controls, and many other equally intricate devices. With the manufacture of such important war goods the Army and Navy awarded the company the Silver Star, plus the Army-Navy 'E' award.¹ The later award was bestowed upon it three times. The company was very proud that it could render a service to its country for an important cause.

¹ D. Stewart, A HISTORY OF THE SHAKESPEARE COMPANY - <https://cache.kzoo.edu/bitstream/handle/10920/19180/Steward-Douglas.pdf?sequence=1> accessed 2-23-2022



Cowl

Kermit Weeks and the Fantasy of Flight Museum generously loaned us a cowl from his P-47. It was used to mock up the fit of the new cowl.



Mike is assembling the control rods that move the cowl flaps.



The mounted engine made the P-47 look larger, and the newly added cowl creates an even more impressive presence.



The hydraulic "mule" (in the bottom of the photo slightly left of center) is hydraulically connected to operationally test the cowl flaps.



Mike works on testing the cowl flaps.



From the front, we can see the ovoid cowl opening that is so characteristic of the P-47.



This side view shows the new cowl flaps mounted behind the borrowed cowl.



Cockpit Enclosure

While the majority of work was dedicated to the mounting of the engine and accessories, work also continued on the cockpit enclosure as the time for its installation is coming up soon.



Some of the fitting work on the cockpit enclosure is easier with it standing on the bench in this position.



Here is a close-up of clecos in place holding the frame in position for hole drilling and chamfering.



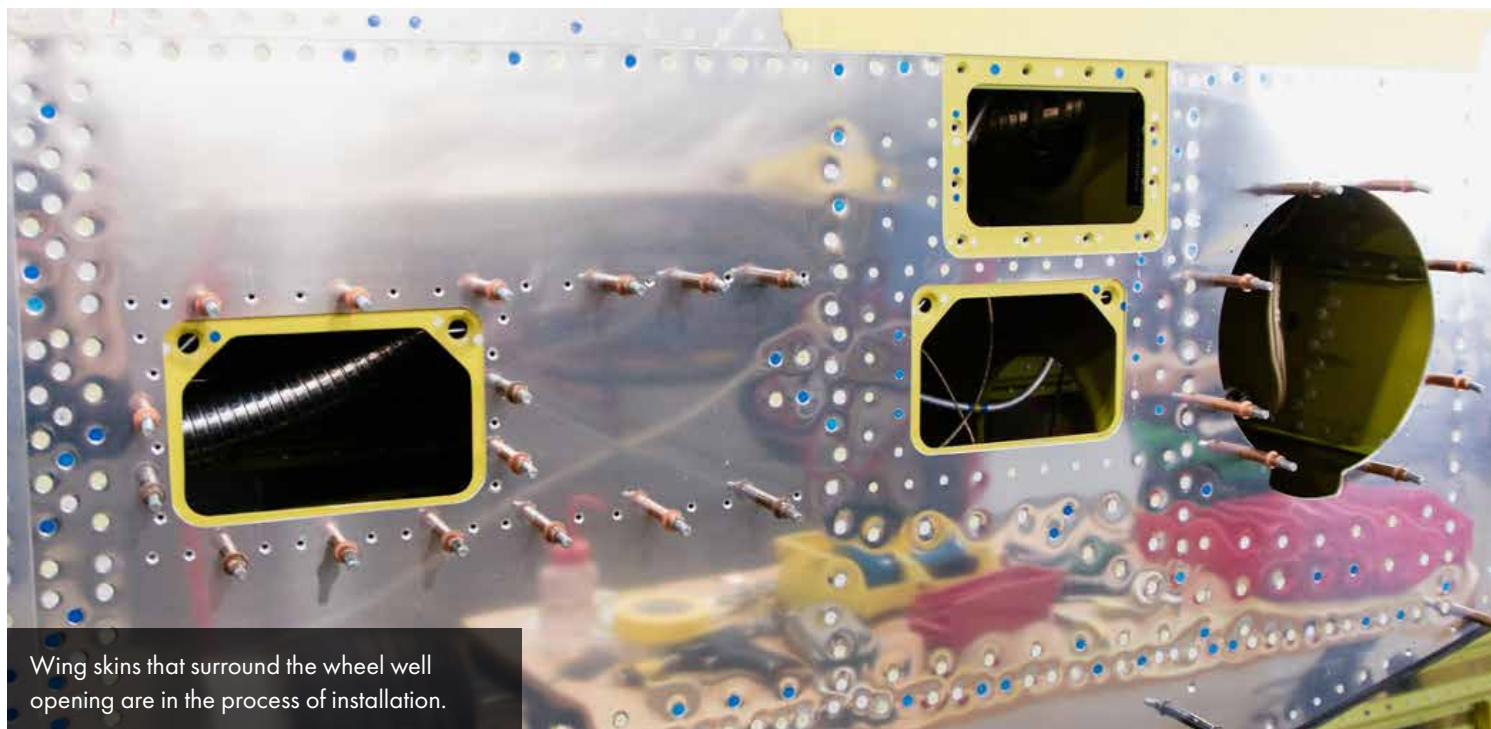
This is how the enclosure looks from below.



Wings and Control Linkages



Mark continues work on lower wing skins.



Wing skins that surround the wheel well opening are in the process of installation.





This is the rudder control cable connection.



This is the elevator trim control linkage where it exits the horizontal stabilizer.



The ammunition boxes are being fitted to the ammo bays.



It takes a lot of space to hold as many as 3,400 total rounds, equalling 425 rounds for each of the 8 .50 caliber Browning M-2 machine guns.

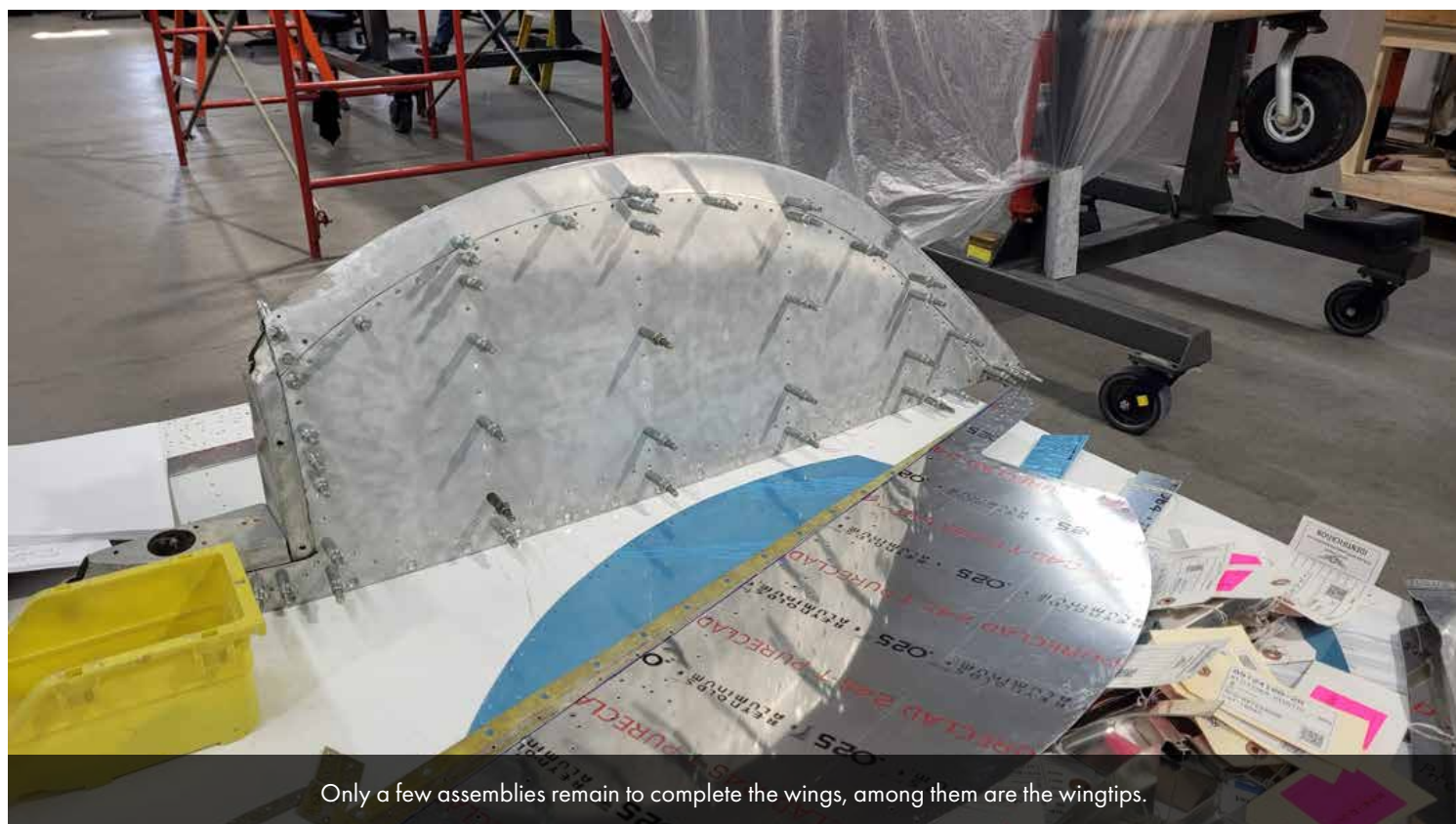
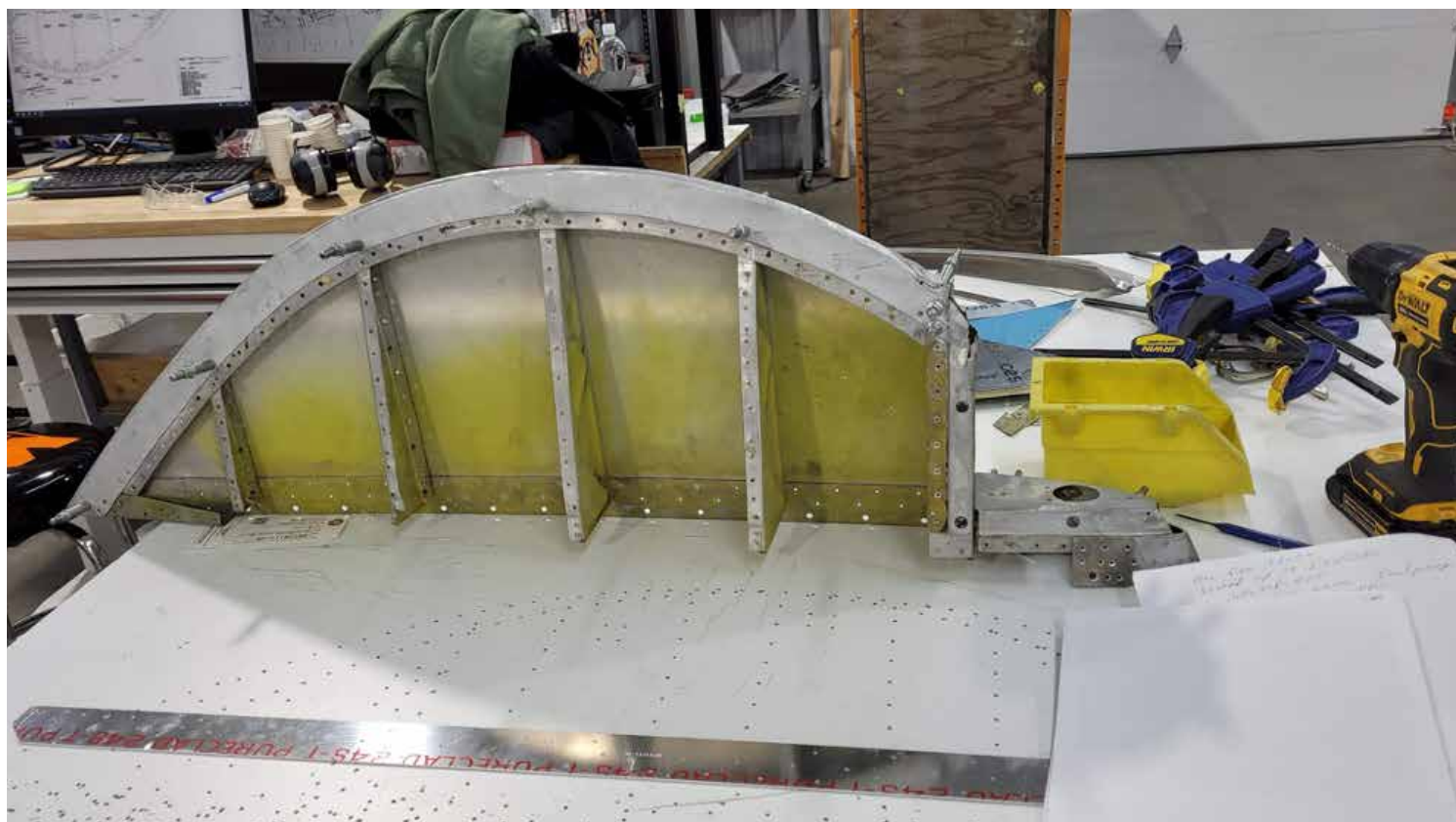
3,400 rounds is the maximum ammo load. It was often reduced to as little as 267 rounds per gun to compensate for the additional weight when a heavy load of fuel and /or bombs was carried.



This is the hydraulic portion of the main landing gear downlock. It is always interesting to see manufacturers' logos from non-traditional aircraft supply corporations like Maytag.



Like the Shakespeare label that was shown earlier, it is a physical demonstration of the all-out American industrial mobilization that was a huge part of our victory in WWII.



Only a few assemblies remain to complete the wings, among them are the wingtips.



Tough Riveting

There are many spots on the P-47 where rivets must be driven in very tight places. The restoration guys needed to get creative with making special bucking bars, and working together to get those tough rivets driven.



Randy (left) and Brad work in concert to drive elevator rivets.



A completed elevator awaits installation.



Corey drives a rivet on the flap leading edge.



Accidental Losses



P-47 crash near the Evansville factory airport. Photo courtesy of Harold Morgan

In any discussion of WWII fighters, combat losses are usually noted. But accidental losses aren't as frequently chronicled. While losing one's life in combat is more newsworthy than in training, the sacrifice is the same. Although they may have never faced flak, Zeros, or Messerschmitts, the sacrifice of pilots involved in training or non combat operational accidents was as real as those shot down over enemy territory. A pilot who lost his life in a training accident did not qualify for a Purple Heart award because their death was not the result of enemy action.

Various sources differ slightly as to numbers, but Anthony J. Mireles' research for his book *Fatal Army Air Forces Aviation Accidents in the United States* indicates that from 1940-1945 13,600 USAAF personnel were killed in 6,351 accidents. Most of these were in primary, basic, and advanced trainers, but 4,553 died in 774 B-17 and B-24 bomber accidents and 1,161 met their end in fighters.²

² Anthony J. Mireles, *Fatal Army Air Forces Aviation Accidents in the United States, 1941-1945* (3 Volume Set), McFarland (May 9, 2006)



After three nine-week phases of primary, basic and advanced training, pilots had amassed approximately 200 hours before moving on to a Fighter Replacement Training Unit. Once there, the newly minted Second Lieutenant or Flight Officer made the transition to early versions of the front line combat fighter. Sometimes that transition was to a different fighter than the one they would eventually fly in their assigned overseas unit. The number of fighter training accidents can be attributed in part to the fact that there were few, if any, two-seat variants of the major fighters available for check-out flights.

The first flight in a fighter was a major leap in aircraft performance, and could be a frightening situation for a pilot who hadn't flown an aircraft with more speed and horsepower than the ubiquitous AT-6.



19 June 1943.[then] Lt. "Hank" Mills' P-47 Thunderbolt Serial no. 41-6191 suffers only slight damage from main gear failure on landing. Photo from American Air Museum in Britain, Roger Freeman Collection

First, the aspiring fighter pilot would study tech orders and flight manuals for the specific aircraft they were transitioning into. They would sometimes spend several days on the ground in the cockpit, familiarizing themselves with the positions of the various flight controls and instruments until they could pass a pre-flight exam by the instructor. The exam typically required the pilot to show where all the controls and switches were while wearing a blindfold.

After passing the ground exam, pilots would be fitted for a parachute. Then the pilot trainee took off in an airplane with over twice the power and speed of anything he (or she in the case of the WASP ferry pilots) had ever flown. Jumping into a 2,000 horsepower Thunderbolt and taking off without an instructor had to be a daunting experience.

The danger of operational, non-combat flying continued after training. Green pilots at the controls of high-performance airplanes that they had little or no experience flying predictably led to accidents.



Once pilots arrived overseas they undertook operational training with their unit. At least in this case they would fly the type of fighter that they would take into combat.

Overseas accidents losses were sobering. The U.S. suffered 52,173 aircrew combat losses. But another 25,844 died in accidents.

Approximately 2/3rds of the 15,683 P-47s built reached overseas commands. A total of **5,222 were lost**, 1,723 of those in accidents not related to combat.

A P-47 (DQ-K, serial number 41-6538) of the 495th Fighter Training Group suffers a watery crash landing. Photo American Air Museum in Britain, Roger Freeman Collection



This particular P-47 was actually crashed 4 different times by novice pilots during 1944. Fortunately, none of these accidents were fatal.