

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23FA172

EXAMINATION REPORT

May 4, 2023

A. ACCIDENT

Location: Hollywood Hills, Los Angeles, California
Date: April 29, 2023
Time: 1950 LCL
Airplane: Cessna 172S N575ND

B. EXAMINATION REPORT

IIC	Elliott Simpson NTSB
Party Coordinator	Mark Platt Lycoming Engines
Party Coordinator	Kurt Gibson Textron Aviation

C. SUMMARY

The examination was conducted at the accident site with the IIC, then at the facilities of Air Transport, Phoenix Arizona on May 3, 2023, with the IIC and Party Coordinators.

The airplane came to rest about 40 ft below a hill peak. The direction of the debris field from the first point of ground contact through to the main wreckage followed appeared to follow the pre-impact ADS-B trajectory and was in the general direction of Van Nuys Airport.

Examination did not reveal any anomalies with the airframe or engine that would have precluded normal operation. Fuel was found in both tanks along with the line from the fuel servo to the flow divider. The propeller blades exhibited damage consistent with rotation at impact. The flap and elevator trim tab actuators were in positions appropriate for cruise flight.

The left seat airbag had deployed, the Emergency Locator Transmitter (ELT) remained attached to the airframe and had activated.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The main wreckage came to rest at an elevation of 1,345 ft msl, on a 45° south-facing slope, about 40 ft below the peak of a hill within the Hollywood Hills residential area, 6.5 miles South-Southeast of Van Nuys Airport (figure 1). A water tank was on city-owned property at the top of the hill. The first identified point of impact was a 5 ft wide bush, about 150 ft east of the main wreckage, that had been topped almost completely level (figure 2). A disturbance in the ground just to the west contained fragments of the left wing tip. The ground disturbance continued on a track of about 285° true and was characterized by disrupted dirt and flattened black mustard vegetation folded in the direction of the main wreckage. The debris field initially contained fragments of the right wingtip, followed by the right main landing gear, right door and window, propeller and hub, and remnants of the instrument panel.

The airplane came to rest nose-down on a heading of about 100° at the base of a tree, about 25 ft below a water storage tank access road, and 150 ft west of the first impact point. The airframe sustained significant impact damage, crushing the firewall and forward cabin structure, and exposing the front left (pilot) seat. The right wing remained partially attached to the fuselage and the left wing was detached and folded over the right wing. The tail section was upright and resting against the top of the tree.

2.0 Airframe Examination

2.1 Fuselage

The cabin sustained crush and impact damage through to the tailcone bulkhead (figure 1). The firewall was compressed around the engine, and the forward seats were exposed (figure 3). The instrument panel and forward flight control assembly had partially detached from the cabin and were separated during airplane recovery (figure 4).

The baggage door was attached to the airframe; the front left door had detached and folded in half and found in debris field along with its detached window. The right door and window assembly were intact but had pulled away from the cabin.

2.2 Empennage

Tail cone detached from aft cabin bulkhead. The empennage was still attached, and the rudder was crushed along its entire length. The rudder and horizontal stabilizers remained attached by all to their hinges, and all balance weights were intact (figure 5). The control cables were all attached, and continuous to the tailcone break, where

they had been cut by recovery personnel. The elevator trim tab actuator displayed 1.375 inches (figure 6) of extension which corresponded to with 5° tab up (range 25° tab up to 13° tab down).

Both rudder cables were continuous from the recovery cut through to the foot pedals. The foot pedals were attached to their respective torque tube assemblies.

2.3 Wings

Right

The right wing remained attached to the cabin. The lift strut had pulled away from both its wing and cabin attach points, and its bolts and fittings were intact at each end. The wing sustained leading edge crush damage along its entire length, and 45 degree aft crush damage at the tip (figure 7). The fuel tank was intact and contained multiple gallons of fuel when observed through the filler neck at the accident site. The fuel cap was in place at the filler neck, and cap was attached by its chain.

The aileron remained attached by its hinges, and the flap remained attached by its rollers. The aileron bellcrank was attached to the wing structure and the push pull tube was attached to the aileron. Control cables were continuous from the bellcrank to the wing root.

The flap actuator was intact and in the fully retracted position consistent with retracted flaps (figure 8). The flap cables were intact and continuous to the cabin where they had separated in a frayed manner consistent with undergoing tension overload forces. A cable in the center section exhibited fray and strand separation, with only two wire ropes still attached. The remaining cables within the cabin roof, exhibited damage consistent with overload or recovery cuts. The flap pulleys were intact.

Left

The left wing had broken away from the cabin, but was largely intact with slight skin wrinkles, 45 degree aft crush damage at the tip, and a puncture midspan to the top skin (figure 9). The aft spar attach bolt was intact and still attached to the spar with remnants of the cabin attach fittings. All failure surfaces exhibited bending and tear-like deformation. The forward spar attach point had broken away from its fitting at the cabin, with similar deformation signatures. The lift strut remained attached to the wing and cabin. The strut was bent inwards about midspan and had been cut by recovery personnel.

The fuel tank was intact and leaking fuel from the vent at the accident site. The fuel cap was located within the cabin, its chain had broken, and the cap exhibited fresh dents and scratches to its paint.

The aileron remained attached by its hinges, and the flap remained attached by its rollers. The aileron bellcrank was attached to the wing structure and the push pull tube was attached to the aileron. Control cables were continuous from the bellcrank to the wing root.

The flap extend cable remained attached to the bellcrank, and the retract cable had pulled away from the bellcrank.

2.4 Landing Gear

The right landing gear leg had separated from the airframe and was located in the debris field, the wheel was not located. The left landing gear leg and wheel remained attached to the airframe. The nose landing gear strut was still connected to the firewall, upper nose gear strut fragments were located in the debris field, but no nose wheel was found.

2.5 Cockpit

Cabin controls

Forward of the tail separation point, one elevator cable was continuous to the bellcrank, the swage ball at the end of the other cable was not located. The elevator push pull tube was intact from the bellcrank to the control column base but had been crushed. The control column was intact, and still attached to the airframe by its pivot bolt. The control column wheel was in place, and both aileron cables were wound around it and their respective aileron chains at the base of each control yoke. The control cables were then continuous to the recovery cuts at the wing root.

Flight Instruments

All flight instruments, including both G1000 units sustained crush and fragmentation damage, the SD card for the G1000 units were not located, nor was one of the G1000 display panels. The backup attitude indicator was crushed, and its display indicated a level attitude, zero bank when compared against the case (figure 10). The face of the backup altimeter had broken away from the unit and the Kollsman window indicated 29.8; the altitude needles were mechanically disconnected and spun freely. The Hobbs-hour meter read 1,426.7 hrs.

2.6 Survivability

Both front seats remained attached to their respective rails, which had partially pulled away from the airframe. The pilots seat airbag had deployed; the lap belt buckle was still locked, and the belt was severed at the seat base hinge point. The right seat airbag had not deployed. The rear seats were crushed and folded, and still partially attached to airframe.

The ELT remained securely attached to tail and its antenna and was armed and transmitting at the accident site. The battery was removed at the site by the NTSB investigator.

2.7 Fuel/Fuel System

The fuel selector valve had pulled away from the cabin controls, and using low pressure air was determined to be in the "BOTH" tanks position. The fuel strainer was empty, and its screen was free of debris (figure 11).

3.0 Engine Examination

Model number: IO-360-L2A
Serial number: L-15271-51A

The engine remained attached to its mount, which was partially attached to the firewall (figure 12). The number 1 and 2 cylinders forward facing pushrods had bent aft with evidence of impact damage. There was no evidence of crankcase breach, and all cylinders were still attached. The exhaust muffler was crushed against oil sump; the inner surface of the muffler was coated in light grey deposits consistent with normal operation (figure 13).

All fuel lines from the fuel strainer through to the fuel flow divider were intact, and their fittings were tight. From the flow divider, the fuel lines were continuous to each fuel injection nozzle, although the housing of nozzle number two exhibited impact damage and had broken away. The fuel servo had detached from the inlet at the oil sump, its mounting lugs and bolts remained attached at its pad. The fuel injection nozzles were removed and were all clear. The fuel pump was disassembled and examined. All internal valves were intact and appeared to be functional, and the diaphragm were pliable and free of cracks (figure 14).

The fuel servo diaphragm assembly was disassembled, the effort spring was intact. Both diaphragms were orange in color, pliable, intact, and did not show any evidence of leak (figure 15, 16). The regulator seat was undamaged, along with the regulator

ball valve. A "G" had been stamped into the regulator hex plug, as required per FAA airworthiness directive (AD) 2009-02-03, and the applicable Precision Airmotive Service Letter RS-87.

The fuel flow divider was disassembled, diaphragm assembly was intact, pliable and there was no indication of damage (figure 17).

The line from the fuel servo to the flow divider was removed and was full of fuel. Residual quantities of fuel were also found throughout the fuel system and were negative for water when checked with water detecting paste.

The throttle and mixture cables remained attached to their respective arms on the servo and were continuous to their cabin controls. The engine driven fuel pump had broken away from the accessory case, leaving its arm, mounting bolts fitting lug attached to its engine pad. The oil filter assembly was cracked but remained attached to the accessory case; the oil filter was intact and firmly attached to the assembly. The oil screen was free of debris. The oil cooler remained in place with its associated lines and fittings. The inner surface of the top engine cowling was coated in oil. The oil appeared to follow a path, diagonally relative to the direction of flight. The oil pattern continued across the rub points of the engine baffles, consistent with oil contamination at or after impact rather than in flight. There was no evidence of oil streaks to the airframe structure, or within the engine compartment to indicate an oil or fluid leak in flight.

Both magnetos remained firmly attached to the accessory case. The spark plug cables sustained varying degrees of impact damage. The alternator remained attached to the forward section of the engine but had been forced aft.

The starter motor remained attached. The vacuum pump was intact and undamaged, disassembly revealed that its shear coupling was intact, and the internal vanes and rotor were undamaged.

The inlet air filter box was crushed and fragmented, the paper element air filter was crushed and coated in brown dirt that appeared to match the dirt on the ground at the accident site.

The top spark plugs were removed and were of the fine-wire type. The plug cases were bright, and the general condition appeared to indicate the plugs had sustained minimal use and were recently installed (figure 18).

The crankshaft turned freely when rotated by hand at the vacuum pump accessory gear spline. Cylinder compression was noted on all cylinders in firing order, and each rocker arm lifted to similar heights. Mechanical continuity was established throughout the rotating group, valve train, and accessory section. Visual inspection of the

combustion chambers was accomplished through the spark plug bores utilizing a borescope; there was no evidence of catastrophic internal damage and all combustion surfaces exhibited light grey deposits consistent with normal operation.

The magnetos were removed and examined. The damaged magneto caps and spark plug cables were removed to facilitate examination. The impulse couplings for both produced an audible click when rotated, and sparks were observed at each distributor block tower.

4.0 Propeller Examination

The propeller had broken away from the crankshaft, and 45° radial shear lips were present at the fracture surfaces (figure 19). Both blades exhibited leading edge polishing and paint removal, along with chordwise scratches. One blade exhibited about 90 ° of twist (figure 20), the other blade was largely intact (figure 21). The flywheel and ring gear had broken away from the crankshaft.

5.0 Examination Photographs



Figure 1 - Airplane at the accident site



Figure 2 - Topped bush with airplane in the background



Figure 3 - Airframe with front left seat



Figure 4 - Forward cabin with top engine cover



Figure 5 - Tail section (left horizontal stabilizer removed)



Figure 6 - Elevator trim tab actuator



Figure 7 - Right wing



Figure 8 - Flap actuator



Figure 9 Left wing

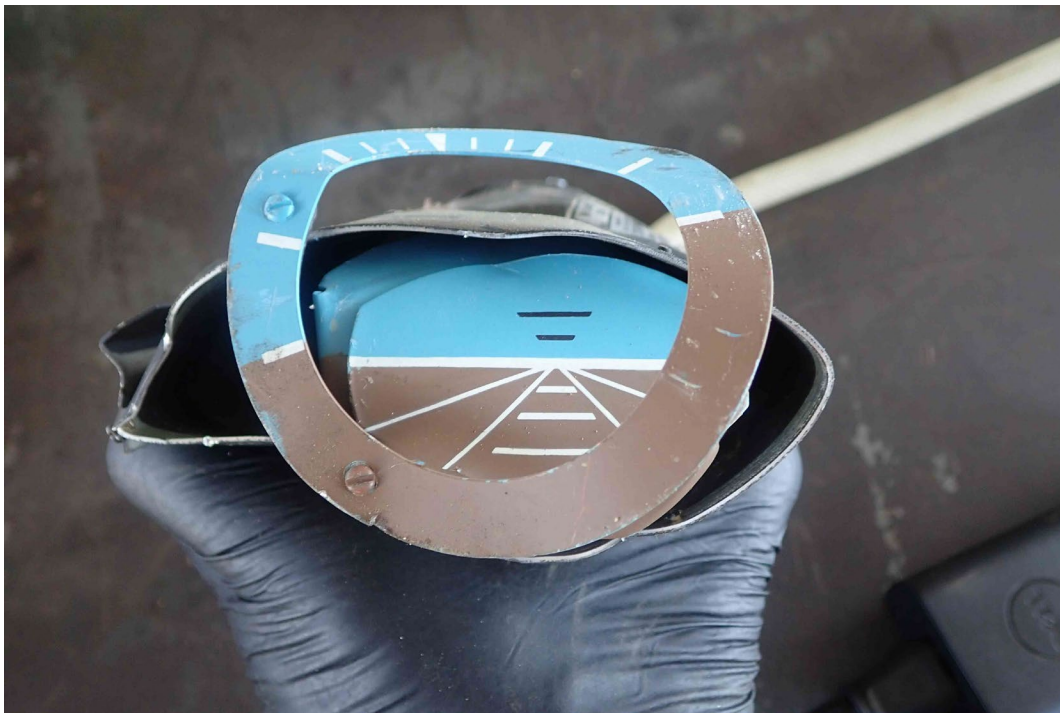


Figure 10 - Backup attitude indicator

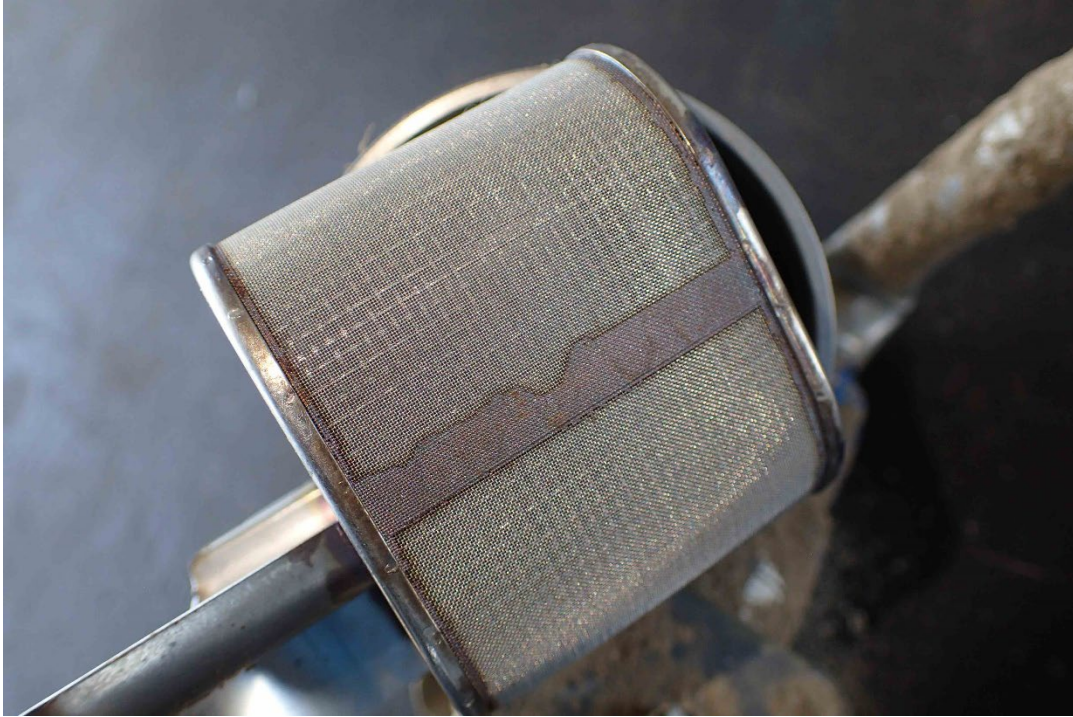


Figure 11 - Fuel strainer screen



Figure 12 - Engine



Figure 13 - Exhaust pipe outlets

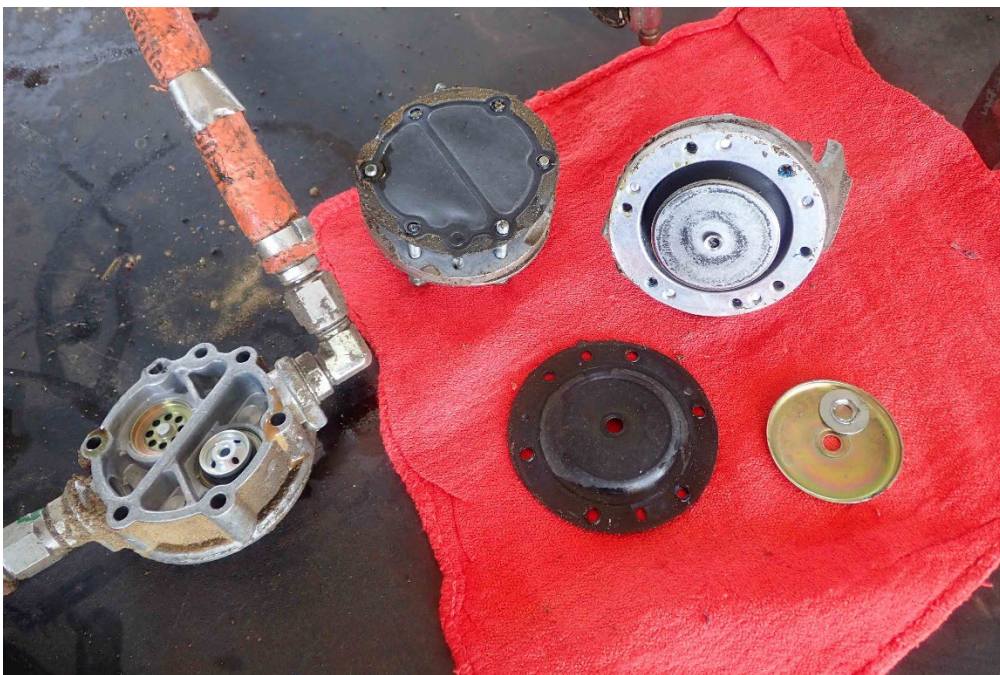


Figure 14 - Engine driven fuel pump components

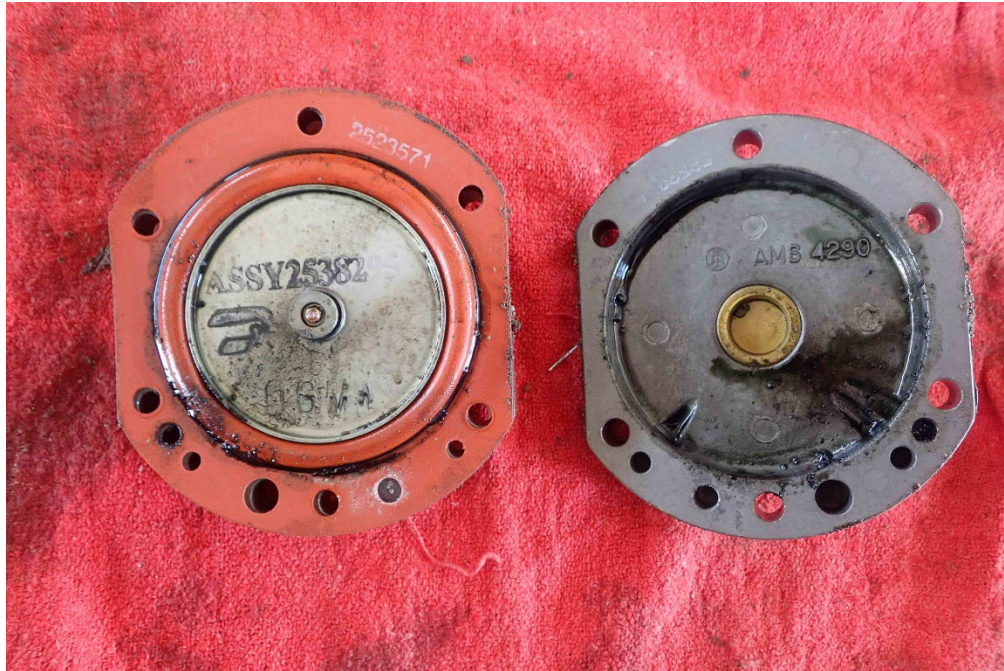


Figure 15 - Fuel servo diaphragm assembly

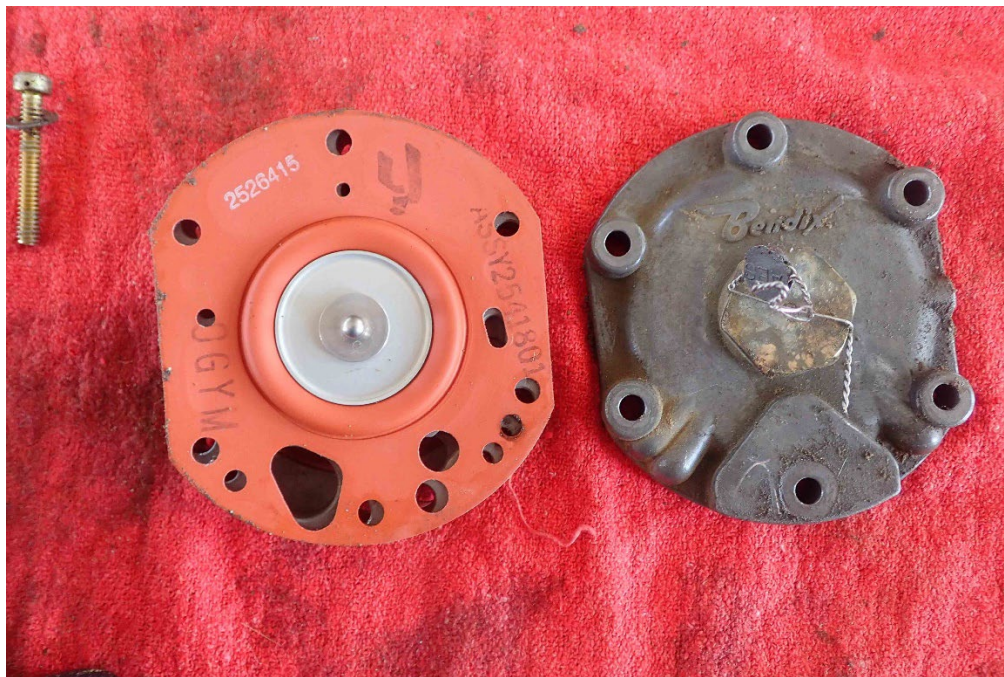


Figure 16 - Fuel servo diaphragm assembly with regulator hex plug

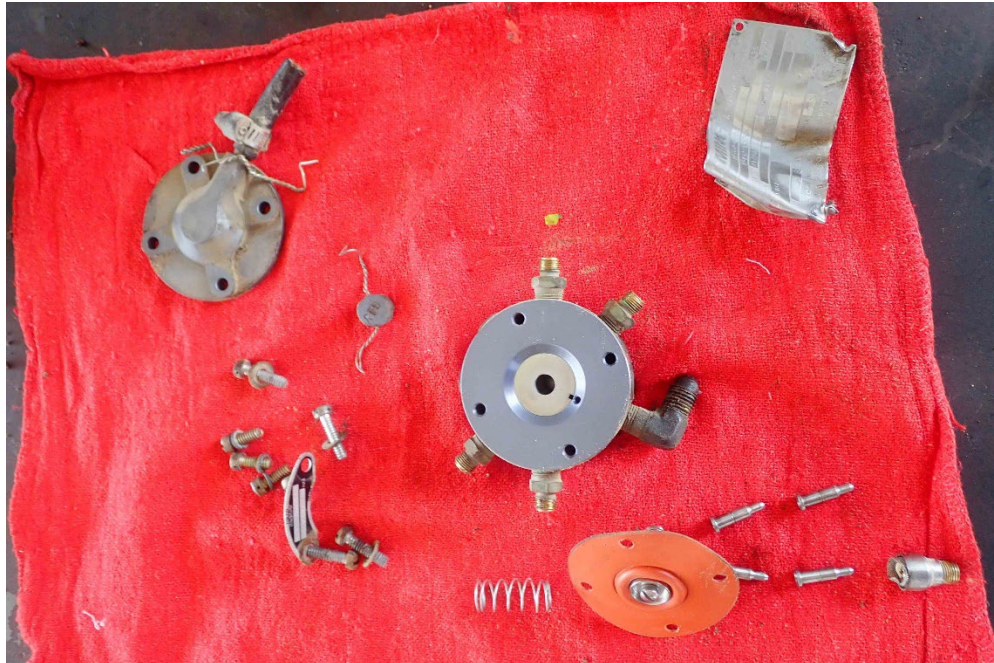


Figure 17 - Fuel flow divider components



Figure 18 - Top spark plugs



Figure 19 - Propeller hub crankshaft flange



Figure 20 - Propeller blade



Figure 21 - Propeller blade

Submitted by:

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