

# VINTAGE

AIRPLANE



The Magazine of the **EAA VINTAGE AIRCRAFT ASSOCIATION**

OCTOBER 2003



# TYPE CLUB NOTES

## CARE AND REPAIR OF THE AAF TYPE A7 MAGNETO SWITCH

STEVE KROG AND BOB GEHRING  
FROM THE CUB CLUB NEWS

**T**he A7 magneto switch has been around for over 60 years and at one time, I'm sure, was the most common mag switch used by virtually every airplane manufacturer producing single-engine dual-ignition airplanes. Many thousands of these old mag switches are still in use today and are continuing to perform flawlessly. However, there are many of these near "bullet proof" switches that have been taken out of service due to the modern day philosophy of "remove and replace" rather than repair.

The next time you encounter the problem of being unable to shut down the engine when you move the mag switch lever to the "Off" position, don't get in a big hurry to remove that old switch and replace it with one of those new fangled key-operated Bendix mag switches. Make sure you've properly identified the mag switch as the problem.

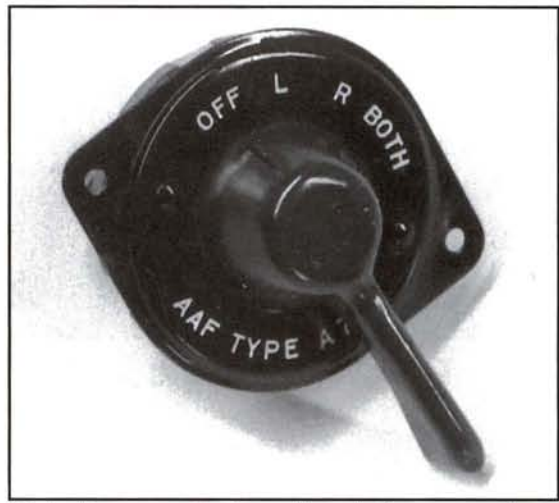
Over the past near 20 years of providing tailwheel instruction in a Cub, I've had the mag switch fail three times. Twice the switch was faulty and the third time a

broken "P" lead on the right mag prevented me from shutting down the engine. Both times the mag switch failed, it was easily repaired and placed back in service.

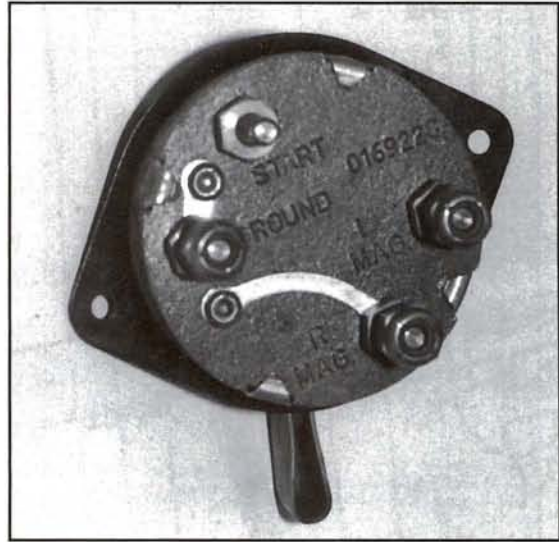
The A7 magneto switch is quite simple to test. Before removing the mag switch though, carefully mark the "Left," "Right" and "Ground" wires using masking tape. Then, with the use of an ohmmeter you can test the magneto for continuity to clearly diagnose the problem.

Turn the mag switch to the "Off" position and place one Ohmmeter probe in contact with the "Ground" post and the other probe in contact with the "Left" post. If the switch is functioning properly, the ohmmeter should "zero out" or have full needle deflection to the right of the scale. Repeat the test with one probe in contact with the "Right" post. Again, if the needle deflects to zero, the mag switch, at least in the off position, is working properly in that the two circuits are shorted to ground and will not let the mags fire.

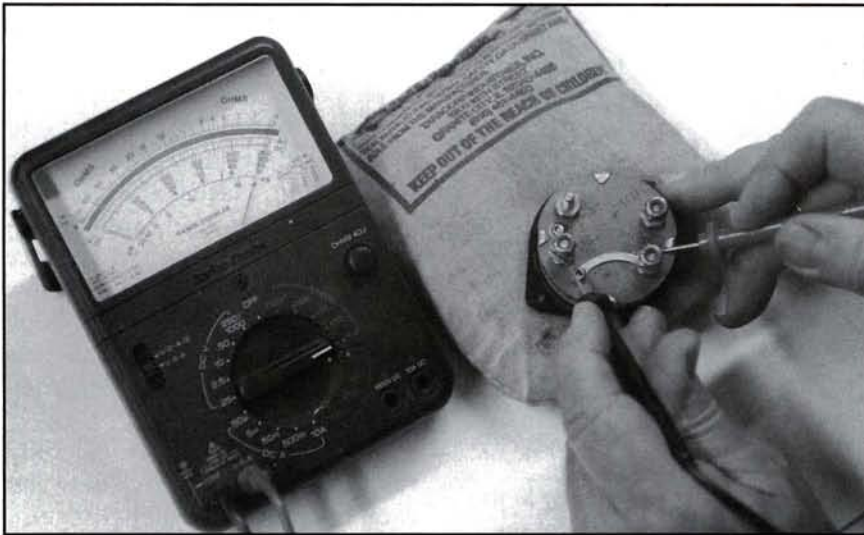
If the needle does not deflect all the way to zero, you do not have a good connection between the ground



Virtually every single-engine airplane manufacturer has used the AAF Type A7 magneto switch since the early 1940s.



The A7 mag switch backplate is clearly marked as to which terminal post is the "Ground," Mag (Left) and Mag (Right).



**In this photo the mag is in the "Off" position and the Right mag circuit is being tested. The ohmmeter needle shows full deflection to the right or zero indicating the mag switch is working properly in this position.**



**Using a small flat blade pocket screwdriver, carefully open each of the four retaining tabs holding the fiber backplate.**



**This photo shows the left mag circuit being tested with the mag in the "Left" mag position. The ohmmeter shows no needle movement, indicating the circuit is "open" and working properly.**

and the post being tested, thus allowing that mag circuit to possibly fire.

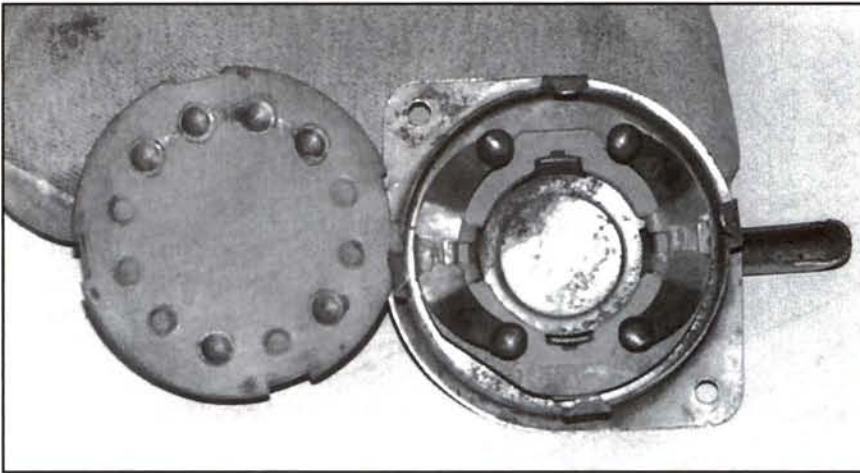
Now, turn the mag switch handle to the "Both" position. Then place one ohmmeter probe in contact with the "Ground" post and the other in contact with the "Left" post. If the mag switch is functioning properly, the ohmmeter needle should not move. The circuit is "open" and would permit the Left magneto to generate a spark if the engine was turned over. While continuing to hold one probe in good contact with the "Ground" post, move the other probe to the "Right" post. (NOTE: Ground, Left and Right are clearly imprinted on the outer back panel of the mag switch.) Again, if the switch is working properly, the ohmmeter needle should not move.

If the ohmmeter needle does deflect either partially or all the way to the right, the circuit is shorted and could cause the mag to misfire.

Disassembly of the mag switch is quite simple but it does take a bit of patience. Using a small pocket flat blade screwdriver, carefully pry up the four metal tabs. Do not bend them all the way to a vertical position; just open them far enough to lift the hard fiber backplate off the switch.

Once you remove the backplate, carefully examine the brass indents. You'll note that each is probably tarnished or even corroded, and there will be a distinct copper track running between each of the indents. The indents need to be thoroughly cleaned and the copper track needs to be removed.

Cleaning the backplate requires three simple items: a wooden pencil, a small piece (approximately 1-by-2 inches) of 3M Scotchbrite scouring pad, and either an old-fashioned ink eraser or a stainless eraser. Stainless erasers are available from any good welding supply shop. It is used for polishing out

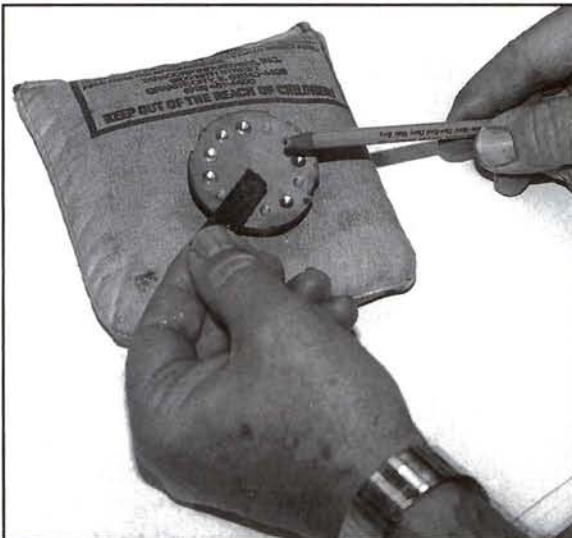


With the backplate removed, the dirt and corrosion are seen clearly in the brass indents and the dirt or copper track is visible between each of the brass indents.

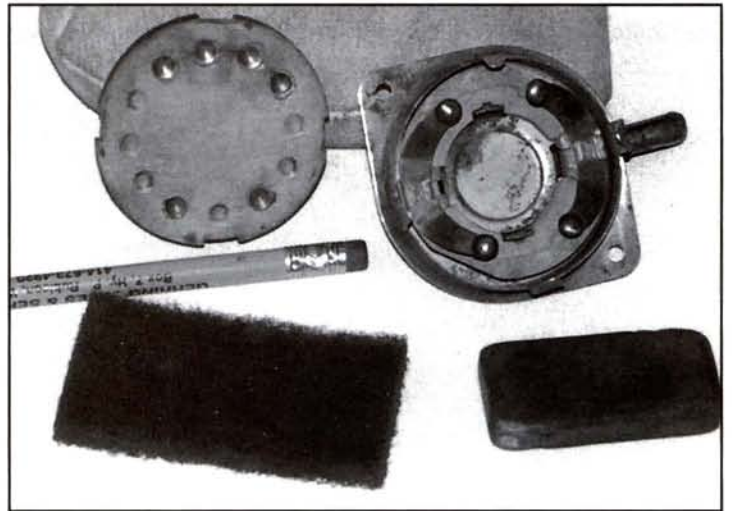
minor scratches and imperfections in a stainless steel surface.

Break the lead tip off the pencil so that it has a dull pointed end that will fit into the contour of the brass indent. Place the Scotchbrite pad over the indent, apply pressure with the pencil and rotate back and forth. After only a few strokes, the brass indent will look as good as new. Repeat this process until you've thoroughly cleaned each indent.

Now, using the eraser, carefully rub out the copper track between each of the brass indents. Again,



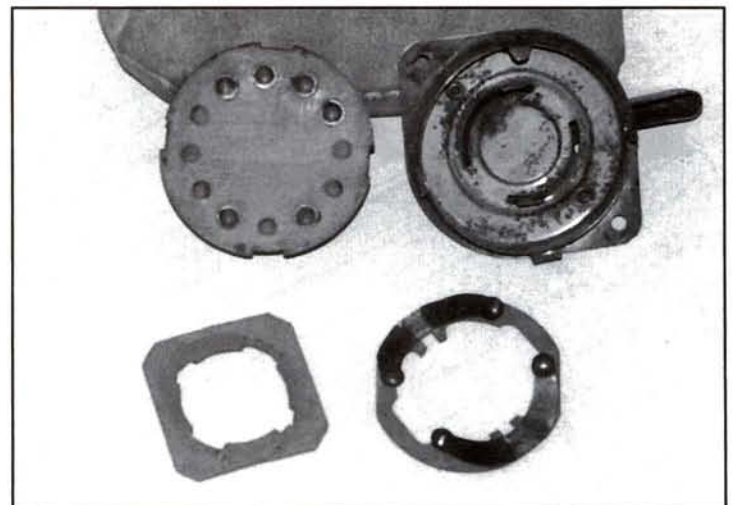
Use a dull pointed wooden pencil and a small piece of a 3M Scotchbrite pad to clean the brass indents.



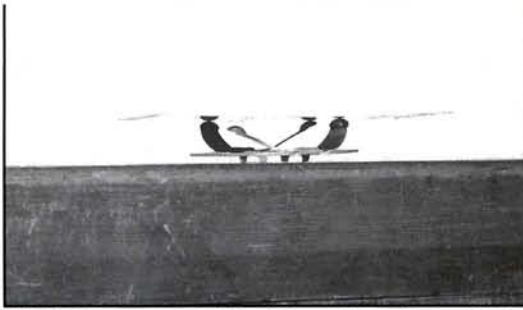
Three simple cleaning tools are needed to restore the A7 mag switch: a wooden pencil, a small piece of 3M Scotchbrite, and either an ink or stainless steel eraser.



Using the pencil and Scotchbrite pad, apply pressure and rotate in each of the brass indents to clean any impurities and corrosion.



All four components of the A7 mag switch have been disassembled as shown in the photo. There is no need to remove the square spacer, but if you do, align the slotted openings with the two metal tabs when reassembling.



With the copper tabbed ring placed on a flat surface, place a piece of flat material over the tabs to assure they are evenly aligned. Note in this photo that one tab has been bent downward and is not making contact with the flat material. It will need to be carefully bent upward until it too makes even contact with the flat surface.

this should only take several strokes to remove the copper track.

Once you have cleaned the brass indents and removed the copper tracks, carefully wipe down the entire face with lacquer thinner to remove any fingerprints and other oily deposits.

Next, carefully remove the copper tabbed ring from the open mag switch. As you do so, you'll note how tarnished the copper tips have become. Once removed,

place your finger under one of the tabs and clean the tarnish off the tip with the Scotchbrite pad. Repeat the process for all four copper tips.

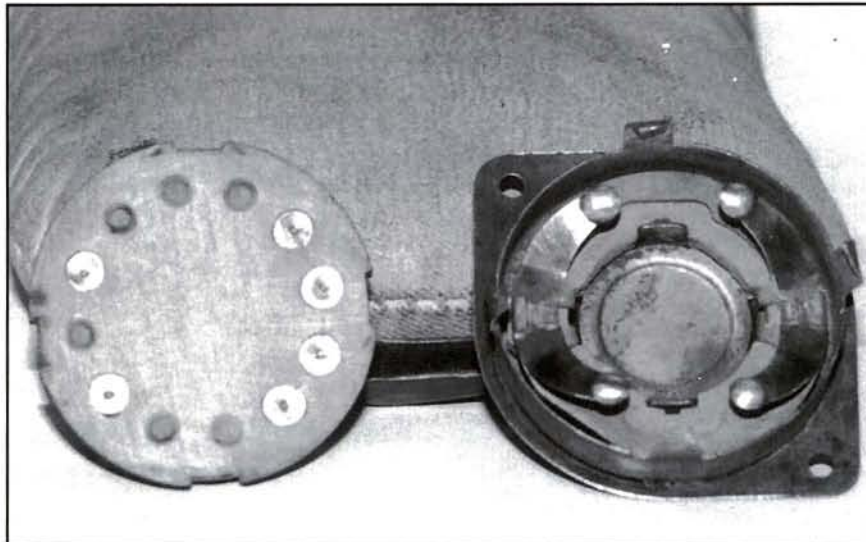
Now place the copper tabbed ring on a flat surface with the tab side up. Place any flat piece of material, aluminum, cardboard, etc., on top of the tabs. Carefully look at the tabs and make sure that each makes contact with the flat surface. If one or more tabs do not make contact, carefully bend them up until all four tabs make equal contact.

Next, thoroughly clean the entire copper tabbed ring with lacquer thinner, removing all fingerprints, dust, etc.

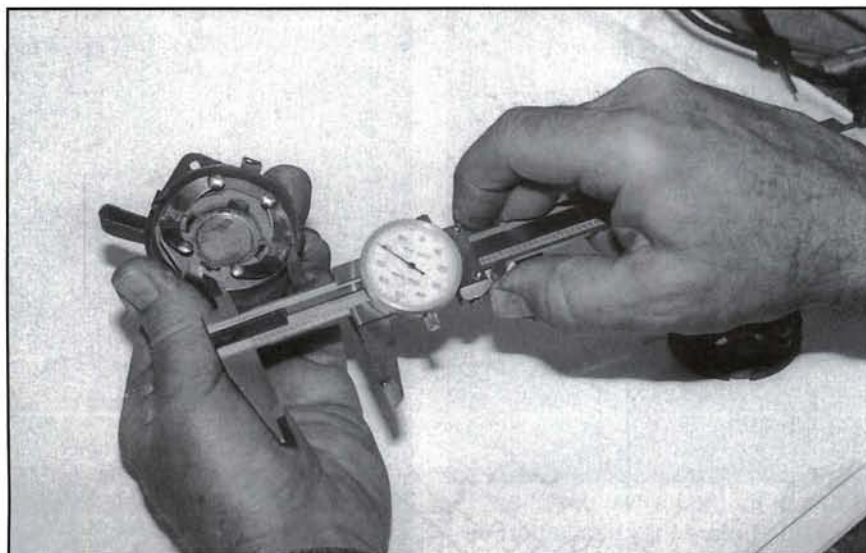
You're now ready to reassemble the mag switch. Place the copper tabbed ring in the mag-neto housing with the copper tabs pointing out. There are two tabs on the copper ring for alignment in the housing. It can be correctly placed in either of two positions and either is correct. With the mag switch handle positioned in either the "Off" or "Both" position, align the tabs on the copper ring with the handle.

You can now place the fiber backplate back on the mag switch housing. Carefully rotate the backplate until the four slots align with the four tabs. There is only one position where it is correctly aligned, as the separation between each tab on the housing is different. Take your time and continue to rotate the backplate until it aligns exactly.

Once the backplate has been correctly aligned, press down firmly and carefully bend the retaining tabs over. The restoration of your A7 mag switch is now complete. Before installing, however, retest with the ohmmeter to assure that it works in every position. If it doesn't, it may mean that you incorrectly aligned the copper tabbed ring or the fiber backplate.



Carefully clean the copper tabbed ring and the fiber backplate with lacquer thinner. The copper tabbed ring fits in either of two positions.



The distance between each tab is slightly different so as to assure that the backplate can only be reassembled in one position.