



By Marc Ellis

# ELLIS ON ANTIQUE RADIO

## Replacement drive belts made easy

□ FOR THOSE OF YOU WHO MAY HAVE just joined us, we've devoted the last three issues of *Ellis on Antique Radio* to the ongoing restoration of a very interesting receiver: a Zenith Model 7S232 "Shutter-Dial" set. Zenith's beautiful and ingenious shutter-dial mechanism was used on many of its broadcast/shortwave models, beginning in the late 1930's. On that type of dial, calibrations for individual bands were printed on sets of movable, semicircular shutters linked to the band-change switch. The dial arrangement was such that only the calibration for the selected band was visible behind a strategically-placed window.

In the three previous columns, we took stock of the set's major electronic and mechanical problems, corrected some of the more obvious ones, and powered up the set to try it out. At that time, using a short test antenna, I determined that the broadcast band and one of the two shortwave bands were definitely operational. But I wasn't able to observe any movement in the tuning-eye tube. The broken belt connecting the flywheel-shaft pulley and the tuning-condenser drive pulley had not yet been replaced and the shutter-dial assembly (previously removed for repair) was still off the radio.

### Tired Fingertip!

At the start of this month's restoration session, I considered reinstalling the dial assembly, but decided to delay that operation a little longer. I still need a replacement dial-glass and hope to find something suitable at a clock-supply shop. The fitting process will obviously go a lot smoother if I can carry the assembly along with me from dealer to dealer.

It was definitely time to replace the drive belt. I'd been pushing the tuning-condenser drive pulley by hand while testing for reception on the different

bands. But the mechanism is geared for vernier action, and my pushing finger was getting pretty tired! I wanted to have the help of the tuning knob and flywheel before searching for any more stations.

If the Zenith tuning drive had been equipped with the more-usual dial cord system, there would have been no problem. Dial cord is a generic item that is still available and can be used in almost any radio, modern or old. But dial belts are seamless loops having very specific diameters, and are made for individual sets. They're not used in modern radios and are no longer manufactured.

### Strategies That Failed

After reading the first column in this series, one reader wrote me that he had replaced the drive belt in a similar radio with an "O" ring. For those of you not familiar with "O" rings, they are rings made of a rubber-like material having a circular cross-section. The rings are used for various sealing and retaining purposes. Hardware stores carry assortments of them.

I thought using an "O" ring would be a terrific idea until I tried to get one in the required size (about three and a half inches in diameter). The hardware

clerk just looked at me, smiled and shook his head. The biggest one he had was about half that diameter. To get a bigger one, I'd have to go to a more specialized supplier—and those aren't usually open on week-ends when I'm free to shop.

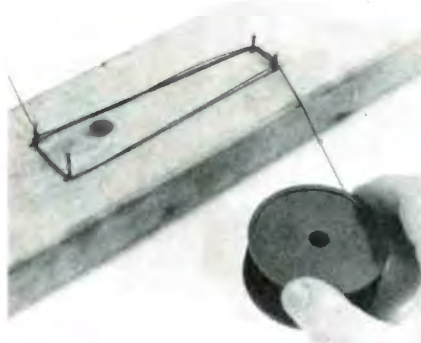
Then I had what I thought was a truly inspired notion. Before leaving the store, I picked up some vacuum-cleaner drive belts. It was hard to judge their size through the bubble packs, so I spent about six bucks and purchased several. The belts were about a half-inch wide—but I figured I could slit them to the one-eighth-inch width I needed.

After about an hour of playing with a mat knife, a metal straight-edge, and some clamps, I managed to carve out some pretty creditable-looking eighth-inch belts. But none of them fit correctly! Although the full-width belts had fit snugly enough, the slit versions had lost so much of their resilience that they were too loose. So it was back to ground zero.

### Success at Last

What finally worked for me was an adaptation of a belt supplied to me by the old gentlemen who sold me the set—and who had started to restore it himself. He'd made his belt from many strands of fine monofilament fishing line, forming it around a jig made of nails hammered into a board (see photos). His belt was a little too tight, so that the flywheel didn't run smoothly. It also had a tendency to slip, and was a little messy looking because the strands wouldn't lie smooth as the pulleys turned.

To determine the correct size, I made up several one-turn test loops using dial cord joined with an ordinary square knot. After finding the loop that fit correctly on the radio, I used it as a pattern to set up my own nail-and-board jig. I then used the jig to make up a "belt"



After much experimenting, a replacement drive belt was successfully made on a crude jig, consisting of four nails hammered into a board.

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consisting of four turns of dial cord (ends tied, as before, with a square knot). The result was not only neat-looking, but it also worked perfectly. The tuning-condenser drive now runs smoothly with no slippage, and the flywheel action is excellent.

Here's the conclusion I've come to about belt substitution. Using a material with "stretch" is not nearly as important as obtaining the correct diameter. The tuning condenser on the Zenith is mounted on a springy "L" bracket in such a way that the end of the condenser carrying the drive pulley has about a quarter-inch of "give" in the direction of the flywheel pulley. When the drive belt is the correct length to take up about half of that "give," everything runs right. If it's slightly looser than needed, there's slippage; get it tighter than needed and there's binding.

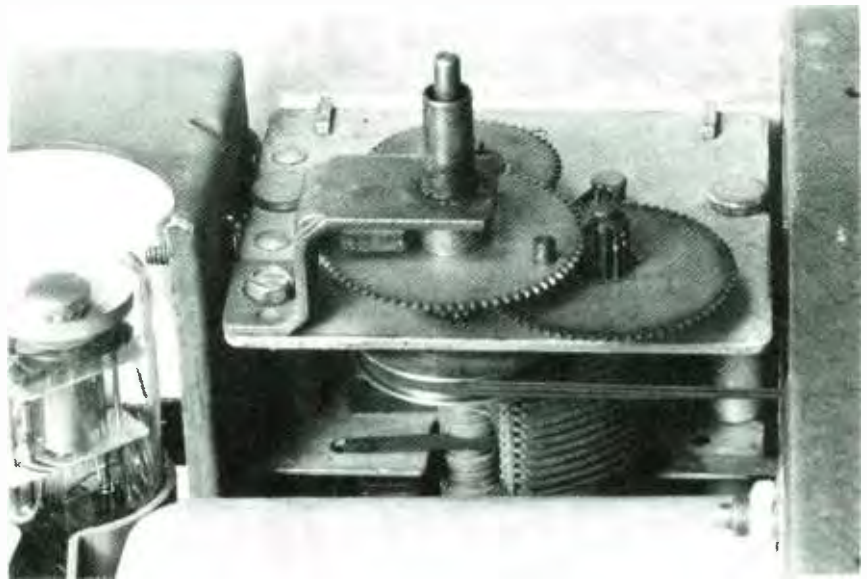
### Voltage-Checks

Now that I could tune the set easily, I connected it to a good outside antenna and fired it up once more. This time, I heard signals on all three bands and observed movement in the tuning eye. But, to me, the set's performance still isn't quite convincing. It isn't lively enough and the tuning-eye's movement seems sluggish.

I feel that my next major move is likely to be a realignment, but before moving into that phase, I wanted to convince myself that there was nothing functionally wrong with the radio. So to get a quick picture of the set's general health, I decided to do a voltage check.

Such a check involves measuring the voltage at each tube-socket connection under actual operating conditions and comparing the results with the voltages published by the set manufacturer. That's an excellent "scattergun" method for checking a radio because most component failures have some effect on tube operating voltage(s).

The results I obtained are probably within the acceptable range for a normally operating set. The plate and screen voltages do seem a little low—possibly a result of the aging electrolytic capacitors. The capacitors show no signs of leakage and the set runs without hum, so I'm on the fence about replacing them. I also want to investigate some irregularities in a few of the bias readings. More on that next month.



Here's the drive belt in place on the radio. It looks neat and works well.

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MODELS 7S204, 7S232, 7S240 7S242, 7S256, 7S260 7S261		ZENITH RADIO CORP.								
Chassis 5709		SOCKET VOLTAGES								
Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter	0	6.4	255	89	-10	182	0	0	-2
6K7	Osc.	0	6.4	243	89	0	—	0	0	-2
	I.F.									
	2nd Det.									
6H6	A.V.C.	0	0	2	-2	2	—	6.4	2	—
6F5	1st Audio	0	0	—	117	—	—	6.4	-1.5	1.5
6F6	Power	0	0	243	255	-2	—	6.4	2	—
5Y4	Rect.	0	—	AC	—	AC	—	32A	32B	—
		H	Ep	Eg	Et	Ek	Il			
6T5	Target	0	16	2	255	2	6.4			

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground lead connected. Line voltage 117V Consumption 1.5 W. P. 1.5 A. 117 V

Shown here is the manufacturer's voltage chart for the Zenith Model 7S232. The values measured during voltage checks differed a bit, but not seriously.

### The Mysterious Philco Thing

Last month I received a letter and some interesting pictures from Larry Lovell, 2732 King St., Endwell, NY 13760. (Unfortunately the photos that we received could not be reproduced for this column.) While cleaning out the attic, he came across a mysterious gadget in a small wooden cabinet bearing the Philco logo.

Mounted on the front panel is a telephone-like dial mechanism which, when activated, rotates a metallic vane inside a large coil. A type 30 tube is also part of the assembly. Larry would like some help identifying the device.

At first, I wondered if it was some kind of a Rube Goldberg gadget built

inside a case salvaged from a small Philco radio. However, studying Larry's pictures with a magnifying glass soon dispelled that notion. The back of the dial assembly is clearly marked Philco Part No. 38-9704, and the tube definitely bears the Philco house brand. All-in-all, it appears that the unit was built in the Philco plant and not pieced together by an old-time experimenter.

As it happens, I was recently browsing through the latest copy of *Antique Radio Classified* magazine when I noticed that someone was trying to locate a wireless remote control for a Philco 39-116 console. Could Larry's unit be a wireless remote? The dial defi-

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nately suggests some kind of a control function. The coil, with the trimmer capacitor that I notice associated with it, could easily be a tuned circuit for a small radio transmitter. And the presence of a couple of standard battery connectors indicates that the unit was intended to be portable.

The first two digits of a Philco part number generally indicate the year of manufacture, so Larry's unit seems to be a year older than the radio in the classified ad. However, I'm sending Larry the name and address of the advertiser and maybe they can get together. In the meantime, if any reader has any idea as to what that gadget is and can tell us how it works, I'd certainly like to hear from you!

### One-Stop Tube Shopping

Some months ago, Marvin Tocherman of International Components Corp. (105 Maxess Rd., Melville, NY 11747) wrote me to say that his company stocked over 2,000 receiving and industrial tubes—including many older types—and would be happy to be of service to readers of **Popular Electronics**. In looking over the enclosed catalogue, I was struck by the fact that many types from the 1920's and 30's were listed and the prices quoted were quite reasonable.

However, I also noticed that the catalogue was geared to the needs of radio/TV servicemen buying in bulk, and that a \$50.00 minimum order was required. So I wrote Marv and asked if he would consider lowering the minimum-order requirement for **Popular Electronics** readers. The result is that he will now accept a \$25.00 minimum from those who mention this column. Let me hasten to say that this is not a personal endorsement or recommendation since I've never had occasion to order anything from International Components. But I'd certainly encourage you to send for a catalogue and draw your own conclusions.

Well that about does it for this month, but be sure to come back next month when we'll have more antique-radio tips, techniques, and information for you. In the meantime, be sure to send your comments, suggestions, and questions to Marc Ellis, C/O **Popular Electronics**, 500-B Bi-County Blvd., Farmingdale, NY 11735. ■