

PHILCO

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Service Bulletin—No. 189

Model 32

Philco Model 32 is a superheterodyne radio receiver designed to operate directly from a 32 volt D. C. (direct current) electric system, such as used on many farms for lighting purposes. In this model the filaments of the tubes (except the rectifier) are connected in series, while the necessary plate and grid voltages are secured from a special vibrator-

and-rectifier unit, contained in a separate metal box mounted on a shelf of the radio cabinet. The rectifier tube is inside the vibrator-and-rectifier unit box. It obtains its filament voltage from a secondary winding of the transformer which is also located in the vibrator-and-rectifier unit box.

Model 32 uses the following tubes: R. F., type 39-44; Detector-Oscillator, type 36; I. F., type 39-44; 2d detector, type 75; Output type 42; Rectifier, type 84.

The frequency range of the model 32 is 520 to 3260 kilocycles. The intermediate frequency (I. F.) is 260 K. C. The power consumption is 50 watts when the line voltage is 32, and approximately 70 watts when the line voltage reaches 38.

With a line voltage of 35 volts to the vibrator and an effective voltage of 28 at primary of power transformer (voltage from white lead to white-black-tracer), the A. C. voltage across secondary should be about 300 volts at 65 milliamperes. Secondary voltage measured from yellow lead to yellow-green-tracer. Voltage across 84 filament approximately 7 volts at .5 amperes. (Filament leads have blue insulation.)

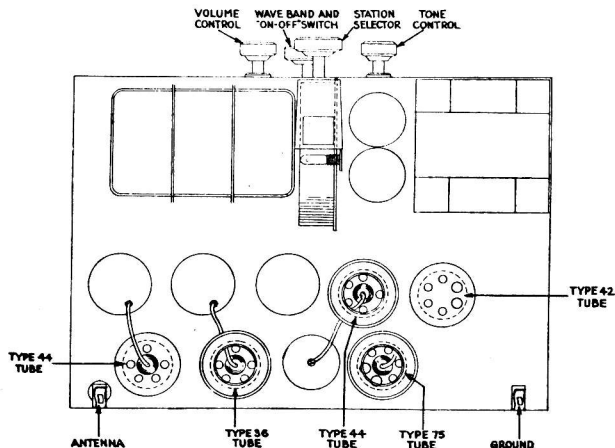


Fig. 1—Top View of Model 32

NOTE: In 32-volt systems where the batteries are old, the voltage is high (40 volts) when generator is running (due to the higher internal resistance of the batteries). In such cases it will help conserve life of the tubes in the set if battery charging is done at periods of the day when the radio is not in use.

Tube Socket Data Line Voltage 34 Volts

Circuit	RF	Det.-Osc.	IF	AF	Out-put	Rect.
Type Tube	39-44	36	39-44	75	42	84
Filament Volts.....	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts.....	205	200	235	155	220	300
Screen Grid Volts (SG to K).....	85	83	85	.....	240	.....
Cathode Volts (K to Gnd).....	4	8.5	4	0	0	.....

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum



Fig. 2—Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis

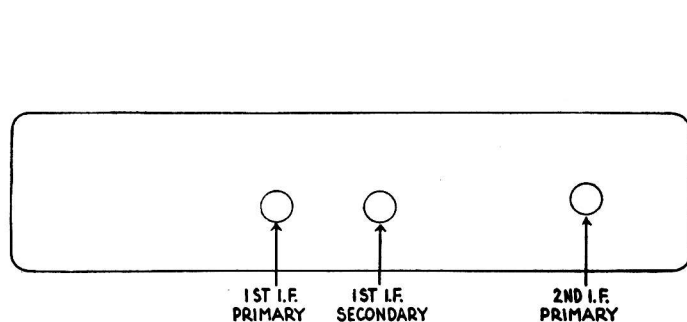


Fig. 3—Rear of Model 32 Chassis, showing location of I.F. Compensating Condensers. I.F. of Model 32 is 260 K. C.

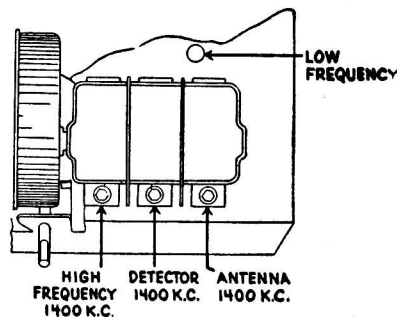


Fig. 4—Top View of Chassis Showing Compensating Condensers Mounted on Tuning Condenser, also Low Frequency Compensating Condenser.

ADJUSTMENT OF MODEL 32

COMPENSATING CONDENSERS

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

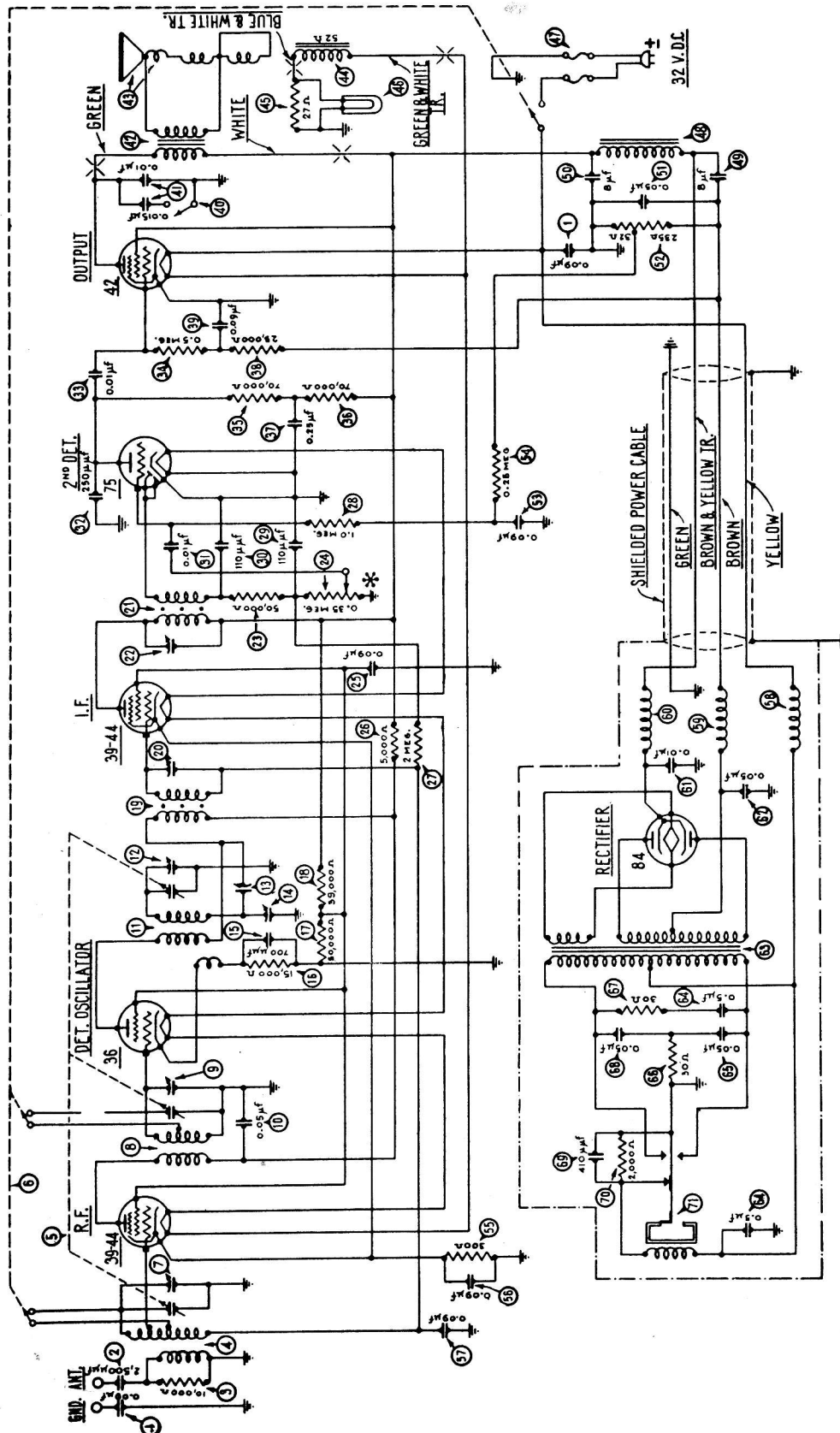
Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.



* MUST BE GROUNDED AT 75 CATHODE

Fig. 5—Wiring Diagram—Model 32

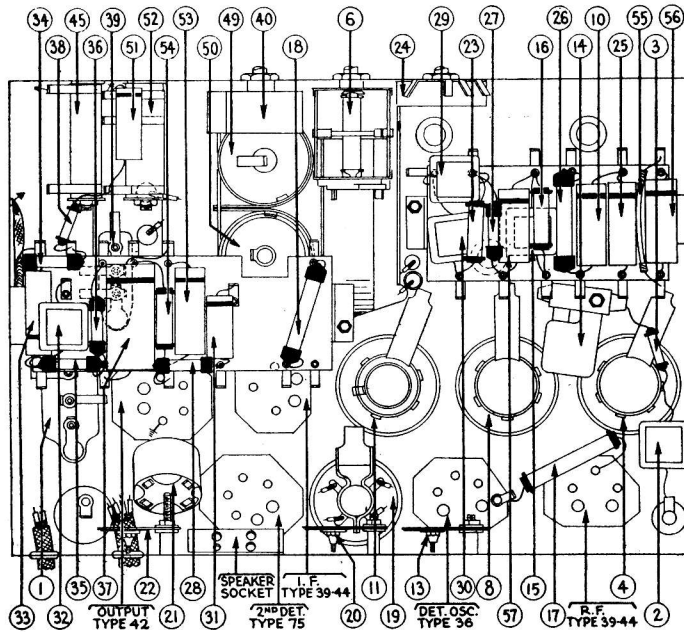


Fig. 6—Bottom View of Chassis

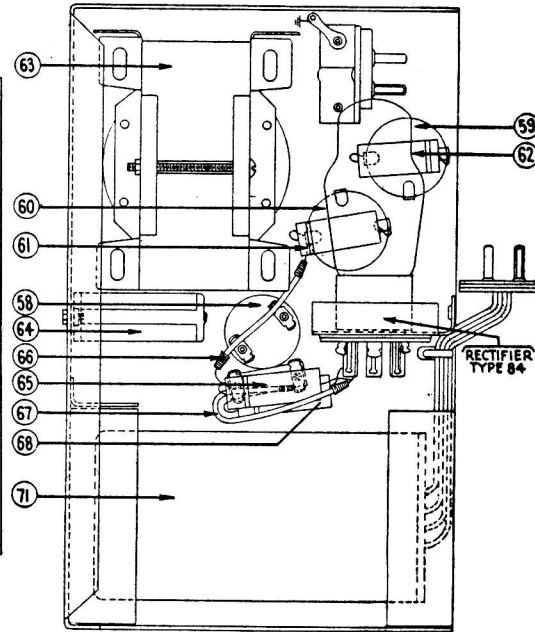


Fig. 7—Bottom of Vibrator and Rectifier Unit

REPLACEMENT PARTS FOR MODEL 32

No. on Figs. 6 and 7	Description	Part No.	List Price	No. on Figs. 6 and 7	Description	Part No.	List Price
1	Condenser (.09 mfd.—.09 mfd.)	4989-G	\$0.40	36	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	\$0.25
2	Condenser (.0025 mfd.) (mica)	7006	.40	37	Condenser (.25 mfd. tubular)	30-4134	.45
3	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25	38	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
4	Antenna Transformer	32-1062	.70	39	Condenser (.09 mfd.) (Bakelite block type)	4989-AL	.35
5	Tuning Condenser Assembly	31-1059	5.00	40	Tone Control	06764	.50
6	Wave-band & On-off Switch	42-1017	1.00	41	Condensers	Part of 40	....
7	Compensating Condenser (ant.)	Part of 5	....	42	Output Transformer (For K-26 spkr.)	32-7042	.95
8	Detector Transformer	32-1063	.50	43	Voice Coil and Cone (For K-26 spkr.)	36-3174	.40
9	Compensating Condenser (det.)	Part of 5	....	44	Field Coil and Pot Assembly (K-26)	36-3306	2.85
10	Condenser (.05 mfd. tubular)	30-4123	.35	45	Resistor (Pilot light) (27 ohms)	33-3132	.20
11	Oscillator Transformer	06620	.90	46	Pilot Lamp	4567	.12
12	Compensating Condenser (osc. H. F.)	Part of 5	....	47	Line Fuses (Located in line plug) (3 amp.)	45-2046	ea. .06
13	Compensating Condenser (1st I. F. pri.)	04000-M	.20	48	Filter Choke	32-7213	1.60
14	Compensating Condenser (osc. L. F.)	04000-S	.35	49	Condenser (Electrolytic—8 mfd. wet)	30-2026	1.50
15	Condenser (.0007 mfd.—mica)	5863	.35	50	Condenser (Electrolytic—8 mfd. dry)	30-2014	1.70
16	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25	51	Condenser (.05 mfd. tubular)	30-4020	.35
17	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25	52	B. C. Resistor (235—32 ohms)	7998	.20
18	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25	53	Condenser (.09 mfd. tubular)	30-4122	.35
19	First I. F. Transformer	32-1289	.60	54	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
20	Compensating Condenser (1st I. F. secondary)	04000-M	.20	55	Resistor (Flexible—300 ohms)	33-3010	.20
21	Second I. F. Transformer	06622	1.20	56	Condenser (.09 mfd. tubular)	30-4122	.35
22	Compensating Condenser (2d I. F. primary)	04000-A	.15	57	Condenser (.09 mfd. tubular)	30-4122	.35
23	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25		Speaker Plug Socket	4957	.10
24	Volume Control (350,000 ohms)	33-5065	1.00		Line Plug Assembly with Cord (Less fuses)	L-1738	.85
25	Condenser (.09 mfd. tubular)	30-4122	.35				
26	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25				
27	Resistor (2 meg. Red-Black-Green)	5872	.25				
28	Resistor (1 meg. Brown-Black-Green)	4409	.25				
29	Condenser (.00011 mfd.—mica)	30-1006	.35				
30	Condenser (.00011 mfd.—mica)	30-1006	.35				
31	Condenser (.01 mfd. tubular)	30-4124	.25				
32	Condenser (.00025 mfd.—mica)	3082	.35				
33	Condenser (.01 mfd. tubular)	30-4145	.25				
34	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25				
35	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25				
				58	R. F. Choke (Low voltage)	32-1375	\$0.40
				59	R. F. Choke (High voltage)	32-1348	.30
				60	R. F. Choke (High voltage)	32-1348	.30
				61	Condenser (.01 mfd. tubular)	30-4145	.25
				62	Condenser (.05 mfd. tubular)	30-4020	.35
				63	Power Transformer	32-7218	4.95
				64	Condenser (.5 mfd.—.5 mfd.—metal case)	30-4155	.85
				65	Condenser (.05 mfd. tubular)	30-4020	.35
				66	Resistor (30 ohms flexible wire wound)	33-3119	.25
				67	Resistor (30 ohms flexible wire wound)	33-3119	.25
				68	Condenser (.05 mfd. tubular)	30-4020	.35
				69	Condenser (.00041 mfd.—mica)	Inside 71	....
				70	Resistor (2,000 ohms)	Inside 71	....
				71	Vibrator Unit	38-5640	6.00

VIBRATOR AND RECTIFIER UNIT

ELIMINATION OF NOISE INTERFERENCE CAUSED BY THE FARM LIGHTING SYSTEM

The operation of a radio receiver directly from a 32 volt farm lighting system is sometimes interfered with by noises in reception, caused by the operation of the lighting system's charging equipment. These noises are radiated from the service lines and picked up by the antenna and lead-in. A certain amount of the noise also comes directly thru the lines. A whirring or crackling noise may be caused by sparking at the brushes of the generator; and a "clicking" by the sparks at the spark plug of the gasoline motor used to drive the generator, and by the operation of the "breaker" in the spark coil primary.

Installation of the proper type of antenna system is of considerable importance in eliminating these troublesome noises. For maximum freedom from noise the antenna should be the special Philco "Three-Purpose" aerial system, which was designed to prevent pick-up of noise by the antenna lead-in.

The antenna wire should in all cases be run in a direction from the house opposite to that of the service leads from the lighting system, as indicated in Fig. 8. Where the Three-Purpose System is used, the instructions furnished with it should be very carefully followed. Note that this system employs a special "transmission line" lead-in, at each end of which a special transformer is installed. The transformers must be installed as per instructions, and if this is done the transmission line (lead-in) will be completely noise-proof. All other necessary parts for the antenna installation such as ground clamps, lighting arrester, etc. are included with the Three-Purpose Antenna System.

Philco has designed a special interference-suppression and filter for 32 volt systems which will eliminate most if not all of the interference encountered in the majority of installations. This unit consists

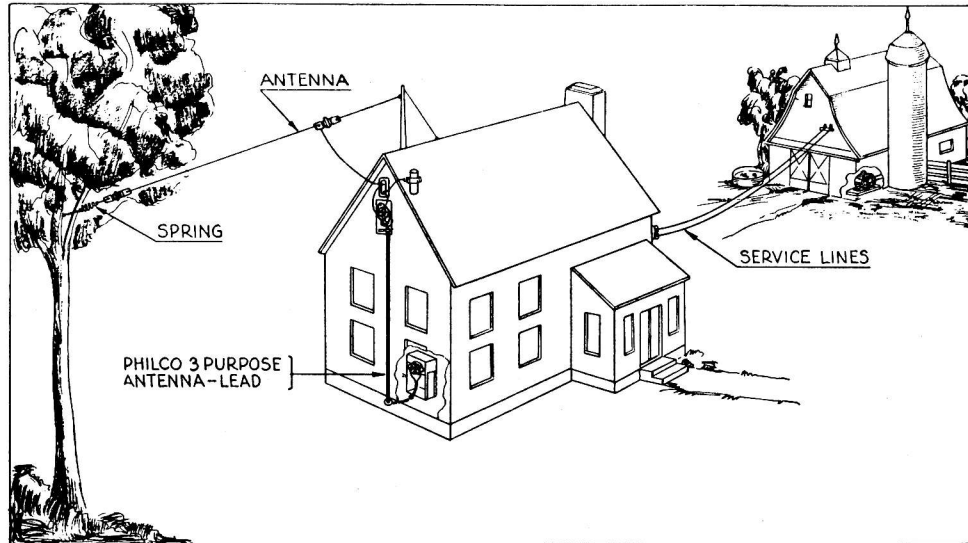


Fig. 8—Best Method of Antenna Installation for Model 32

of filter chokes and condensers, and is connected directly in the output lines of the generator as per instructions supplied with this special unit. The unit may be obtained from your Philco Distributor.

It is generally advisable also to connect a $\frac{1}{2}$ mfd. fixed condenser (Philco Part No. 30-4015) from each set of generator brushes to the frame of the generator (which should be grounded). The method of locating these condensers is indicated in Fig. 9 which shows a cut-away view of one end of a generator. These condensers help eliminate the whirring or crackling caused by the generator brushes.

To reduce the clicking noise caused by the ignition at the spark plug, a suppressor (Philco Part No. 4531) should be inserted in series between the terminal of the plug and the cable leading to it. See Fig. 10.

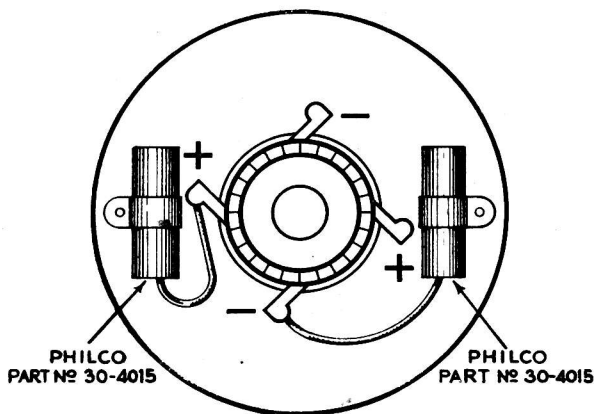


Fig. 9—Condensers Attached to Generator for Suppressing Interference

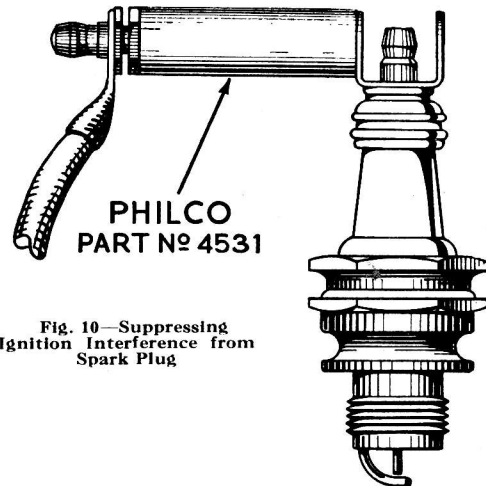


Fig. 10—Suppressing Ignition Interference from Spark Plug

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Service Department