THE FORD ELECTRICAL SYSTEM

Six years ago, in Volume 15, Number 3 of *The Vintage Ford* we published a compilation of all previous articles we had done on the Ford electrical system. Mot much has been added since that time but judging from the letters we receive, perhaps it is time to do it again.

In the pages that follow, every major article on the Ford electrical system has been edited and reprinted. In addition, we have included many of the Tinkerin Tips which pertain to the standard Ford electrical system.

The information contained in this one issue should solve over 90% of your Model T Ford electrical problems - and this information is all in one place!

THE FORD IGNITION SYSTEM

The Ford Ignition System is composed of three major sections; the flywheel magneto, the commutator or timer, and the ignition coils. In this article we present the description of the system from the Ford Service Course of the 1920 s, the repairing of the coil units with modern tools and components, and the restoration of the magneto by Murray Fahnestock as written for Ford Owner and Dealer magazine during the Model T era.

PARTS OF THE HIGH TENSION JUMP SPARK SYSTEM

The Ford ignition system is known as the High Tension Jump Spark System. It includes the following parts :

MAGNETO -to provide current (alternating).

INDUCTION COIL or COIL UNITS -- to transform the primary (magneto) current of 8 to 30 volts into a secondary current of 8000 to 20,000 volts. This is necessary as a current must be provided which can jump an air gap of at least one-quarter inch.

COMMUTATOR or TIMER -- (a) to close primary circuit and produce a spark in the cylinder at the proper time to fire the charge and start the power stroke; (b) to control passage of current thru different coils according to the firing order; and (c) to advance and retard the spark.

SWITCH - to start and stop current. When switch is "on or "closed current can flow and engine may be started. When switch is "off or "open current stops, and engine stops.

SPARK PLUG -to conduct high tension current into combustion chamber and provide a gap across which it can jump so as to ignite the explosive mixture.

WIRING - to conduct current from one part to another.

THE MAGNETO

TYPE - Flywheel type, rotating magnets, stationary field, alternating low tension current. This magneto is of the inductor type, but unlike the other inductor type magnetos, the magnets themselves serve as inductors. It is designed to be mounted on the flywheel, thereby becoming a part of the power plant. It is protected from mechanical injury and moisture which tends to short circuit and damage it, by the same case that houses the transmission. The coils are stationary to avoid trouble from commutation or moving contacts.

MAGNETO -- is composed of 16 "V shaped permanent magnets, mounted on, but mechanically insulated from the flywheel, and sixteen coils wound of insulated copper tape, one quarter of an inch wide and .015 thick, twenty-five turns to a coil, mounted on bosses on the magneto frame. The coils are wrapped with cambric, with fiber inserts in the center and bristol board insulating washers beneath when mounted on the bosses. The coils are connected with the winding of consecutive coils in opposite directions.

MAGNETS -- are mounted with similar poles of adjacent magnets together making sixteen magnetic poles each having twice the strength of a single magnet pole, so in each revolution of the flywheel the magnetism in the boss of each coil reverses sixteen times, producing sixteen electrical impulses, which at ordinary engine speed produces a continuous alternating current of much higher frequency than is used for house lighting. Because of this fact it is possible to operate lights from the magneto.

THE COIL UNIT

The coil unit consists of a soft iron core, primary coil, secondary coil, condenser, and the upper and lower bridge. The coil unit is also called an induction coil. Induction is the process by which a current is produced in one wire by another current running in another wire, near the first but not touching it. The illustration shows the relative position of the parts in the coil box.

CONSTRUCTION - The soft iron core is made up of 160 to 170 pieces of No. 20 Swedish soft iron wire and well insulated from the primary coil, which is wound around it, by a heavy paper tube in which the core is packed.

PRIMARY COIL -- is made up of two layers of No. 19 insulated copper wire. The first layer having 112 turns and the second 110 turns. The primary coil is then impregnated in hot paraffine and rosin for 20 minutes. This cements the pieces of wire in the core together, insulates and holds the windings of the primary in place.

SECONDARY COIL - is composed of 16,400 turns of No. 38 enameled copper wire, and between each two layers are three layers of paper insulation. The coil is wrapped in two spools with forty-one layers on each spool. The reason for building the coil in two spools is because there will not be as many volts difference between the consecutive layers at the same end of the coil as if it was wound in one spool. By wrapping in two spools the difference in voltage between the consecutive layers at the same end is just one half as much as if it was wound in one spool, and consequently the thickness of the insulation between the layers is reduced one-half and the diameter of the coil is reduced proportionately. The secondary coil is then placed in a vacuum tank for twenty minutes at 220 degrees F to make sure all moisture Is drawn out; then it is submerged in hot wax. A heavy piece of wax paper is wrapped around the primary coil and it is placed within the secondary coil making the induction coil complete.

THE CONDENSER - is composed of two pieces of tin-foil seven feet long and 3% wide. One piece of this tin foil is placed on the other one but l/8 to one side, with two layers of glassine paper insulation between one layer on top and one layer on the bottom. It is then rolled. up into a roll and placed in a vacuum tank for twenty minutes at 220 degrees F and then boiled in paraffine for twenty minutes, after which it is taken out pressed and to each end terminals are attached. The condenser must test from three to four microfarads. The condenser terminals have no connection within the condenser. These terminals are connected in the primary circuit with one terminal on each side of the contact points. The condenser is used to absorb the current of primary windings at the breaking of the contact points and thus prevent it from arcing across the points, which would soon bum them. As soon as the condenser is charged it seeks the path of least resistance to discharge or neutralize itself, which is thru the coil in the opposite direction. This causes the magnetic field about the coil to collapse very quickly. The more rapid the fall of the primary current the greater the force of the induced current in the secondary winding.

THE UPPER BRIDGE - is stamped out of brass and to this at the terminal post end is riveted a cushion spring which is stamped from bronze. The other end of the cushion spring contains a tungsten steel point and this end is held from .003 to .005 from the upper bridge by a spacer rivet.

THE LOWER BRIDGE - is a copper spring by means of which the amperage can be adjusted by increasing or decreasing the tension of the armature which is attached to the lower bridge by means of two screws. The armature is stamped out of Swedish steel and has a tungsten point on the free end, directly under and in line with the tungsten steel point on the cushion spring.

The parts are placed in the coil box, with the exception of the upper and lower bridge which are placed on top, in their relative positions and tar from 300 to 350° F is poured around them holding them in place, insutating them from each other, and protecting from dampness. The space between the points is adjusted from .029 to .031 . Coils are adjusted from 1.2 to 1.4 amperes.

PATH OF PRIMARY CURRENT

The current flows into the coil unit from the magneto or battery thru the bottom contact, thru the inner layer of the primary, then back thru the outer layer of the primary, thru a wire to the lower end of the condenser where it meets a wire leading it to the terminal post supporting the upper bridge, from there thru the cushion spring, thru the points, back thru the armature, thru the lower bridge terminal post which is connected by a wire to the upper end of the condenser, to the upperside contact on the coil box, from there to a commutator segment, thru the roller when in contact with the segment, which is grounded, thru the ground to the magneto or battery. This completes the primary circuit which magnetizes the core. The core attracts the armature and breaks the primary circuit by separating the contact points. At this moment the core is demagnetized and the armature returns to its normal position, again completing the primary circuit, and the operation described above is repeated.

PATH OF SECONDARY CURRENT

The secondary current flows from the coil to the lower side contact on the coil box, from there thru a high tension cable to the spark plug, jumps the air gap in the spark plug, and grounds to the engine, thru the metal of the engine to the commutator roller, and back thru the primary wire to the upper side contact on the coil box, to which the other end of the secondary coil is soldered, completing the secondary circuit. There is no electrical connection between the primary and the secondary circuit except where the secondary is grounded and this is done simply to save wire. The current is induced in the secondary coil by the increase and decrease of the lines of magnetic force around the primary coil caused by the making and breaking of the primary circuit at the contact points. When the points are closed induced current is entering the secondary coil but it does not attain strength enough to jump the spark plug gap until the points break, this gives the induced current an added impetus which then jumps the gap in the spark plug and completes the circuit.

THE COMMUTATOR

The commutator effects the make and break in the primary circuit. On it depends the point at which the spark plug will fire.

PARTS OF THE COMMUTATOR or TIMER --roller brush or center, segments, shaft, terminals, cover. The roller is attached to the end of the camshaft and revolves with it at half the speed of the crankshaft. The brush or roller makes contact with the insulated contact points, of which there are four in the commutator cover. When the roller comes in contact with one of the insulated points, the coil unit connected with it becomes operative. After the roller passes over the point the coil unit is inoperative. The commutator cover is connected with the spark lever on the steering column by a pull rod connection. By this lever the spark is advanced or retarded. By advancing the spark, the charge in the cylinder is ignited earlier, that is, at the end or slightly before the end of the compression stroke. This gives the piston the full force of the explosion on the power stroke. By retarding the spark the charge is ignited later, or after the piston has started down on the power stroke.

CARE OF TIMER - Keep wires firmly secured. Once a month remove the cover, wipe out inside (particularly the contacts) with gasoline and cotton waste. Oil frequently with a light oil (3 in 1). See that no grooves are worn in the fiber. See that the spring is in good condition, as well as the fiber washer on the terminals.

SPARK PLUG

The spark plug provides a means of igniting the gas in the combustion chamber. Champion X and Bethlehem plugs are used on Ford cars. The thread on this plug is half-inch pipe. Metric is used on foreign cars.

PARTS OF SPARK PLUG -Center wire or electrode, core or porcelain, shell and side wire, lock nut and gasket. Spark gap is 1/32 .

CARE OF SPARK PLUGS .- Remove lock nut and take out core, being careful not to injure it or the gasket. Clean off carbon with gasoline and wire brush or knife blade. Brighten points of center and side wires with sandpaper. Do not use sandpaper on glazed porcelain as it will roughen it, causing it to soot more readily. Replace parts carefully, screwing down lock nut firmly. Adjust gap to 1/32 .

TROUBLE HUNTING

IF ENGINE DOES NOT START - See if sparks are produced when the magneto terminal post is shorted to the cylinder block.

Magneto contact is free of foreign matter.
All wires are connected.
All contacts are clean and bright.
Insulation on wires is worn.
Switch is turned on.
Vibrators are properly adjusted.
Timer wires are properly connected.
Roller revolves, is set right, spring is strong, fiber washers are OK.
Spark occurs at plugs.
Spark plugs need cleaning.
Spark plug gap is correct, 1/32 .
There is gasoline in the tank and carburetor.
Carburetor primes properly.

ENGINE MISFIRES: CAUSES -
Dirty magneto contact point.
Loose wires.
Vibrator points pitted or dirty.
Vibrator points need adjusting.
Dirty timer segments (contacts).
Timer wires short circuited.
Dirty spark plugs, or gap too small or too large.
Loose spark plug core. (broken porcelain)
Loss of compression in one or more cylinders.
Condenser open or shorted.
Weak mixture from carburetor.
Water in gasoline.

ENGINE MISSES AT HIGH SPEED:
Bad spark plug.
Sticking valve.
Loose electrical connection.
Weak valve spring.
Spark plug gaps not set correctly.
Commutator case rough, causes roller to jump.

ENGINE MISSES AT LOW SPEED:
Weak exhaust valve spring.
Bad spark plug.
Exhaust valves need grinding.
Leak in intake pipe or connection.

ENGINE LACKS POWER:
Late spark.
Poorly fitting piston rings.
Valves sticking.
Leak in intake pipe or connection.
Engine full of carbon.
Clogged gasoline line.

TO LOCATE CYLINDER which is misfiring, short-circuit spark plugs with a screwdriver. If it changes the running of the engine or the sound of the exhaust it is a live cylinder. If it makes no change it is a dead cylinder.

TO LOCATE CYLINDER which is misfiring on a vibrator system: Hold down all vibrators but one and see if the remaining cylinder is firing. Hold down one vibrator at a time and see if it changes the running of the engine or sound of the exhaust. If it makes no change it is a dead cylinder.

LOOSE ROLLER IN TIMER will cause engine to misfire as follows: On suction stroke, backfires at carburetor. On compression stroke causes back-kick while engine is being cranked. Too late on power stroke engine will not run but gives weak explosion in muffler. On exhaust stroke gives strong explosion in muffler.

CONDITIONS NECESSARY FOR ENGINE TO START AND RUN:

1 Proper ignition,
2 Proper carburetion,
3 Sufficient lubrication,
4 Good compression,
5 An efficient cooling system,
6 Proper timing of spark and valves.

Given the six conditions above, the engine must run.

ALWAYS RETARD THE SPARK BEFORE CRANKING ENGINE, particularly with the battery system. If this is not done the engine will start backwards, and the operator may injure himself. When cranking with the electric starter, and ignition switch on magneto, advance the spark lever a little farther.

SPARK TOO FAR ADVANCED has the following effects:

1 When starting the engine runs backwards,
2 When the engine is idling, engine races and consumes too much fuel,
3 Engine under load causes knocking which may be made severe enough to stop the engine. Knocking hammers out the bearings and may cause them to come loose, resulting in injury to the engine.

CHANGING THE POSITION OF THE SPARK. This can be done by moving the commutator case to the right or to the left so that the spark occurs before or after the piston reaches top dead center on the compression stroke. The reason for changing the position of the spark is on account of the variable speed of the automobile engine, where the piston speed is constantly being changed. When the pistons are moving slow the spark must occur late, so that the gas will not expand before the piston reaches the top of the compression stroke, but after the pistons are starting down on the power stroke. If the pistons were traveling fast and the spark was retarded, the engine would lose power because the pistons would be quite a ways down on the power stroke before the expansion of the gas occurs. Therefore, when the pistons are traveling fast, advance the spark so that the spark ignites the gas before the pistons reach top dead center of the compression stroke, and by the time the pistons reach top dead center of the compression stroke the gases are just starting to expand and the pistons are driven down on the power stroke with the force of the expanding gas on them for the whole length of the stroke. If the spark were advanced with the pistons working slow, the expansion of the gas would take place before the pistons reach the top of the compression stroke, having a tendency to retard the speed and drive the piston in the opposite direction, causing a severe strain on the crankshaft and the bearings and most important of all losing considerable power.

COIL TROUBLES AND TESTS FOR LOCATING THEM

In trying the coil on the test stand: -

If the points vibrate with a heavy blue arc at the points and no spark on the test ring, then the condenser is open.

If the vibrator at the points is noisy with no spark on the test ring nor any arc at the points and the ampmeter hand flies across the dial, you have a short circuited condenser.

If the points vibrate properly with a weak or irregular spark at the test ring with the ampmeter registering, the secondary coil is short circuited.

If the points vibrate properly and no spark at the test ring, the secondary circuit is open.

If there is no vibration at the points and the ampmeter hand flies across the dial, then the primary is shorted.

If there is no vibration at the points and the ampmeter hand does not register, then either the points are at fault or the coil is dead. File and adjust the points and if the ampmeter still does not register or the coil still refuses to vibrate, then the coil is dead, and in order to find the exact location of the trouble, the test line should be used on the following tests. (Refer to the accompanying drawing for locations of the test points.)

If there are no sparks or only a few around the test ring it may be caused by dirty points, or one or more of the nuts on the top of the coil may be loose. This is especially true with the coils used on the Fordson tractor.

Editor s note: The service course now describes the testing of the coils with a lamp and D.C. voltage source which formed a test set of the day. Since such items are uncommon today, we have revised the procedure, using modem took and equipment.

1. Using an ohmmeter, measure the resistance between points 2 and 2. This is the secondary coil and should measure around 3,000 ohms (the value is not critical and will vary somewhat between coils, depending on the individual manufacturing tolerances and on the brand of coil). If the reading is considerably less or almost zero, the coil is shorted, either entirely or in part. No reading indicates the coil winding is open.
2. Using the low range of the ohmmeter, measure the resistance between 3 and 4. This should be a dead short (zero ohms). Since there is just a wire between

these two points (inside the coil box), an open would indicate the wire had broken or that the post at (4) is loose. It should be noted that different manufacturers might reverse the connections at 4 and 5. Most Ford coils are as shown; most K-W coils are reversed.

3. Break the circuit between 4 and 5 (by either removing the points or by slipping a piece of paper between the contacts). Using an ohmmeter, set for high resistance measurements, measure the resistance between 4 and 5. If the condenser is good, after an initial surge of the meter s needle, there will be an open circuit (infinite resistance). Any reading here indicates a leakage in the condenser. A very high resistance (a few million ohms) is usual for old coils but ideally there should be no leakage. Now reverse the ohmmeter connections. The meter needle should jump quite far, then settle back to the previous reading. If the resistance between 4 and 5 is low or zero, the condenser is shorted. If the circuit is open and there is no needle “kick the condenser is open or one of the wires from it is broken.
4. Using the low range on the ohmmeter, measure the resistance between 1 and 5. Most coils will measure about one-half ohm. This is the resistance of the primary winding. An open circuit indicates a break in the wiring or an open winding.
5. Now measure between 1 and 4 with the points installed and closed. There should be no difference in this reading and the one in test 4. If there is, the points are defective or the nuts that secure them are not tight.

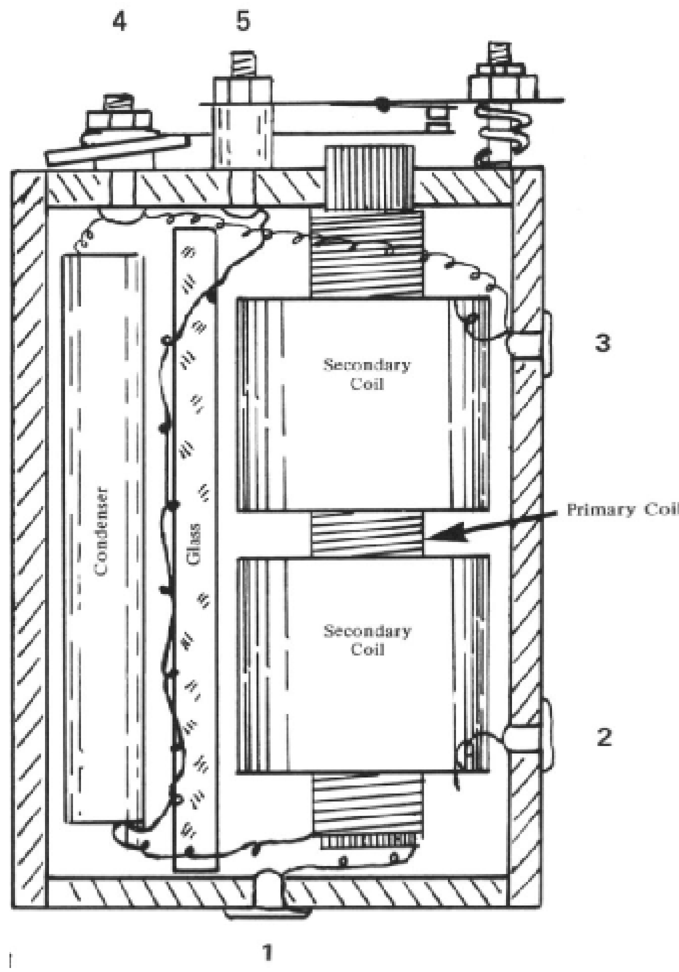
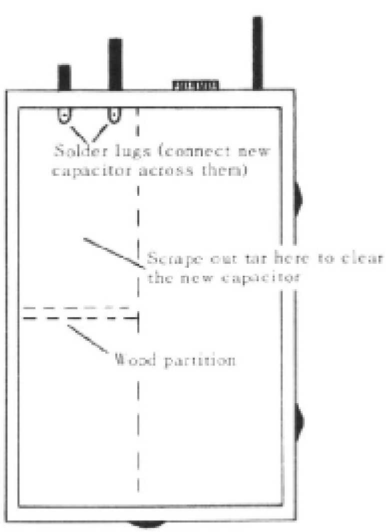


FIGURE 1



TYPICAL K-W COIL

REPAIRING THE FORD COIL UNITS

By Bruce McCalley

Until a few years ago, we recommended the purchase of new K-W coils and a slight modification of them rather than the repairing of old coils. For some time now, however, K-W is supplying coils in plastic boxes and this construction precludes any internal modifications. The new coils may be entirely satisfactory but we have had no personal experience with them.

Wood-box coils have turned up in the past few years at bargain prices but most of these we have seen have been 24-volt units and cannot be used in a Model T.

The problem with the K-W coils in the wooden boxes was that they tended to cause a surging condition and poor high-speed (for a Model T) performance. This was caused by the internal capacitor (condenser) not of sufficient capacity. Removing the old one and substituting a new capacitor of higher value ended the problem. The new plastic boxes preclude such modification.

If you can find the wood box K-W coils, the procedure is as follows:

Remove the side cover and scrape the tar away to make room for an additional capacitor as is illustrated in Figure 1. The new capacitor will connect to the two terminals at the top of the unit. It is not necessary to remove the original capacitor from *NEW* coils unless it is defective. The value of the additional capacitor is not critical; we have used anything between .25 and .47mf, 200 volts, with no problems.

If you have a set of the old original coils, either K-W or Ford, that have good boxes and that have been giving fair performance most of the time, simply changing the old capacitor in the box will make them good as new - better than new, because modem capacitors are better than those made in the old days.

Figure 2 shows the location of the old capacitor. It s exact size and position will vary with the make of the coil but in every case you will find a partition (usually glass) and the capacitor is between this partition and the side of the box. It is not necessary to heat the tar to remove the old capacitor. By scraping away some of the tar it is possible to pry out the old unit with a screw-driver. This will leave you with some wires; one pair that went to the bottom and one single wire that went to the top of the old capacitor.

The new capacitor is connected between the upper wire and the lower pair of wires. There isn t too much room between the partition and the side of the box and since modem capacitor manufacturers do not make units that look like the original, you must install a small one. Fortunately modem technology enables us to find small capacitors in almost any electronic supply house.

The new capacitor should have a rating of .47 or .5mf at 200 volts. Mallory, Sprague and others make these capacitors in a size that is suitable. The old capacitor was listed as having a value of about 3mf; most of those we have checked have been 1.5mf. The lower value of .47 or .5mf has proven quite satisfactory.

After installing the new capacitor and soldering the connections, stuff wood or cardboard in to fill the space and support the new capacitor. Those of you who enjoy a real mess can fill the space with hot tar.

Before going to the trouble of installing a new capacitor, though. it might be advisable to be sure the windings of the coil are good (in other words, that the capacitor is the only thing that is bad). This can be done by shorting out the points of the coil you are going to repair and connecting this coil in series with a known-good coil as shown in Figure 3. By doing this you have eliminated all but the windings of the coil in question and are letting the points and capacitor of the good coil do all the work. If the coil is good you will get equal sparks from the high-tension terminals of both coils. If the spark is weak or missing, find yourself another coil.

The schematic diagram to the right shows the typical K-W coil wiring. The Ford-made coils are similar except that the connections to the points are reversed.

FIGURE 2

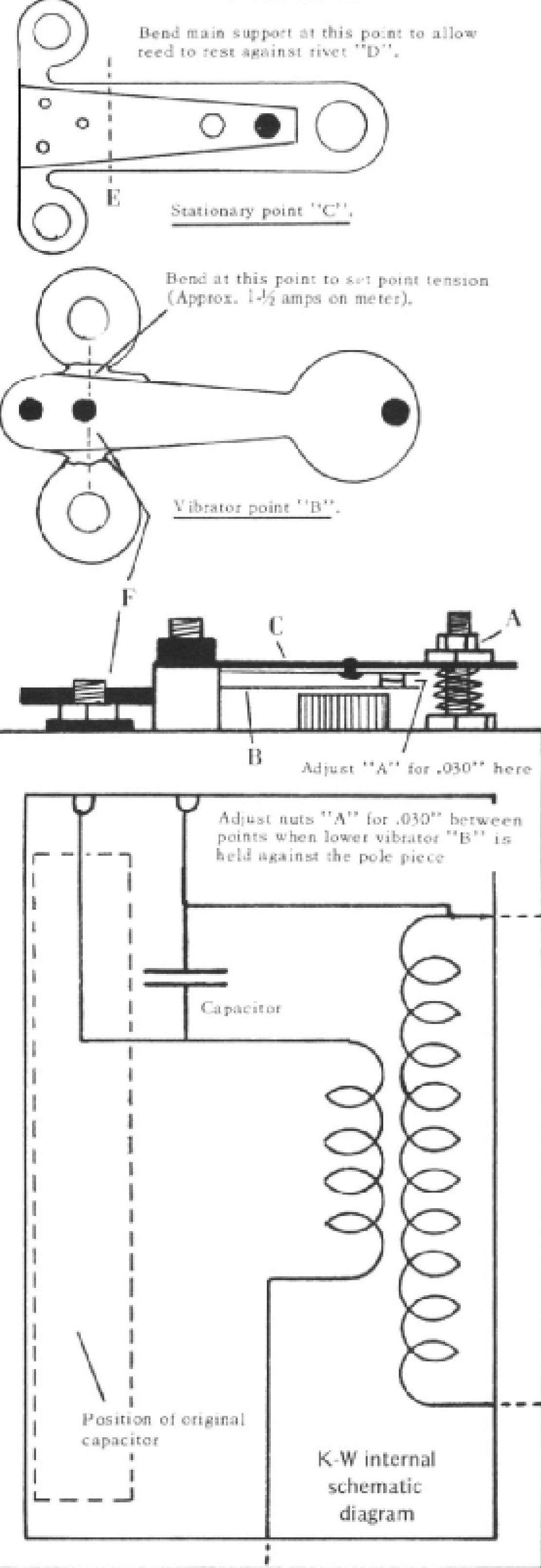
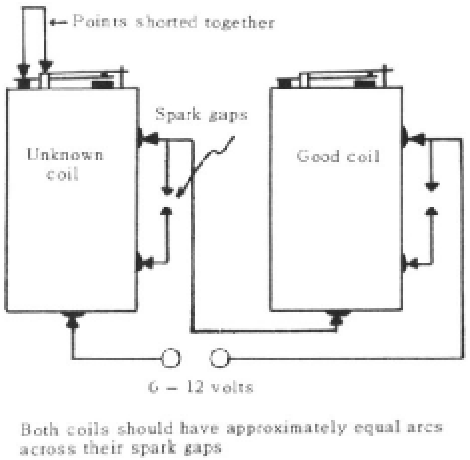


FIGURE 3



CHECKING AN UNKNOWN COIL TO SEE IF ITS WINDINGS ARE GOOD

When you have the capacitor installed and the cover replaced on the box, remove the points and other parts from the top. Clean up the box (a good household detergent and not too much water will do wonders) and sand it smooth. It is generally easier to clean the top and contact side of the box as well as possible and then paint these two surfaces with a flat black paint. Be sure to mask the screws and contacts before painting. The rest of the box can be varnished.

If the old points are in good shape (plenty of contact area left), clean them up and perhaps file them to remove any pits. The upper contact has a movable brass spring-like support for the contact point. This should be free to move up and down between the main body of the support and the head of the retaining rivet. If the spring is not free to move, bending the support at “E, Figure 2, should do the trick. The brass spring should rest against the head of the rivet, with not too much tension.

Install the points on the coil box. Often the wood is compressed around the studs that hold the points and this will prevent proper adjustment. If this condition is found, use small washers to fill in the depression, raising the point supports to their proper position. Adjust the two nuts (“A in Figure 2) so there is about .030-inch clearance *between the points* when the lower reed is held against the pole piece. Note this clearance is *between the points, not between the lower reed and the pole piece!* Tighten the two nuts securely. Be sure the contacts are square with each other and that they meet so their contact surfaces are parallel. (None of these settings are critical so far as the operation of the coil is concerned but they do effect the life of the points.)

When the points are tightened down, connect the coil to a test jig such as is shown in Figure 5 and adjust the contacts by bending the lower reed “B, Figure 2, so that the coil draws between 1.3 and 1.5 amps. The exact current flow is not critical - anywhere between 1.25 and 1.75 is OK. Note the adjustment is made by bending the lower reed support, not by the two nuts that set the point clearance.

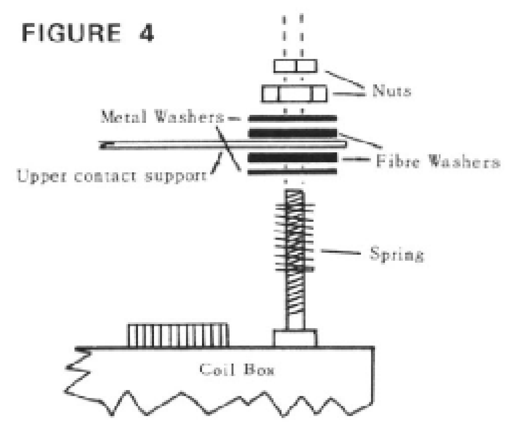
Figure 2 shows the internal schematic of the K-W coil. The Ford-made coils are similar except that the connections to the vibrator points are reversed; the upper “button on the coil box connects to the lower (vibrating) point instead of the upper one. The adjustments are the same in either case.

In the many coils we have “rebuilt we have found no brand or style to be better than another. Many have told me that the ones with the brass tops are the best but aside from being a little prettier, their only advantage is that they are taller and tend to short out in a steel coil box.

Earlier coils such as were used in the 1909-13 Fords are another story. The same cure would apply but due to their construction, removal of the old capacitor means melting the tar and you do so at some risk. The adjustment of the contact point also differs.

When properly adjusted, the coils should put out a spark that will jump about 3/84nch. Each coil should draw the same amount of current.

FIGURE 4



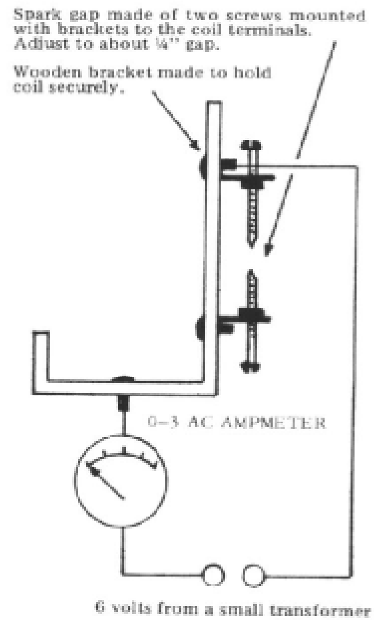
DETAIL OF CONTACT SUPPORT ASSEMBLY

Proper operation of the system is quite dependent on a good magneto and timer. It is next to impossible to get decent performance when operating the coils on a battery. A good magneto will put out around thirty volts at speed and this results in increased spark at the plugs. While the engine may idle better on battery, the weaker (at speed) spark will cause missing and stuttering at a good cruising speed. The coil points can be set to draw more current, perhaps as much as three amps, to give fair high speed performance on battery but the point life will be short, as well as that of the timer.

The timer must be in good condition. The roller must be clean and tight (but not frozen) on its shaft and the contact segments should be smooth, even and clean. A good electrical connection from the segments to ground (through the roller and camshaft) is the important thing here. Worn and rough contacts, regardless of the type of timer, will cause irratic operation of the coils. The timing gear cover must be installed so that the timer case is concentric with the camshaft; if it is off-center the roller (or brush) will tend to oscillate as it revolves and this tends to cause missing, poor timing and faster wear of the roller assembly.

The connections in the coil box on the dash must also be clean and tight. The coils should not miss-fire as they are pressed forward, backward and side to side in the box. The ignition switch must make a positive and secure connection.

FIGURE 5



SUGGESTED COIL CHECKING FIXTURE

TINKERIN TIPS

SOME NOTES ON COIL ADJUSTMENT

When the vibrator tension on a coil is increased, or more vibrations are produced in a given time by screwing down on the vibrator adjusting screw, the secondary voltage is increased and the primary will draw more current. The same thing can be accomplished by tapping down on the end of the vibrator spring, forcing the points together more tightly. Therefore, the proper adjustment in this area for certain current values is necessary in order to prevent the building up of too high a voltage which is liable to puncture the insulation of the secondary winding or “sputz the condenser. When connected to a six-volt circuit, a coil unit should draw between 1.1 and 1.5 amperes as read with an ampmeter connected in series with the primary of the coil.

As a starting place, when the vibrator spring is pressed down against the iron core, the air gap between the points should be l/32 . Here it is very essential that the vibrator spring should have the proper tension since this determines the amount of current drawn by the coil, as well as the effectiveness of operation.

The tension (which really determines the number of vibrations in a given time) can be adjusted by the vibrator adjusting screw but it is important that the vibrating contact have the proper initial tension. This can be roughly set as follows:

Remove the top bridge. If tungsten points are used the vibrator spring should stand about 1/4 above the iron core. If K-W “Sparkite springs and points are used (and there are still quite a few around) the spring tension is a little less, owing to the low surface tension of the point material, therefore the vibrator can be set about 5/32 above the iron core.

It is important that the vibrator spring tension be correct, as stated, before attempting to adjust the tension of the vibrator spring with the adjusting screw.

Hard starting can be due to the vibrator adjustment. If there is too much tension on the vibrator spring the weak current generated by the magneto at cranking speeds will not be enough to cause the vibrators to buzz and it will be difficult, if not impossible, to start the engine on “Mag. Too little tension will not let the vibrators respond quickly and the engine will not run evenly due to the weak spark generated, especially at touring speeds.

A defective coil unit can be detected by noticing if the vibrator buzzes without producing a spark. It is a good idea to make sure it is the coil by replacing it with a known-good one. A heavy (and hot) spark at the points, accompanied with a weak spark at the spark plug, usually indicates a defective condenser.

MORE ON THE MODEL T COIL

When a Model T is equipped with a battery, it can be used for testing the coil units as follows: