

INSTRUCTIONS

*For Using
The*

**FORD AGENTS'
COIL UNIT *and* MAGNETO
TEST STAND**



Introduction

WE have issued this pamphlet for the purpose of enabling Agents to obtain the maximum benefit from the Ford Agents' Coil Unit and Magneto Test Stand.

In addition to the method to be followed in testing coil units, magnetos, spark plugs and commutators, we show the manner in which different troubles may be determined and the course to pursue in overcoming them. A thorough understanding of the contents of this pamphlet will materially assist the Agent in locating and remedying ignition trouble on the Ford Car.

FORD MOTOR COMPANY.

The Spark Coil

The Ford Spark Coil is of the open core transformer type. It is used to change the low tension alternating current received from the magneto to a high tension current of from 8,000 to 20,000 volts, sufficient to jump the gap between the spark plug points.

The spark coil unit consists of several parts as follows:

(1) A vibrator, in the magneto or primary current circuit.

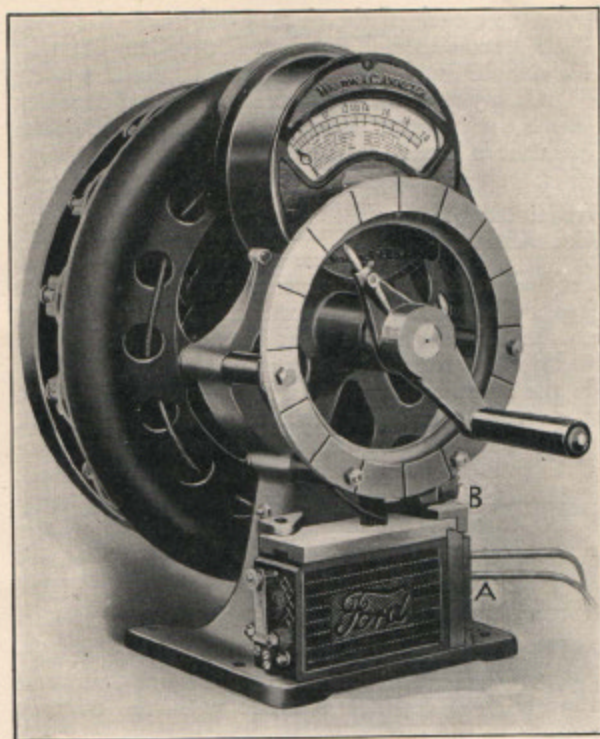
(2) The primary coil, which is also in the magneto or primary current circuit.

(3) The condenser, terminals of which are connected across the vibrator terminals. As the current is made and broken rapidly, the condenser absorbs the spark which otherwise would form at the points of the vibrator.

(4) The secondary coil, into which the high tension current, flowing through the secondary circuit, is induced. The spark plug is in this circuit.

The primary coil, condenser and secondary coil are sealed inside of the coil unit box, which should never be opened. The vibrator is on top of the box and is the only part that we will discuss. There are four of these spark coil units, each with its vibrator, on every Ford car. The four vibrators should be uniformly adjusted, otherwise irregular running of the motor will result, with consequent racking of the crank shaft and bearings.

(2)



To Test the Coil Units

To test a spark coil unit, place it in the receptacle, as shown in the illustration on Page 3, making sure that it is pushed snugly to the right so that good contact will be made at the proper points. See that the wires attached to the binding posts at point "A" on the outside at the right of the receptacle are not in contact with each other or with anything else. Turn the crank at a moderate speed (about 150 to 175 revolutions per minute) and if the vibrator on the coil unit is properly adjusted and the unit in good condition the hand on the meter will register between 1.2 and 1.4. Also one good spark will jump from the ring to the

(3)

pointer at each of the sixteen points on the ring. If the hand on the meter does not register between 1.2 and 1.4, or if three or even four small sparks, or possibly no spark, appear at some of the sixteen points the vibrator is not properly adjusted or the coil unit is broken down internally.

Adjusting the Coil Units

To adjust a coil unit, first see that the vibrator bridge is set, by means of the thumb nut, so that when the vibrator spring is pressed down the gap between the vibrator points is $\frac{1}{16}$ ". You should be able to see light between the vibrator bridge and the cushion spring which is fastened to the under side of the vibrator bridge. Remove the screw at the rear of the vibrator spring, and, with a screw driver small enough to go through the hole from which the screw has been removed, without damaging the threads, turn the adjusting screw to the right or left until the hand on the meter registers between 1.2 and 1.4, and one good spark jumps from the ring to the pointer at each of the sixteen points.

When replacing the units in the coil box be sure that all of the contacts on the units are clean and that a good contact is made with the contact springs in the box.

When necessary new vibrator parts may be installed, but if the unit is found to be broken down internally a complete new unit should be used. Under no circumstances should the coil unit box be opened and attempts made to correct internal trouble.

NOTE—If the coil unit is adjusted so that not more than two sparks jump from the ring to the pointer at each of the sixteen points the unit will work satisfactorily. In fact, in cold weather, to facilitate starting, it is sometimes advisable to have the unit so adjusted that two sparks will appear at each of the sixteen points. However, ordinarily it is preferable to concentrate all of the energy into one good spark rather than divide it between two sparks.

The Magneto

The magneto of the Model "T" motor is of the alternating current type, using rotating permanent magnets and stationary field coils for generating the current. The design is extremely simple, exceedingly strong and practically trouble proof. The magneto consists of sixteen magnets and sixteen coils and gives a constant current with a frequency and voltage proportionate to the speed of the engine.

To Test the Magneto

To test a magneto it is not necessary to remove it from the car or disconnect any wiring. Start the motor of the car and run it at any moderate speed, being sure that all four coil units are in good condition and properly adjusted, that the light switch is turned off and that there is no coil unit in the receptacle of the Test Stand. Then take a double conductor wire, such as a piece of lamp cord, attach one end of the double wire to the two binding posts on the lower right hand side of the Test Stand, as shown in the illustration on Page 3, at point "A," and attach the other end of this pair of wires to the car, one at the magneto terminal on the transmission cover or on the dash, and the other to any part of the motor casting. If the hand on the meter registers .8 or more the magneto is sufficiently strong. If the hand does not register .8 the trouble is undoubtedly due to one of the following causes: (1) Dirty magneto contact assembly; (2) Grounded coils; (3) Short circuited coils; (4) Reversed magnets; (5) Weak magnets.

NOTE—As a general rule if the trouble developed gradually it is due to a dirty magneto contact assembly or weak magnets, whereas if it developed suddenly it is undoubtedly due to grounded or short circuited coils.

Magneto Contact Assembly

To determine if the trouble is in the magneto contact assembly, remove it from the transmission cover and clean thoroughly. Also clean the contact on the magneto coil assembly. Then

replace the contact assembly and again test the magneto. If the trouble was in the contact assembly the hand should now register .8 or more. If it does not it will be necessary to make tests for other causes.

Grounded Coils

Grounded coils are usually caused by failure to occasionally drain the oil from the crank case, as outlined in Answer No. 99 of the Ford Manual. The oil becomes filled with metallic sediment which sometimes lodges in the space between the coils and the casting, thus grounding the coil. Another frequent cause is a small piece of metal or cotter pin becoming lodged between the coil and the casting.

To test for a grounded coil, remove the coil assembly from the car. Then unsolder the end of the ribbon winding on the first coil from the ground connection, and connect to a battery. Connect the other terminal of the battery to one of the terminals at "A" on the Test Stand, and connect the other terminal of the Test Stand to the ground of the metal of the coil assembly. If there is a grounded coil the meter will show a reading.

In case of a magneto with a grounded coil it is advisable to install a complete new magneto coil assembly. The coils are carefully wound to specifications and should not be repaired, as tampering with one coil will unbalance the working of the others.

Short Circuited Coils

Short circuited coils usually result from rubbing or other causes which cut through the insulation and allow the various windings of the coils to come in contact with each other. In almost every instance a careful inspection will locate any trouble of this nature.

As in the case of grounded coils, a complete new magneto coil assembly should be installed rather than attempt to repair the damaged one.

Reversed Magnets

To determine if the magnets are reversed, remove the transmission cover and with a small hand compass test the polarity of each magnet as the fly wheel is turned slowly. Make sure that the north pole of the compass points to one pair of poles of the magnets and that the next pair attract the south pole. The pair immediately following should again attract the north pole of the compass, and so on throughout the complete set.

In case one or more magnets are found reversed it will be necessary to remove the reversed magnets and find their proper location. This can be determined by the punch mark in the center of the magnet and the upset at the ends and bend of the magnet. The punch mark and upset should be on the side away from the fly wheel. See that like poles are together.

Weak Magnets

It is almost impossible for the magnets to become demagnetized unless acted upon by some outside force, such as connecting a storage battery to the magneto terminal, or by defective wiring where storage batteries are used. Rough handling of the magnets, such as hammering or dropping them, will also tend to demagnetize them. However, if the test shows that the trouble is not due to dirty magneto contact assembly, grounded coils, short circuited coils, or reversed magnets, the magnets have become weak.

In case of weak magnets it is advisable to install a complete set of new magnets rather than attempt to recharge the old ones.

The Spark Plug

To Test the Spark Plugs

In the illustration on Page 3, a spark plug is shown at point "B," in position for testing. To test a spark plug for a cracked porcelain, place a good clean coil unit, which you know to be properly adjusted, in the receptacle of the Test Stand and then place the spark plug on the receptacle so that

the thumb nut on the top of the plug is held firmly in the clip and the iron part of the plug rests on the metal frame. (Care should be taken to see that there is a $\frac{1}{8}$ " gap between the spark plug points). Next place a piece of mica or fibre about the size of a postage stamp between the points of the spark plug. Turn the crank at a moderate speed and if the spark plug is in good condition the spark will jump around the mica or fibre and the hand on the meter will register between 1.2 and 1.4. If there is a cracked porcelain the spark will be forced through the crack.

Commutator and Commutator Wiring

To Test the Commutator or Commutator Wiring

Start the engine and run it at a moderate speed. Connect one of the Test Stand terminals to the magneto terminal on the dash or on the transmission cover, and touch the other terminal successively to each of the commutator terminals. The meter should read .4 or more at each terminal. In case the reading is less than .4 it is an indication that the commutator is worn and making poor contact. Then touch the same terminal successively to each of the commutator terminals on the dash and if the same reading is not shown there it would indicate that the wire is broken. While making this test it would be well to slightly pull the commutator wires to assure the separation of any broken strands.

In case of trouble with either commutator or wiring, replace such parts as are necessary.

Care of Test Stand

THE Test Stand should be oiled occasionally and if it is used frequently the pointer, which revolves inside of the ring, should be cleaned every day or two with fine sand-paper. This is necessary, as the spark will cause oxidization of the pointer. The pointer should be adjusted so that the clearance between it and the ring is about $\frac{1}{8}$ " or $\frac{1}{16}$ ".