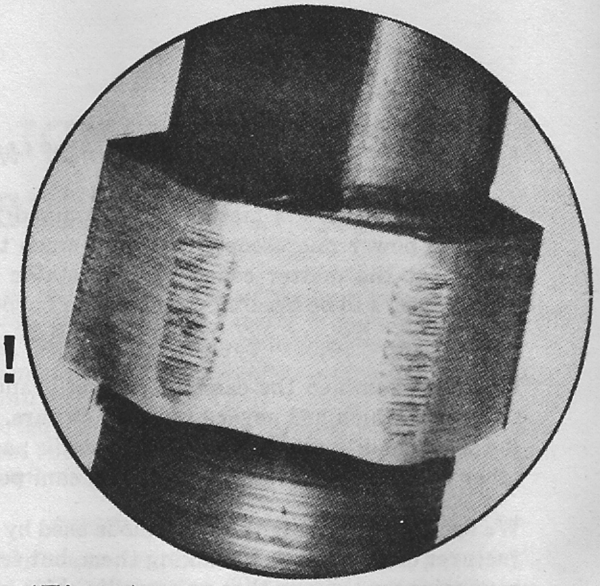
SERVICE BULLETIN No. 72-53

GUILTY

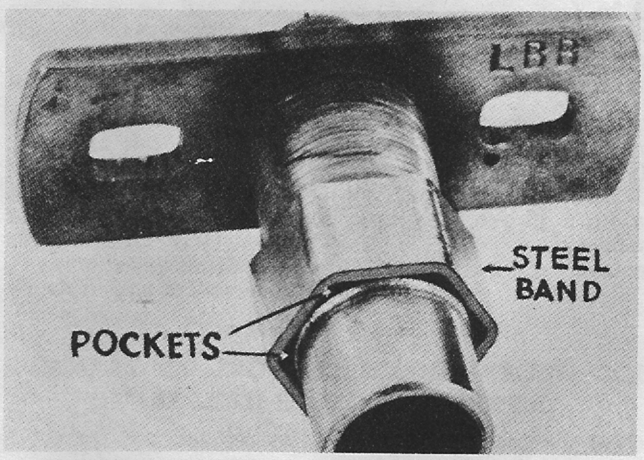
OF MURDER IN THE FIRST DEGREE!!!

Be on the lookout for a vicious murderer who will ruthlessly destroy breaker arms without let or mercy. His sharp, file-like grooves will rub out the life of the best Bakelite bumper block in as little as 200 miles. The unretouched photograph (Fig. 1) shows up the file-like corners very distinctly.



(Fig. 1)

We are talking about the distributor cam that is being furnished by one ignition manufacturer and is being used on many cars in the past couple of years. Up to then the cam was made of solid metal and of comparatively heavy thickness. The new type of cam is a two-piece assembly, consisting of a carrying post and a six or eight sided thin steel band, forced or sweated on to the post. *(Fig. 2)*



Since the new type of cam appeared, we have been receiving inquiries from the trade regarding abnormal wear of breaker arm Bakelite bumper blocks, when used on cars equipped with the new type cam. We have seen breaker arms of various makes with worn down bumper blocks, where about ⅔ of the bumper block had been worn off in a comparatively short length of service. Invariably, an examination of such bumper blocks showed deep scoring of the rubbing surface, as if they had been worked over with a rough file; also the breaker arm itself was covered with a film of pulverized Bakelite.

We have been investigating this matter right along and checked a number of the new type cams, finding a considerable variation in the hardness of individual cams.

It was through the cooperation of one of our good customers, however, that we were able to secure conclusive evidence of faulty cam service and lay our hands on an actual offender, the murderer shown in our photograph.

This customer had written as follows:—*"In a search for information rather than in registering a complaint, our Studebaker dealer, ... has called our attention to the fact that they are experiencing excessive cam wear in their cars that are equipped with Auto-Lite distributors. The Delco-Remy equipment does not show this tendency although this dealer is using 'STANDARD' ignition exclusively."* The customer was kind enough to send in the cam you see in the photograph.

We went to work on this cam and made the following disclosure:

> The Rockwell hardness readings on old type solid cams varied from C-55 to C-60, which is quite hard. On new type cams, the hardness readings ran from C-50 to C-52, much softer, as you can see. But on the cam sent in by the customer, the reading was C-43, which is *really* soft.

We might have jumped to the conclusion that it was the softness, and softness only, of the cam that was entirely responsible for the scoring of the cam, had we not been fortunate in receiving seven more worn cams from the same customer. We noticed that in each of these cams, there was present in the pockets formed between the six-sided steel band and the round post to which the band was brazed (Fig. 2), an accumulation of matter, which, to the eye, looked like dirty grease. However, when we

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(Continued) GUILTY OF MURDER IN THE FIRST DEGREE!!!

dug out some of this matter and examined it under a hundred power microscope, we found much to our surprise that the matter consisted of metallic chips and what appears to be brazing material and hardened brazing flux.

We then examined the cams of several brand new distributors, which had never been used on cars, and found the same condition existed, that is, metallic particles and other substances were present in the cam pockets.

We are not familiar with the methods used by the manufacturer of these cams in making them, but from a basic viewpoint we can say that no metallic chips or abrasive material should be present on cams or even near cams, as such substances must sooner or later be shaken out of the cam pockets and affect the surface of the cams. It is possible, for instance, for metallic chips to become embedded in the rubbing surface of the Bakelite bumper block, which would, of course, score the cam, causing it in turn to wear down the Bakelite block, much in the fashion that a scored brake drum and brake lining will mutually wear each other down. We can also surmise that the comparatively softer temper of these cams will aggravate the scoring tendency of the foreign substances and hasten ignition failure.

THE REMEDY? Frankly, we cannot suggest any, as the fault is basic in the manufacture of the cam and should be corrected at the source. We can only offer our recommendation that this type of cam be correctly lubricated by applying a *light* film of high temperature grease to the cam, and it should be checked often.

As soon as you find any signs of roughness or scoring on the cam, the only thing to do is to replace it immediately and without hesitation, with the further precaution of thoroughly cleaning the new cam and washing out as much as possible of the foreign substance out of the pockets. Otherwise you will have to reconcile yourself to extremely short breaker arm service.

SERVICE BULLETIN No. 73-53

WHY 12 VOLTS?

and how it is accomplished

In 1953, several models of well-known cars have come equipped with 12-volt systems. Questions are being raised as to the reasons for the change from 6-volts and the changes involved, and we will try and give you the answers to both angles.

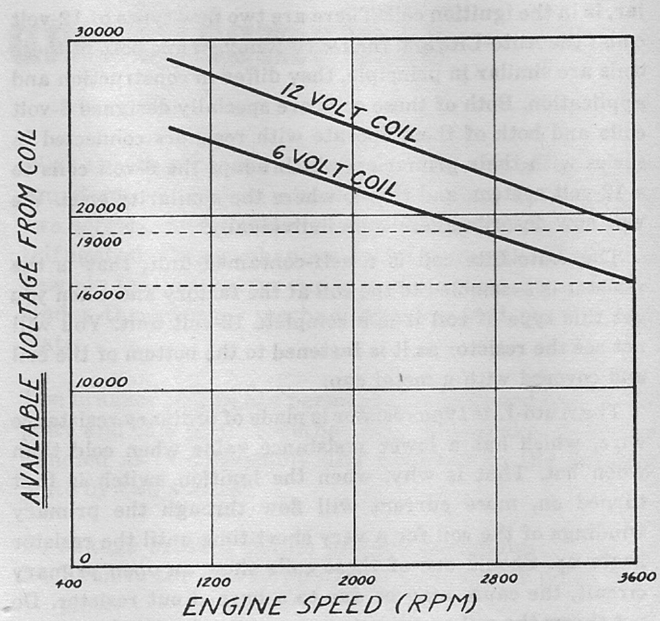
The two main reasons for a 12-volt system are:

1. **The new higher-powered engines with their high speeds and high compression ratios require greater available voltages in the ignition system.**
2. **The growing requirements for more and more electrical power to feed the numerous accessories furnished on cars.**

Let us discuss the two reasons in detail. The first reason, that is the greater voltage requirements of new type engines, can be explained in the following manner. Compression in the combustion chamber of the gasoline engine bears the same relation to the firing of a spark plug as does resistance in an electrical conductor to the passage of current through it. The higher the resistance of the conductor, the less current can flow through it; the higher the compression ratio, the weaker the spark. You can force more current through a conductor of a certain resistance value by increasing the voltage across the conductor; by the same token, you can increase the strength of the spark by increasing the voltage across the spark plug. This is one reason for increasing the system voltage from 6 to 12-volts.

Another factor is the higher speeds developed by the new type engines. With higher speeds, the 6-volt ignition coil does not get sufficient time to become thoroughly saturated and therefore cannot produce enough energy to create a good spark. The 12-volt system is one way of putting more energy into the coil at high speeds without overloading and burning the breaker points at the lower speeds.

If you consult the graph you will see an actual comparison of the available voltage outputs of 6 and 12-volt coils at the various engine speeds. Thus you will notice, for instance, that the 12-volt coil is capable of producing 19,000 volts at 3600 Engine RPM, while the 6-volt coil can produce only 1600 volts at this high speed. From this graph it is also obvious that the 12-volt system is capable of furnishing greater available spark plug voltages at all engine speeds, and, what is of the utmost importance, at the high engine speeds, where the 6-volt coil frequently fails.



The second reason for the 12-volt system, as we said, is the greater power required in late cars. In 1936, passenger car generators were capable of producing 22 amperes. In 1952, generator capacity increased to over 50 amperes and even this high output was found to be insufficient in some cases, as more and more electrical accessories were added. For all practical purposes, the limit of generator output was reached in 1952 with a 6-volt system as generators had become bulky and wiring heavy and clumsy. With a 12-volt system, the same amount of electrical power can be delivered with half the amperage, because power is measured in watts, which are simply amperes multiplied by volts. In other words, when a generator is required to deliver 600 watts, for instance, this amount of power can be delivered in two ways: 100 amperes at 6-volts ($100 \times 6 = 600$), or 50 amperes at 12-volts ($50 \times 12 = 600$). As it is the current in amperes flowing through a conductor that determines the required size or gauge of the wire, it is obvious from these figures that with the 12-volt system, smaller size wires can be used to deliver the same amount of power as the larger sizes would deliver in a 6-volt system.

Of course, with a 12-volt system many changes had to be made in the electrical units of the car. The battery, the starter, the generator, the ignition coil, the various electrical motors, the lighting bulbs – all had to be redesigned for 12-volt use. *However, the ignition distributor, the breaker*

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(Continued) WHY 12 VOLTS AND HOW IT IS ACCOMPLISHED

points and condenser remain the same as in the 6-volt system.

The design change which is of greatest interest to the service man, and with which he should be thoroughly familiar, is in the ignition coil. There are two new types of 12-volt coils: the Auto-Lite and the Delco-Remy. While both of these coils are similar in principle, they differ in construction and application. Both of these coils are specially designed 6-volt coils and both of them operate with resistors connected in series with their primaries, which adapt the 6-volt coils to a 12-volt system, and this is where the similarity ends. We will now describe these coils individually.

The Auto-Lite coil is a self-contained unit, that is the resistor is assembled to the coil at the factory and when you get this type of coil it is a complete 12-volt unit. You will not see the resistor as it is fastened to the bottom of the coil and covered with a metal cap.

The Auto-Lite type resistor is made of ordinary resistance wire, which has a lower resistance value when cold than when hot. That is why, when the ignition switch is first turned on, more current will flow through the primary windings of the coil for a very short time until the resistor heats up. Should one of these coils show an open primary circuit, the cause may be due to a burned out resistor. Do not throw the coil away, but pry open the four little tongues that hold the metal cap to the bottom of the coil and remove the cap. The resistor will thus be exposed and, if you find it burned out, you can remove it by unscrewing the two fastening screws. A new resistor can then be installed, the metal cap replaced, and the coil used as before.

Please let us caution you at this point: *Under no circumstances short out the resistor and permit the coil to operate this way. You will burn up breaker points galore and shorten the life of the coil.* You will simply be putting 12-volts across a 6-volt coil and this will push double the normal current through the breaker points.

The Delco-Remy 12-volt application differs from the Auto-Lite in the method of using the resistor. In the Delco-Remy 12-volt system, the resistor is a separate unit mounted on its own bracket and is connected to the coil by a lead. The resistor is of a constant temperature type, that is, it is not affected by temperature and its resistance is approximately the same when it is cold as when it is hot. However, in this system a feature is employed which shorts out the resistor while the engine is being cranked and automatically puts the resistor back into the coil circuit as soon as the starter switch is released. This arrangement connects the 6-volt coil directly to the 12-volt battery, producing a high voltage coil output during starting only. Naturally, while this is happening, the breaker points have to carry an abnormal amount of current, but as the starting time is short, it is hoped that the breaker points will not be affected too much by the overload. It is our opinion that the effect on the breaker points will vary with the type of use of a particular car: Infrequent starting will probably have no bad effects; frequent starting may affect the points to some extent.

The caution against the repairman shorting out the resistor applies to the Delco-Remy coil as well as to the Auto-Lite. *Just don't do it.*

All the other 12-volt electrical units on the 1953 cars require no special explanation or instructions, as their basic construction remains the same as before, except that they are adapted to 12-volt use by the proper redesign.

SERVICE BULLETIN No. 74-53

HOW TO ELIMINATE
breakage of rotors on Ford cars

When Ford first changed to a conventional type distributor in 1948, a considerable amount of trouble was experienced in the field due to the breakage of rotors. Our Blue Streak Service Bulletin #59-49, written in 1949 when the present Ford distributor was comparatively new, attributed the cause of rotor breakage to the snug fit of the rotor on the rotor shaft (Figure 1) and suggested a method for installing the rotor that would minimize the trouble.

Since then, certain changes were made in the Ford distributor itself that helped still further to reduce rotor breakage. The first change consisted of a flat spring with a slightly radiused surface that was inserted into a slot in the distributor rotor shaft alongside the flat section of the shaft. The rotor now fitted over a spring surface which had a certain amount of "give" instead of the previous unyielding solid shaft. (Figure 2)

This arrangement helped to a certain extent, but not entirely, as the spring insert was comparatively stiff and the rotors still broke. So another change was made in the Ford distributor in the form of a spring clip which slips over the end of the rotor shaft. This clip is much more flexible than the flat spring, but we still hear of occasional rotor breakage, especially in the older models of Ford distributors. (Figure 3)

We believe, therefore, that the following instructions in the Ford Service Letter, a publication issued by the Ford Motor Company, will be of interest to the trade:

> "CORRECTION FOR DISTRIBUTOR ROTOR BREAKAGE—A recent investigation has shown that if the various component parts in the distributor all fall on the one side of the specifications, there is a possible interference of approximately 0.004" between the end of the distributor rotor blade and the contacts of the distributor terminal housing.
>
> "When necessary to install a new rotor or terminal housing, it is recommended that this condition be checked by removing the distributor from the engine and rotating the shaft by hand with the terminal housing in place. The same interference can come about if the distributor terminal housing is not set squarely on the distributor base.
>
> "The interference can be corrected by removing approximately 0.005" to 0.006" of metal from the end of the blade. This can be done with either emery cloth or a file. (Note: be sure to remove all metal chips and filings after removing material from rotor.) Care must be exercised not to remove more than the specified amount of metal."

Please note that the "distributor terminal housing" or "terminal housing" mentioned in the Ford instructions simply means "distributor heads", and what the instructions mean is that **when you remove the distributor from the car, make sure that the distributor head is on squarely and not cocked over to one side, and then rotate the shaft.** You will be able to feel through the shaft if the rotor segment touches the distributor head firing insert. If it does, you can then make the corrections as recommended in the Ford instructions.

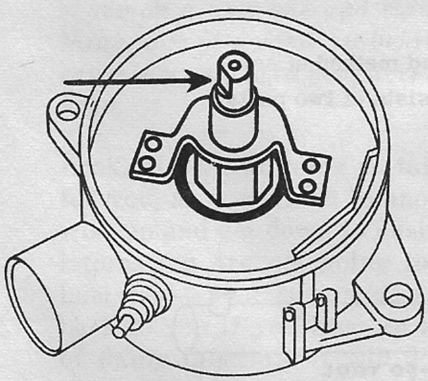
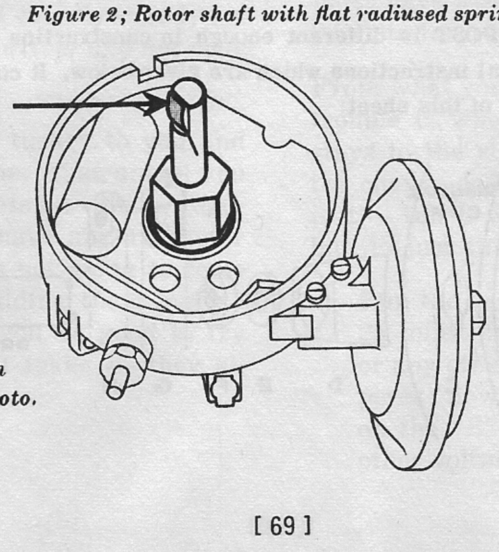


Figure 1; Rotor shaft with flat keyway for roto.

Figure 2; Rotor shaft with flat radiused spring.



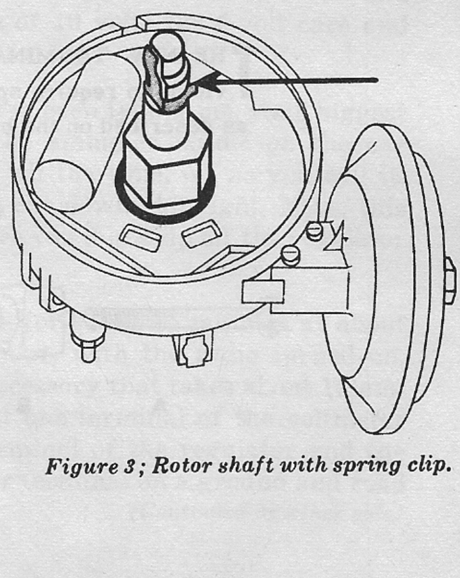


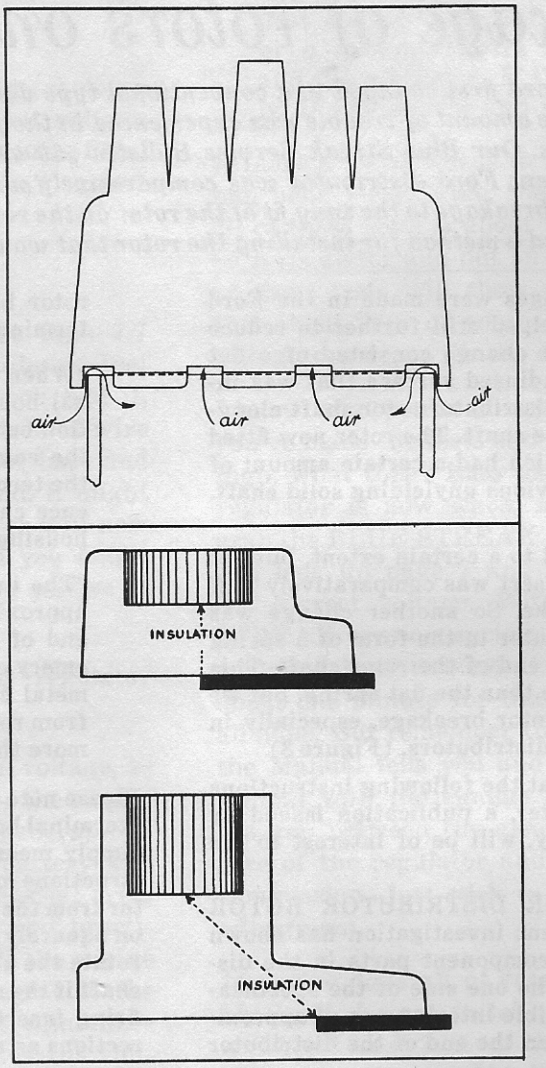
Figure 3; Rotor shaft with spring clip.

SERVICE BULLETIN No. 75-53

NEW CHEVROLET DISTRIBUTOR (Production of 1953 and on)

The 1953 Chevrolet distributor is quite different from the type of distributor used on the Chevrolet since 1933. The main differences between the old and new distributors are in the improved construction of the distributor head and rotor and also in the terminal post to which the breaker arm spring and the condenser lead are fastened.

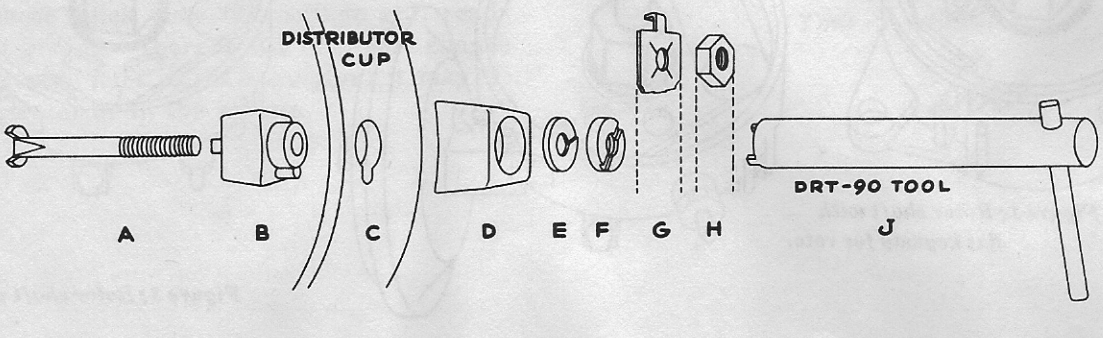
The distributor head has several new features, all intended to prevent high tension leakage. The sides of the head are higher; the high tension towers are deeper; the inside of the head has two ribs molded in between each two adjacent firing inserts. Each one of these features tends to provide a greater insulating distance between the high tension terminals and ground, and in the case of the ribs between the firing inserts, an obstruction against cross-firing between adjacent inserts.



Instead of the conventional ventilating holes in the sides of the distributor head, which often became clogged and deprive the distributor of the necessary ventilation, resulting in moisture condensation and corrosion, the new head has an overhanging rim with many openings for ventilation. These openings cannot become clogged, thus assuring proper ventilation for the distributor.

The new rotor is much higher than the old one and the thickness of the insulation between the grounded distributor shaft and the live high tension rotor parts has been increased from 1/4" to 1/2". This should prevent the occasional cases of the high tension firing right through the rotor to the shaft.

THE NEW TERMINAL POST is different enough in construction and method of servicing to require special instructions which are given below. It consists of two parts as described on the back of this sheet:

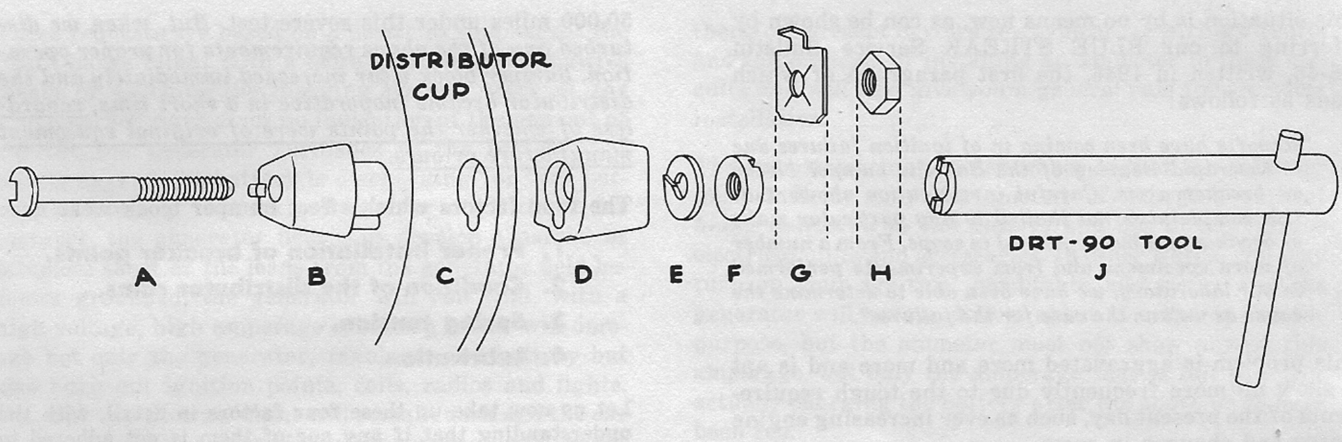


1. A molded Bakelite part B, which fits inside the distributor cup C and is shaped with a key, which fits into a key-way in the distributor cup C, preventing this part from turning. It also has another key which engages part A.

2. A long threaded metal stud A, which fits through a hole in part B and is slotted on one end to fit over the key of part B.

In order to use this round nut a special wrench J is required. Such a wrench is available from your jobber, under our number DRT-90.

The threaded section of stud A is long enough to take the coil - to - distributor primary wire terminal, a pressure washer G and the conventional hex nut H fastening the primary wire.



3. Another molded Bakelite part D, which fits on the outside of the distributor cup and also has a key-way which engages with that portion of the key of part B, which extends beyond the cup. In this manner the three parts are locked together and none can turn in relation to the other or to the distributor cup.

4. A lockwasher E, which fits into part D.

5. A slotted round nut F, which screws onto stud A and on top of lockwasher E. This nut, when screwed down all the way, keeps the entire assembly tight.

In order to remove the breaker arm from the distributor, the following procedure should be followed:

1. Remove the hex nut H, the flat pressure washer G and the primary wire.

2. Using wrench DRT-90, loosen the round nut F sufficiently to permit you to press in stud A.

3. Pressing in stud A makes it possible to pull out the breaker arm spring and the breaker arm, as well as the condenser terminal.

To install a new arm or condenser after the old parts have been removed, the above procedure is reversed.