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## Adjusting the Distributor on Late Series Sixes and Eights

**T**HE late series cars both Sixes (526-533) and Eights (443) have ignition distributors in which the breaker cam has one-half as many lobes as the motor has cylinders. The cam operates two contact breaker arms which are arranged so that each one furnishes the spark for one-half the cylinders.

The advantage in this construction is that the breaker arms operate only half as fast as in the previous type. The slower speed is an advantage in several ways.

It gives a fuller and better spark at high car speeds. The spring pressure required to make the contact arm follow the cam at high speeds is less, which results in longer point life and quieter operation.

With this construction the distributor must be timed on two successive cylinders, 1 and 5 on the Six and 1 and 6 on the Eight, unless the two contact breakers are known to be set in exactly the right relation to each other. This setting, or synchronizing as it is called, is one of, if not the most important step in the timing of the motor. If the breaker points are not synchronized correctly some cylinders will be fired early and others late causing ragged and uneven running and in some cases it will increase the tendency to vibrate.

On the 526 and 533 cars the distributor has a three lobed cam and two sets of contact breaker points connected in parallel. Both the breaker arms must be open to break the circuit and so cause a spark in the cylinder. To do this when one breaker

is opened, it is held open by the cam until the opposite one has closed and opened when it, in turn, is held open until the first one has been closed and opened again.

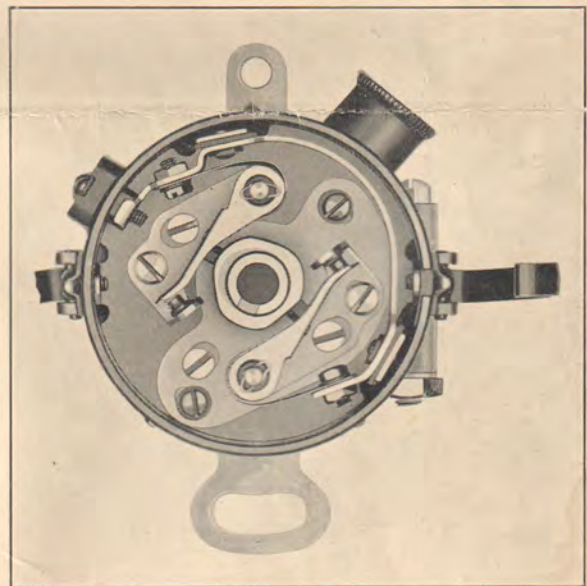


FIGURE ONE

*Looking down on the six distributor showing one breaker being held open while the other has been closed and is just about to open again.*

Since the breakers fire alternate cylinders, it is very apparent that if the cylinders are to fire at evenly spaced intervals the breakers must be set accurately at the proper angle to each other so that they will break contact alternately every 60° of distributor rotation, or 120° of engine rotation.

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To make it possible to set these points accurately the synchronizing tool, S. T. 682, shown in Figure 2, has been developed.



FIGURE TWO  
S. T. 682 Synchronizing Tool for use on 526-533 distributors.

It consists of a T-shaped metal stamping with a spring arrangement at the base of the T, so that it may be attached to the distributor. The shank is offset and the top bar curved so that when attached to the cam the top edge will fit flush with the rim of the distributor case. The outer edge of the tool is graduated in degrees, the marks on one side being just 60 cam degrees or 120° engine degrees from the similar marking on the other side. If one breaker arm is seen to open at let us say 5° on the M-side, the other breaker should open just 60° later or at the point marked 5° on the N-side.

It is not necessary to remove the distributor from the motor to synchronize the points altho if the unit has been removed for any other reason it can be done very easily and quickly on the bench.

The stationary arm should be set first to the proper clearance and then the moveable arm set to break with the proper clearance—.020"—in the correct relation to it.

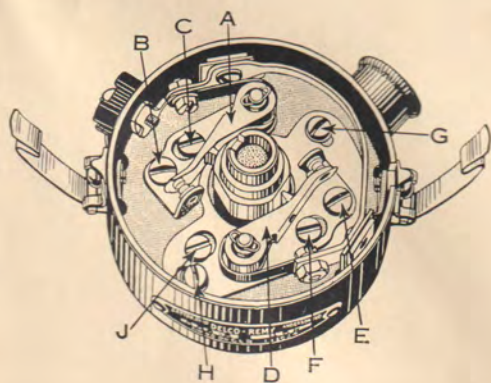


FIGURE THREE

The distributor used on the Packard 526-533 with the distributor head and rotor removed.

Turn the distributor shaft until the rubbing block of the stationary breaker arm A, Fig 3 is on the high point of a cam. Loosen lock screw B. The stationary contact point is adjustable and is controlled by eccentric screw C. Turn screw C to adjust until the gap to .020" measured with a thickness gauge S. T. 657 or common feeler.

Lock the adjustment by tightening screw B and recheck.

Now turn the distributor shaft until the rubbing block of the adjustable arm is on a high point of a cam. Loosen lock screw E and adjust the breaker gap, by turning eccentric screw F, to .020". Lock the adjustment by tightening screw E and recheck the opening on both breaker points.



FIGURE FOUR  
S. T. 657 a handy thickness gauge in a fibre case. It has two blades, one .020" for the distributor breaker gap, and one .025" for the spark plug gap.

Attach the Synchronizing Tool S. T. 682, Figure 2, to the distributor cam.

The spring on the M-side (see Fig. 2.) of the tool should engage the slot in the top of the cam. The tool itself is not marked but the following rule may be applied in case of doubt. Turn the tool in the direction of distributor rotation and engage the spring on the leading side in the slot.

Now turn the distributor shaft in the direction of rotation — clockwise — until the numbered graduations on the leading M-side of the tool are close to the near edge of the slot in the distributor rim. Turn very carefully now and note the number that lines up with the edge of the slot at the instant the contact points of the stationary arm A break contact.

As the instant of contact breaking is difficult to detect accurately, a timing light or ammeter should be connected across the distributor so that it will burn as long as either point is closed. The point of contact opening will be indicated by the light going out or the ammeter hand falling to zero.

Note carefully the reading on the tool registered with the edge of the slot at the instant of contact opening. Continue to turn in the direction of rotation for 60°. This is indicated by the near edge of the slot lining up, with the graduations previously noted, on the trailing or N-side of the tool. The breaker arm should break contact at this point. If it does not, loosen lock screw H and turn the eccentric screw J.

...the right, at this  
 ... G and H.

... mechanism and gap at both  
 ... The points should be synchronized  
 within two degrees, that is, the stationary arm  
 breaks contact at, let us say 20 on the leading side,  
 then the other set must break contact not sooner  
 than 19, nor later than 21 on the trailing side.

Before replacing the rotor, soak the felt packing  
 in the top of the cam with light oil. This acts as a  
 reservoir for the oil which feeds out thru holes in  
 the cam face lubricating the rubbing blocks.

The distributor on the late Eight (443) is  
 similar to the one used on the earlier models in that  
 it has a four lobed cam and two sets of contact  
 breaker arms. The difference is that each set of  
 contact points is connected in a separate primary  
 circuit with a separate coil. With this arrangement  
 the effect is the same as two distributors firing  
 alternate cylinders. The points are set to fire every  
 45° of distributor travel or every 90° of engine  
 travel, and this relation must be accurately set  
 and maintained for smooth even running. Failure  
 to have the points of contact breaking evenly  
 spaced will cause some cylinders to fire early and  
 others late, with the result that the motor will  
 run unevenly, may be short of power, may spark  
 knock excessively altho it seems to be timed  
 correctly, or any one of a number of things that  
 are caused by incorrect timing, all depending, of  
 course, on how much they are out of time.

In order to set the points easily and quickly in  
 their proper relation to each other, tool No. S. T. 685,  
 Fig. 5, has been developed.

Before using the tool the  
 breaker gap should be set.  
 Turn the distributor shaft  
 until the stationary arm A,  
 Fig. 6, is on a high point of the  
 cam. Loosen lock screw B and  
 turn eccentric screw C until  
 the breaker point gap is .020"



FIGURE FIVE  
 S. T. 685 Breaker  
 gauge for use on  
 the 443 distributor.

measured with S. T. 657, or an ordinary feeler  
 gauge. Tighten lock screw B and recheck. Turn  
 distributor shaft until the adjustable breaker  
 arm D is on a high point of the cam. Loosen  
 lock screw E and turn eccentric screw F until  
 the breaker opening is .020". Tighten lock screw  
 E and recheck.

Loosen the screw in the center and remove the  
 breaker gauge. If the distribu-

tor has been removed from the motor tighten the  
 center screw, if it has not leave it loose so that  
 the breaker gauge may be turned freely on its  
 shaft. Rotate the gauge until the breaker arm  
 rubbing blocks drop into the notches as shown in  
 Fig. 6. Loosen lock screws G and H and hold the

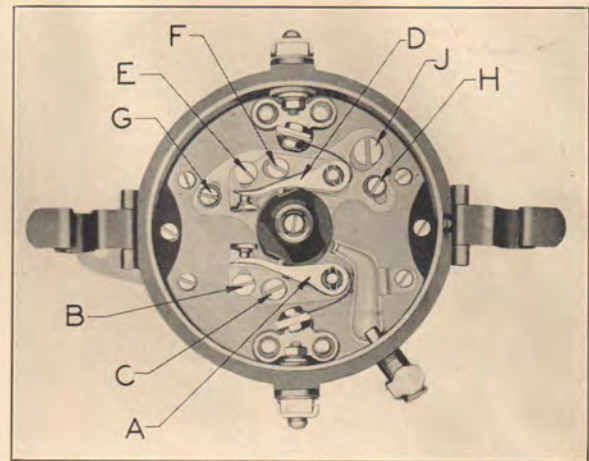


FIGURE SIX  
 The distributor used on the Packard 443 shown with the  
 distributor head, rotor and cam removed and with the  
 breaker gauge S. T. 685 in place.

notch firmly against the heel of block on the sta-  
 tionary arm and turn eccentric screw J until the  
 heel of the block on the adjustable arm D is in  
 firm contact with the other notch. Tighten the  
 lock screws and check. This can best be done by  
 holding the gauge firmly against the rubbing  
 blocks and raising each breaker arm separately.  
 When properly set a slight friction should be  
 felt as the arms are raised.

If the distributor has been removed from the  
 engine the procedure is the same except that the  
 drive coupling should be held in a vise and the  
 screw in the center of the cam tightened to lock the  
 gauge in place. Then rotate the distributor case to  
 hold the stationary arm rubbing block snug against  
 the gauge while adjusting the moveable arm as  
 before.

After the adjustment has been made and checked  
 the cam should be replaced and the motor timed in  
 the regular way.

The tools referred to may be purchased thru the  
 parts department on regular parts orders, under the  
 following tool numbers and at the prices shown:

- S.T. 657, Thickness Gauge . . . . . \$ .55
- S.T. 682, Synchronizing Tool . . . . . \$ .25
- S.T. 685, Breaker Gauge . . . . . \$1.50

# Answers to Questions Contained in Letter No. 15

1. Insufficient clearance between the ends of the piston rings will cause a light motor knock and will also cause excessive cylinder wear. The ring clearance can be checked by removing the ring from the piston and placing it in the cylinder bore. The clearance should be .010 to .016 of an inch.

2. Motor knocks caused by loose pistons or by tight piston pin bushings will be most noticeable when the motor is cold and are apt to disappear as it becomes warm.

3. Stiffening the front springs results in a stiff, jerky ride, particularly at rather slow speeds and on fairly good roads. It will be found that the front springs and the front stabilator adjustment have a much more pronounced effect on the ride of the rear seat than would be considered possible.

4. It is dangerous to arch the springs higher in order to prevent their striking through, because if the riding clearance is increased the spring loading is increased correspondingly and breakage is more likely to result.

5. It is necessary to leave a slight clearance between the window glass and the runway in order

to allow for the expansion of the runways when they become wet. If this is not done the windows will be hard to operate in rainy weather.

6. If the clearance between the sides of the glass and the runway is so great as to cause a rattle the clearance can be reduced by the use of felt liners between the runway and the window frame.

7. Oil will usually be found around the outside of the chassis lubricator, because there is an oil relief in the plunger cylinder which prevents oil which has passed the plunger from working up around the handle. If it were not for this relief oil would work all the way up to the handle and get on the hand of the person operating the plunger.

8. If the valve cover gasket becomes oil soaked it may swell inward so as to press against the valve spring collar, and force the valve sideways against the guide. The center of the gasket should be cut out so that it will not bear against the valve mechanism. (This condition has been taken care of in the new construction by eliminating the center of the gasket.)

Note—Hereafter the questions and answers to them, will both appear in the same issue.

## In Union There is Strength

SEVERAL of our Distributers and Dealers have informed us that they are using the "Ask Me Another" questions, as the basis, for conducting semi-monthly service meetings. In addition, to mechanical subjects, other important subjects are discussed. Better contact with owners; better shop methods; cleanliness; promises; diagnosis; follow-up methods; operating expenses and control; these and other important features of service work are all hashed over and many decided improvements are the result of these get-together

meetings. *These meetings pay dividends.*

There is many a modest mechanic carrying around a brilliant idea, which he would no doubt be glad to give us, if we would only give him an opportunity. God didn't give all the ideas to any one man. Einstein, occupying a mediocre government job, advanced a theory that made the greatest, of the great, sit up and blink.

Let's give all of our service men an opportunity, to display their initiative, in helping to build stronger or more efficient service stations.

Whenever we hear some sledge hammer mechanic singing the blues because he got the air for "butchering" a repair job, we feel like singing to him the second line of "Hail! Hail! The Gang's All Here!"

Do you have a service sign on your building or do you believe in making it as hard as possible for owners to find you? Surely, you aren't afraid they will!

"Cleanliness is next to Godliness." How many inches of grease covers your shop floor?

If your valve seat reamer chatters, tighten the bushing. The increased friction will dampen out the vibration.

Maybe the pen is mightier than the sword but we've noticed that a speed wrench reigns supreme around a service station.

Does it hurt your pride to use the words "sir," "please" and "thank you?" If so, look out for the proverbial fall.

Fill in blank spaces. A dainty white glove . . . . . a steering wheel . . . . . grease . . . . . the devil.

We wonder if all the "antiques" and "relics" been cleaned out from under the shop benches we wonder!