

# VERTEX MAGNETOS

## *INSTRUCTION MANUAL*



LIBRARY

BOOK No. 61

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Vertex Magnetos and spare parts may be purchased  
from:

Taylor Cable Products, Inc.  
310 Highgrove Road, Grandview, Missouri 64030.  
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Fax 1-816-765-2452

Website: [www.taylorvertex.com](http://www.taylorvertex.com)

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## TECHNICAL INSTRUCTIONS FOR VERTEX MAGNETOS

### I. INTRODUCTION

(For sectional drawing and part list see p. 9 ).

#### A. General

In order to conform with standard magneto terminology, wherever rotation is mentioned in the following instructions it refers to rotation as viewed from the drive end of the Vertex Magneto. Therefore, when following instructions, wherever rotation is mentioned be sure that it is determined as viewed from the drive end. When ordering distributor heads or breaker cams, complete units or spare parts always specify the year, make and model number of the engine on which the Vertex is to be installed.

#### B . Purpose and construction

##### a. Standard Design

The Vertex Magneto is designed especially for use on automotive, marine and stationary spark-ignited engines, in automobiles, buses, trucks, motor boats and industrial equipment. Compact and completely self-contained, the standard unit can easily be fitted, in place of an existing battery ignition distributor without modifying the engine. The VERTEX, works entirely independently of a battery and unites in one apparatus the functions of distributor and ignition coil. It produces powerful, uniform ignition sparks and thus permits trouble-free starting of the engine in the coldest weather.

The VERTEX is a modern high tension magneto of the vertical type, with fixed coil and rotating permanent magnet. The rotating magnet together with the breaker cam is displaced relatively to the driving shaft by the built-in centrifugal ignition advance and retard device in the pole wheel housing. The spark is therefore uniformly powerful over the whole advance range and is effective. at driving-shaft. speeds as low as 45 - 60 r. p.m., corresponding to crankshaft speeds of 90 - 120 r.p.m.

b. VERTEX with Speed Limiter

Where conditions make it necessary, every VERTEX can be equipped with a speed limiter. This device automatically interrupts ignition as soon as the engine exceeds a predetermined maximum speed, and switches the ignition on again when the speed has dropped.

The speed limiter can be set to any desired speed in the range 800 to 2000 r.p.m., or 1000 to 4000 r.p.m. engine speed ( see para. 3, p.12)

(The speed limiter must not be used as a governor).

c. Interference suppression on the VERTEX

There are two types of suppressions:

1. Distant interference suppression.
2. Close interference suppression.

1. Distant interference suppressions. Every VERTEX can be suppressed for distant interference without big alterations, it being only necessary to replace the distributor rotor by one with built in 5000 ohm resistance (Part No. 1643) In addition to this resistance, however, resistance should be fitted next to the spark plug by means of either special resistance-type plugs or plug connectors with built-in resistance. When selecting these resistances note that the total resistance per ignition circuit should not exceed 10,000 ohms.
2. Close interference suppression: If the suppression has to be more thorough, the VERTEX must be screened. This is the case with vehicles, and aircraft fitted with highly sensitive radio transmitters and receivers. This screening, comprising a special metal hood and screened cables, can be applied to any VERTEX without great alterations. (see para. m, p. 19)

C. Installation

a. General.

The VERTEX magneto is installed in the same way and in the same place as a battery-ignition distributor. However, it should not be inclined at more than 30° to the vertical. For greater inclinations or horizontal fitting special types are made, in

which the plain bearings in the housing are replaced by ball bearings. It is also necessary to avoid blows and pressure on the driving shaft while fitting. The base should not be altered either in diameter or length. Installing the apparatus rigidly is the best way of insuring good, trouble free, operation.

#### b. Installation

(For VERTEX with screening see also para. m, p.19)

- 1 Check that the direction of rotation agrees with that of the engine (see arrow on distributor head of the VERTEX).
- 2 Put the first cylinder of the engine in the upper dead centre position.
- 3 Remove the battery ignition distributor. If its drive gear or coupling is to be installed on the drive shaft of the Vertex be sure there is clearance between the drive gear or coupling and the shank at the lower part of the magneto. This clearance is necessary to allow for end play of the VERTEX drive shaft. It can be obtained by placing shim washers of varying thicknesses on top of the drive gear or coupling.
- 4 Remove the Vertex distributor head and turn the drive spindle until the distributor rotor is approximately opposite. No. 1 electrode of the distributor head and install vertex on the engine.
- 5 Fine adjustment of the ignition timing: Turn the VERTEX in the reverse direction until the contacts just begin to open; the distributor rotor segment must now be opposite the electrode of the lead outlet marked 1.
- 6 Connect the ignition leads to the distributor head in such a way that they correspond to the firing sequence of the engine. To connect the leads, unscrew the pointed screws in the distributor head. Then insert the lead ends in the connection holes in the distributor head and clamp with the pointed screws. It is important to insert the lead ends fully and to completely screw in the pointed screws, so that the conducting core is pierced by the screws (check with test lamp). Care should also be taken when fitting the spark plug connectors to insure penetration of the conducting core (check with test lamp). (See also para. k, p, 19).
- 7 Fix distributor head on the VERTEX. Important: Insert the high tension lead of the ignition coil into the opening in the distributor head. Connect ignition leads to the spark plugs (adjust electrode gap of the spark plugs to 0.4 - 0.5 mm; 0.016" - 0.020").

8. Connect primary connection terminal (at the side of the VERTEX housing) to the short-circuit switch (the second terminal of the short-circuit switch should be connected to ground).

#### D. Maintenance

1. The interrupter contacts should be checked after every 15,000 km (10,000 miles) or 150 working hours. They should then be cleaned and readjusted if necessary; for readjustments the fastening screw has to be loosened: the contacts should be reset to a gap of 0.3-0.4 mm (0.012"-0.016"), measured after retightening the screw (clean oily contacts with a brush and spirit; for filing use only the Vertex special file). During this overhaul lubricate the bearing surface of the center contact brush in the distributor head with a thin film of graphite grease.
2. For VERTEX models-with felt-type cam lubrication graphite grease should be - applied to the felt after every 15,000 km (10,000-miles); or 150 working hours. Always avoid excessive greasing, otherwise there is a risk of contaminating the breaker, so that ignition ceases (see Lubrication Chart p. 22)

#### E. Operating Faults and their rectifications

##### a. Partial Failure of Ignition

| <u>Cause</u>  | <u>Rectification</u>  |
|---|---|
| Individual spark plugs oily or defective.                         | Identify plugs that do not spark. Clean or replace.   |
| Head connections loose.   | Check lead connections and tighten.   |
| Breaker contacts dirty - incorrect contact resistance.            | Clean dirty contacts with spirit (using brush) and file clean with special file. The contact surfaces must be parallel and match perfectly; gap 0.3-0.4mm (0.012"-0.016") |
| Connecting leads in breaker housing are loose; insulation chafed. | Check all screws and tighten; never arrange leads across edges; repair defective insulation, but do not use rubber for this purpose.                                      |
| Brush in distributor head defective or jammed.                    | Unjam or replace (use only Vertex brushes).   |

Partial failure of Ignition (cont'd)

| <u>Cause</u>  | <u>Rectification</u>  |
|---|---|
| Breaker lever jams  | Clean bearing lubricate with graphite grease.   |
| Breaker lever spring weak or broken.                              | Replace the complete lever: never bend the spring, as this will break it.   |
| Short-circuit lead chafed.  | Replace lead.   |
| Dampness in distributor   | Wipe all parts dry (distributor head, distributor rotor).   |
| Insulating parts damaged (distributor head, distributor rotor).   | If any insulating part is cracked, it must be replaced.   |
| Ignition lead punctured or broken.                                | Replace defective ignition lead. In the case of screened leads, make quite sure that the metal screening is not damaged; small broken wires can damage the insulation and short-circuit the ignition. |
| Capacitor defective (shown by excessive burning of the contacts). | Replace capacitor.  |

b. Engine does not develop Full Power

| <u>Cause</u>   | <u>Rectification</u>                              |
|--|---|
| Ignition setting wrong.  | Adjust exactly in accordance with instructions.   |
| Automatic advance mechanism does not function correctly, is jammed or over-lubricated. | Clean, if necessary replace, centrifugal weights. |
| Speed limiter wrongly adjusted.  | Adjust speed limiter (para. 3, p. 12)             |
| Engine cylinder compression insufficient ; leaky valves or other engine defect.        | Overhaul engine.                                  |

c. Engine Pinking Occurs

| Cause  | Rectification   |
|--|---|
| Ignition is too early.   | Adjust VERTEX exactly in accordance with instruction. |
| Unsuitable fuel.   | Use only the fuel prescribed by the engine supplier.  |
| Coupling between VERTEX and engine has play or is worn or loose. | Fix correctly and secure, replace defective parts.    |

d. Engine will not start

| <u>Cause</u>   | <u>Rectification</u>   |
|--|--|
| No fuel in carburettor.  | Check fuel supply.   |
| Too much fuel in cylinders.  | Ventilate by rotating engine several times (press accelerator right down).   |
| Spark Plugs oily.  | Clean, with petrol, dry and test.  |
| Vertex remains short circuited even when short-circuit switch is open. | Carefully check short-circuit lead and switch, replace defective parts.  |
| Speed limiter sticks.  | Unjam speed limiter or replace it (para. 3, p.12)  |
| Breaker lever spring is broken or weak.                                | Replace the complete lever, never bend the spring, as this will break it.  |
| Ignition power of the VERTEX is insufficient.                          | Overhaul the VERTEX, check ignition power as follows: Remove VERTEX and run about 200 r.p.m. the sparks should bridge a gap of 7 mm (with the VERTEX cold) between the VERTEX, housing an ignition lead connected temporarily. (For overhauling see Section , II, p. 8.) |

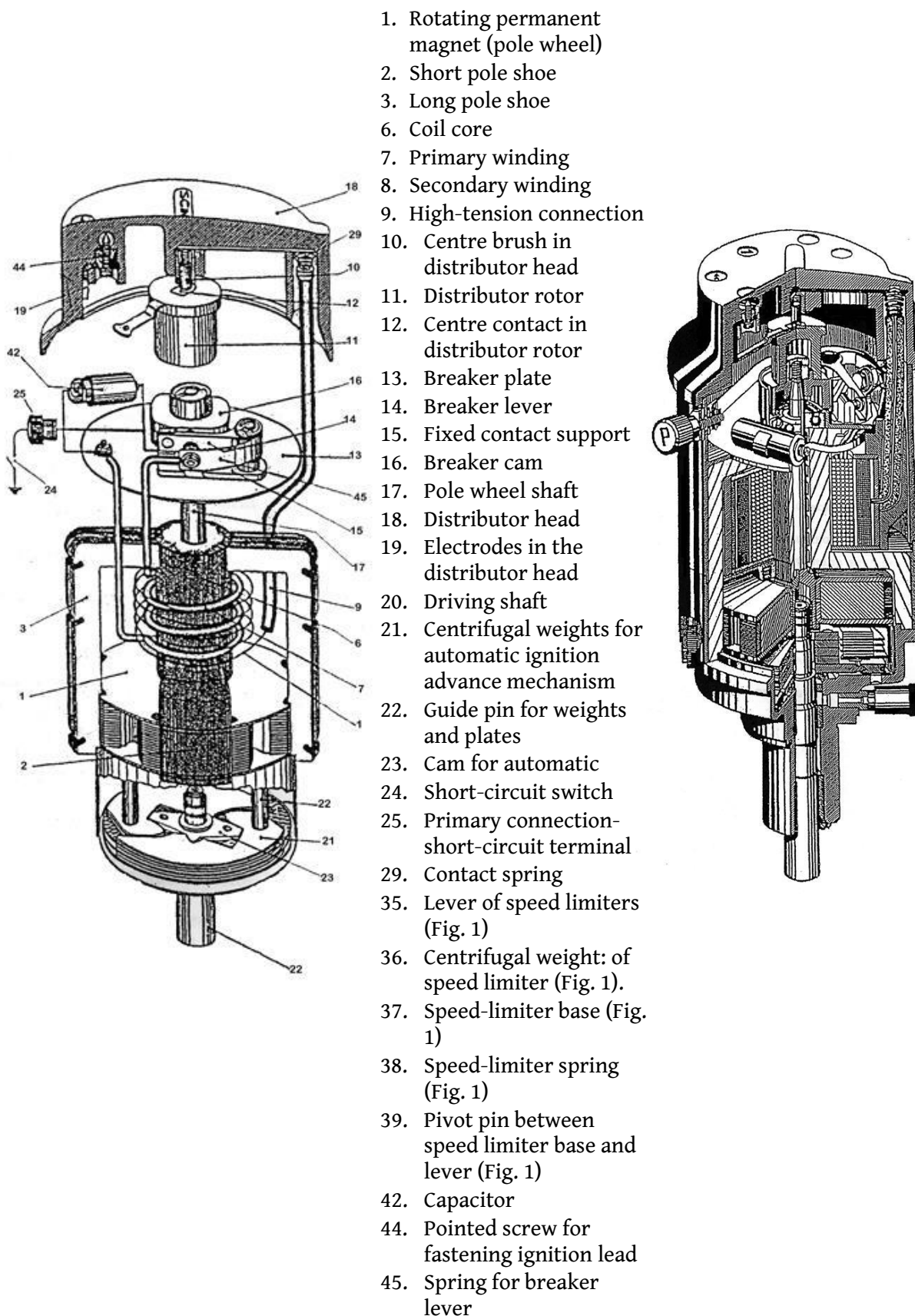
## II OVERHAULING

### A. Testing Equipment and Special Tools Required

| <u>a. Special Tools available from RONCO.</u> | <u>Ordering No.</u> |
|---|---------------------|
| Spacer for Automatic Advance                  | W79042              |
| Base Nut Driver                               | W107620             |
| Cam Nut Driver                                | W109647             |
| Advance Weight Locating Tool                  | W109648             |
| Timing Box & Test Lamp                        | R-682               |
| Degree Plate Tool                             | R-394               |
| Cam Wrench & Pointer                          | R-395               |
| Magnetometer                                  | R-653               |
| Magnet Locating Pin                           | R-772               |
| <u>b. Testing Equipment</u>                   |                     |
| Spring Balance; 0 to 1000 grams               | Commercial          |
| Revolution Counter                            | Commercial          |
| Capacitor Tester                              | Commercial          |
| Spark Stroboscope with Angle Indicator        | Commercial          |
| Magnetising Unit                              | Commercial          |
| Ohmmeter                                      | Commercial          |

## B. Disassembly and Cleaning

### a. Sectional Diagram and Part List



## b. Disassembly

1. Remove distributor head (if the VERTEX is screened, remove, metal cap with distributor head; see pp. 20 & 21. Lock the pole wheel by inserting locating pin R-772 through the 2 mm hole in the side of the base into the corresponding hole in the pole wheel housing (turn the driving shaft in the normal direction of rotation until the locating pin will enter the hole in the pole wheel housing); then check whether the mark on the cam coincides with that on the rim of the protecting sleeve surrounding the breaker cam. This check is important, since it speeds up the break angle adjustment when assembling the VERTEX. If the marks do not coincide, the break should be adjusted again at assembly as described in para. 2 p.18.
2. Withdraw distributor rotor (in the case of racing models first undo the locking screws at the side) and undo cam nut (use tools R-395 and W. 109647). Remove copper washer, fixing spring and speed & limiter, if one is fitted. Place cam spanner on cam and loosen cam from conical seating by means of a light blow on the end of the spanner. If the cam remains tight, first carry out operation 4 and then tap the screw end lightly, protecting it with a copper piece.
3. Loosen the primary connections of the coil (at the breaker plate and breaker lever). Arrange the connections so that they follow the same direction as the high-tension conductor.
4. Remove seal on the longitudinal bolts. (lower edge of base). With screwdriver W107620 undo locknuts and conical nuts. Grip base and withdraw from lower part of housing. The pole wheel can now be moved in the upper ball-bearing and withdrawn downwards out of the housing (pay attention to spring and fiber disc). Withdraw lower part of housing from upper part, and remove coil (pay-attention to insulating washer and felt washer).
5. Remove breaker plate with ball bearing in upper part of housing. Remove breaker lever, fixed contact support, capacitor and cam lubricator.
6. Remove pin for coupling member from driving shaft. Withdraw coupling member and compensating washer. Withdraw driving shaft from the base.

## c. cleaning

All parts, except for the coil, should be washed in petrol or a suitable cleaning agent. The base should only be cleaned externally, on account of the sintered-metal bearing bushes.

### c. Inspection

Inspect all parts for mechanical wear.

Special attention should be paid to the following parts:

Distributor head: for burns (creepage paths). Electrodes for burning. The contact spring in the opening for the high-tension lead for resilience.

Brush with spring: for wear.

Distributor rotor: electrodes for burning (if the rotor incorporates interference suppression, measure the built-in resistance; measured value = 5000 ohms).

Contact support &

Breaker lever: contacts for burning.

Breaker plate with ball

bearings: breaker-lever pivot pin, for wear, ball bearing for play and noise.

Cam: for wear.

Driving shaft: inspect for wear.

Base: for possible wear of sintered-metal bushes (cannot be replaced).

Coil: for cracks and ignition power (electrical test: 6 volts primary with breaker and, spark gap 10 mm). With ohmmeter measure primary resistance  $.375 \text{ ohms} \pm .025$  and secondary resistance  $.675 \text{ kilo ohm} \pm .5 \text{ kilo ohm}$ , resistance must be in tolerance.

Short circuit terminal: inspect connecting screws for grounding to housing. Check with test lamp.  
Pole wheel with

Pole Wheel with

automatic unit: sintered-metal bush in the pole-wheel spindle for wear (if the sintered-metal bushes have to be replaced, the pole wheel must be returned to the factory). Check the sliding fit between pole-wheel, spindle and ball bearing. Remove "circlip and cover plate. When dismantling the centrifugal weights face the mark (x) on the side of the pole wheel housing.

### Pole wheel (cont'd):

(see Fig. 4, p.15) and dismantle the separate centrifugal weights from the left and right alternately, i.e. from pivot pins 1 and 2; for their reassembly in correct order they should be piled up on a clean surface.

Important: Do not interchange the centrifugal weights. Inspect centrifugal-weight pivot pins in the pole wheel for wear. To avoid mistakes or incorrect assembly, it is best to reassemble the automatic advance unit immediately after the inspection, in accordance with para. d, p.15.

## D. Replacing Defective Parts

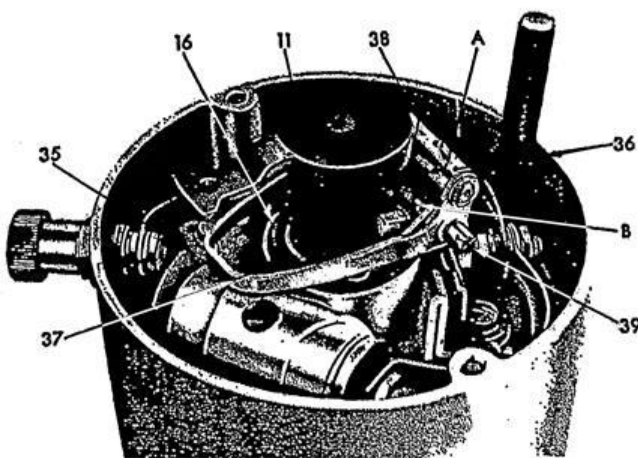
### a. General

Defective parts should always be replaced by new original parts to be obtained from RONCO CORPORATION or their official agents.

### b. Overhauling Assembled Parts.

1. Shank with sintered metal bushes (for lubricating instructions see Lubrication Chart, p. 22). Worn bushes in the base cannot be replaced. In such cases the base should be replaced by a new one.
2. Housing - The upper and lower part of the housing may only be replaced in pairs.
3. Speed Limiter - since it is not worth while repairing defective speed limiters, they should always be replaced by new ones (ordering no. 2040).

Fig.1



Move pin 39 longitudinally with a screwdriver, thus disengaging the notch B. (12 index slots). Turning the pin anti clockwise raises the regulating speed, clockwise reduces it. When pushing on the end of spindle 39, care should be taken that notch re-engages properly. By rotating, centrifugal weight A, which is provided with an eccentric recess, an additional fine adjustment can be made (to turn the centrifugal, weight, insert a peg in one of the two holes.)

## E. Assembling

### a. General.

For lubricating instructions see Lubrication, Chart, p. 22. VERTEX models of "sea-water resistant" design should be given the following additional treatment:

Paint all steel parts of the contact-breaker assembly. (breaker plate, contact, support, breaker lever, etc.) with protective paint (bakelite lacquer); when fitting these parts, remove the lacquer from the earth-connecting surfaces. Paint the flange part of the shank and housing with black lacquer or enamel. The bolts, screws and nuts fastening the flange and distributor head must be cadmium plated and the breaker cam chromium plated.

### b. Housing with Coil

Straighten the primary connections of the coil and lead them into the upper portion of the housing. Care should be taken that the connections and the high-voltage lead are not damaged. Press the coil core into the upper portion of the housing (important: do not use force).

Place the felt disco and insulating disc, on the coil. Arrange the lower portion of the housing so that the marks at the housing separation line agree with the upper portion. Insert the lower portion and press on.

A gap of 0.1 to 0.15 mm (0.004"-0.006") should remain between the upper and the lower portions, so that the coil is under a slight pressure after final assembly (adjust with thicker or thinner insulating discs.) When fitting new coils the primary connections must be cut to the right length. The length is measured from the edge of the housing opening for the coil connections.

|                         |                                   |        |
|-------------------------|-----------------------------------|--------|
| For 4 -cylinder magneto | (coil no. 1110)                   | Length |
|                         | Ground (yellow)                   | 90 mm  |
|                         | Beginning primary winding (black) | 75mm   |

|                         |                                   |        |
|-------------------------|-----------------------------------|--------|
| For 6 -cylinder magneto | (coil no. 1110)                   | Length |
|                         | Ground (yellow)                   | 105 mm |
|                         | Beginning primary winding (black) | 80 mm  |

|                         |                                   |        |
|-------------------------|-----------------------------------|--------|
| For 8 -cylinder magneto | (coil no. 1111)                   | Length |
|                         | Ground (yellow)                   | 65 mm  |
|                         | Beginning primary winding (black) | 90 mm  |

Cut back the insulating tube 15mm on both primary leads and form terminal eye.

### c. Contact-breaker plate

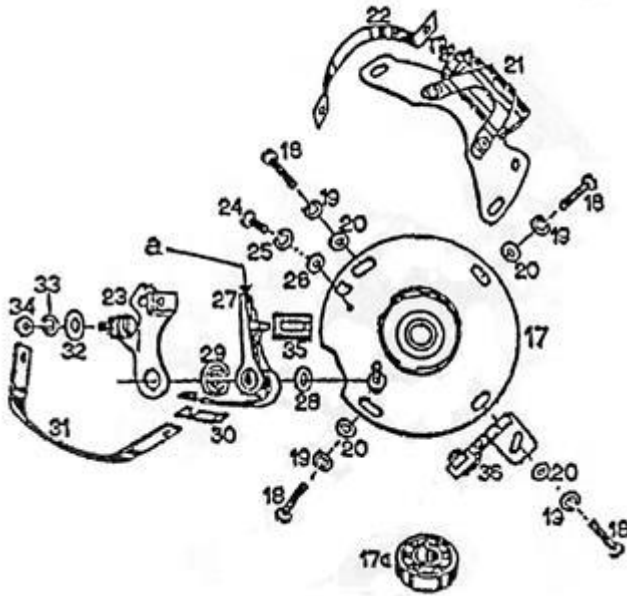


Fig. 2

Fit ball bearing 17a in the breaker plate. After fitting the ball bearing in plate, check that it is a sliding fit on the pole-wheel spindle. If this is not the case, polish the pole-wheel spindle with fine emery cloth.

Place the assembled contact support 23 on the breaker plate and screw down provisionally (check that the support lies flat on the plate).

Push breaker 27 on to the pivot pin and check that the contacts correspond exactly in height (adjust with washers 28).

Withdraw breaker lever 27 again, grease pivot pin, push felt 35 on to the Fiber cam-follower and refit—the breaker lever (the felt must be clean and should not be greased). Circlip 29 must be fitted.

Lead the breaker-lever spring to the fixing screw on the contact support and fix provisionally with nut 34, the auxiliary spring 30 being inserted on the inside main spring before finally tightening.

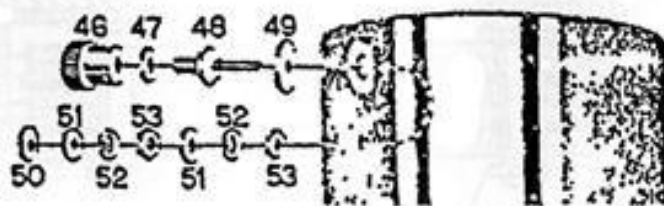
Measure the contact force with the spring balance at point a (for contact force, see para.c, p. 23). The contact force can be corrected by bending the main spring (warning! the spring breaks easily).

Pack the ball bearing with grease if required and insert the assembled breaker plate. in the VERTEX housing and screw down the capacitor and cam lubricator being fitted at the same time.

Assemble short-circuit terminal 48 as shown in Fig. 3 (items 49 and 50 are insulating washers).

Connect contact strip 31 to short-circuit terminal 48 and contact support, contact strip 22 or flexible lead from capacitor to contact support and the black connection of the high tension coil to the contact support.

Fig. 3



#### d. Automatic advance mechanism

##### 1. Standard Automatic advance Unit

Place the pole wheel with the housing of the automatic upwards on a suitable support. Push ring W 79942 with the counter sinking facing towards the pole wheel over the centrifugal-weight pivot pins see Fig.4.

Turn the pole wheel so that the mark (X) on the pole wheel housing is towards you.

##### Adjusting the Centrifugal Weights

Pay attention to the direction of to rotations (see Fig. 5).

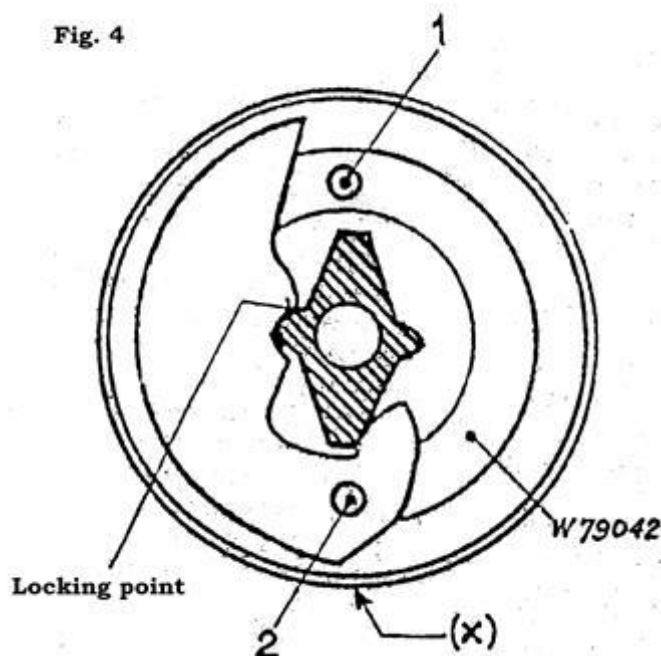
Each individual centrifugal weight must be checked with the driving shaft.

Method: Mount the centrifugal weights on their respective pivot pins.

Insert the driving shaft into the pole wheel in such a way that the mark (·) on the driving cam is on the same side as the (X) mark on the housing rim.

When turning the driving shaft a play of 0.05 to 0.1 mm should be perceptible at the locking point. (see Fig. 4). If the play is greater a new centrifugal weight must be fitted (note degree marking on the centrifugal weights).

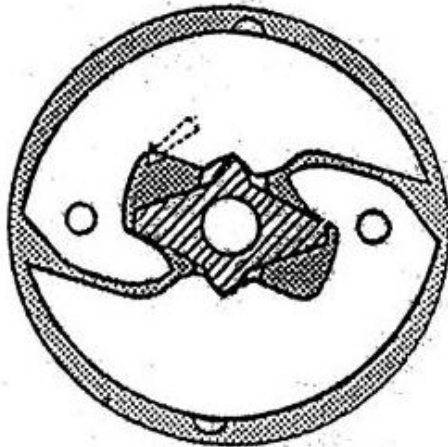
The locking lug of new centrifugal weights must be adjusted with a smooth file (the radius of the lug should be preserved) until the prescribed play is obtained.



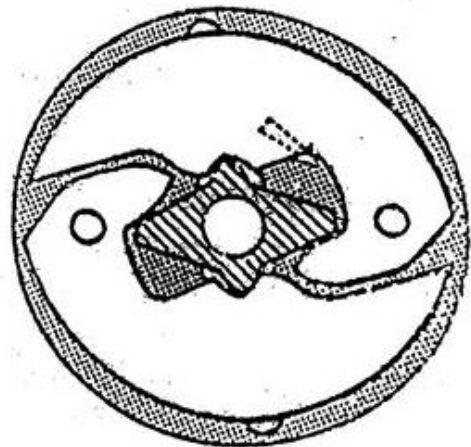
When all the centrifugal weights have been fitted, remove ring W79042 slightly grease pivot pins 1 and 2 and assemble the automatic unit as shown in Fig. 6. (Important! the centrifugal weights must be assembled absolutely dry and free from burrs). after the weights have been fitted on pivot pins 1 and 2, they must not be interchanged.

Direction of rotation seen from driving side.

**Fig. 5**

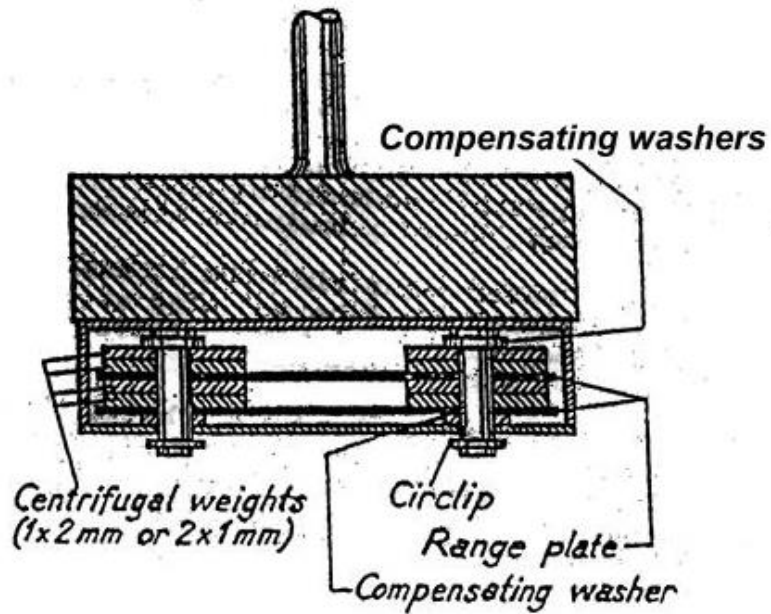


**L.H.  
Anticlockwise**



**R.H.  
Clockwise**

**Standard Automatic  
Advance-Mechanism**



**Fig. 6**

e. Preparing the Base for Assembly.

1. Base with sintered Metal Bushes

Some models have a felt strip fitted between the sintered metal bushes in the base; if this is replaced, the shaft can only be inserted if a well greased dummy shaft with a rounded end is pushed through with the shaft. Only in this way can one avoid tearing off pieces of the felt. Insert the driving shaft in the base.

f. Assembling the Pole Wheel in the Housing

Slightly oil the housing pole shoes and the pole wheel (anti-rust compound). Fit the fibre disc to the pole wheel shaft with the chamfered side to the pole wheel. Also fit the spring to the shaft and slightly grease the shaft and the spring. Insert the pole wheel in the housing, and check the resilience. Fit the cam on the shaft taper and tighten provisionally.

g. Fitting the Base and drive shaft to the Housing

The small adjusting washer between the pole wheel and driving-shaft cam should now be placed on the shaft. Fit the larger washer between the driving shaft cam disc and the base on the shaft. Put the centrifugal weights in the resting position with locating tool W109648. Insert the drive shaft in the automatic advance unit and install the base assembly on the shaft.

h. Adjusting the End-Play

By pressing on the free shaft-end the axial displacement of the pole-wheel driving shaft can be determined. Axial play 0.3 to 0.5 mm (0.012"-0.020"). Correct if necessary with washers. At the same time the projecting length of the driving shaft or the distance of the pin hole and the coupling member with adjusting washer should be checked. To ensure correct adjustment, the following conditions should be observed:

1. Between the rim of the breaker cam and the breaker plate there should be a gap of at least 0.5 mm (0.020"), the fiber lug of the breaker lever resting over the full width of the breaker arm.

2. The adjusting washer between the pole wheel and the cam of the driving shaft must be so chosen that the axial displacement between the cam and the set of centrifugal weights is not too big. (Important! the centrifugal weights must engage fully.)

When the magneto is assembled with the coupling member, the adjusting washer between the base and the driving shaft cam must be thin enough to enable at least one washer to be inserted between the pinned-on coupling member and the base. When the coupling member is fitted, the axial play of the driving shaft should be 0.05 to 0.1 mm (0.002"-0.004"). Bolt base to housing by attaching respective conical and lock nuts.

#### i. Adjustment of Break Angle

Important! Adjust the contacts; opening 0.3 to 0.4 mm (0.012"-0.016").

If the setting marks on the breaker cam and the protecting sleeve coincide at the comparative test (see para: 1 , p. 10), proceed as described in para.1 below; if not, as in para.2.

1. Bring the locating holes in the shank and pole wheel into line with locating pin R-772. Loosen the provisionally fitted breaker cam and bring the marks (cam and protecting sleeve) into coincidence. Hold the breaker cam in this position with spanner R-395, the nut being tightened with tool W109647 (the speed limiter should only be fitted after the trial run; see para. d, p. 25). Connect the ground lead of the coil to the breaker plate.

#### 2. Fitting a New Breaker Cam or Breaker Plate

When fitting a new breaker cam or breaker plate the break angle must be reset. For this operation it is necessary to have a graduated disc which can be mounted on the VERTEX housing.

Adjust the contact opening 0.3 to 0.4 mm. (0.012"-0.016"): Locate the pole wheel with locating pin R-772 by bringing the locating holes in the base and pole wheel housing into line.

Place the degree plate (Tool, no. R-394) on top of the magneto housing and install the cam wrench and pointer (Tool no. R-395) on the breaker cam.

Loosen the cam nut with the cam nut driver, (Tool no. 109647), and turn the cam against the normal direction of rotation until the cam wrench is pointed slightly past the place where the number one electrode in the cap is located, and the points are closed.

Attach one wire of the R-682 Timing Box to the ground terminal bolt and the other wire to the magneto housing. Turn the Timing Box on and observe the test lamp. Turn the pointer in the same direction as the normal rotation of the rotor until the lamp goes on indicating that the points are opening.

At point opening, set degree plate to zero. Observe the degree plate and turn the pointer against normal rotation to break angle (see para. a, p. 23)

Tighten the cam nut securely and recheck the break angle by removing the pin and turning pointer to 0 degrees. In this position of the cam the electrode of the distributor rotor must be opposite the segment of cylinder 1 in the distributor head. Make or correct the mark on the protecting sleeve.

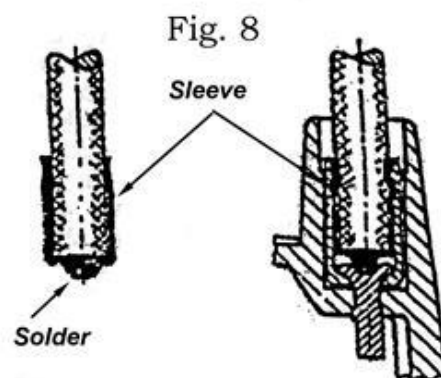
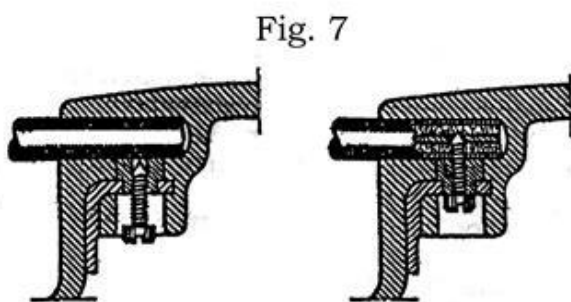
j. Distributor Rotor and Distributor Head

The distributor rotor must fit without play on the cam. In the case of racing and aviation models the rotor is equipped with two locking screws at the side. When fitting the distributor head see that the high-voltage lead of the ignition coil is correctly led into the head.

k. Fitting the Ignition Leads (unscreened)

Horizontal Lead outlets: To fit the ignition leads, remove the distributor head from the VERTEX. Pass the leads into the head as shown in Fig. 7 and secure with the pointed screws; make sure that the pointed screws penetrate the conducting core.

With vertical lead outlets: The sleeve (Fig. 8) should be soldered to the ignition lead and inserted in the distributor head as shown in the diagram.



m. Fitting the screening

1. Vertical Lead outlets

If it is necessary to fit screening to VERTEX with vertical lead outlets that is already in service, the existing distributor head may be used. A screening hood is required and may be ordered complete. It is also necessary to alter the primary

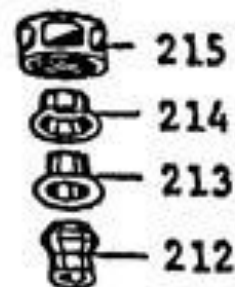
connection terminal slightly, namely by screening it by means of a metallic sleeve (see para. 2, p. 20)

As every ignition lead must also be screened, high voltage leads with metal braid should be used. For connecting to the distributor terminals of the VERTEX these leads should be prepared as follows:

Fig. 9

Remove metal braid from the end of the lead for a distance of about 25 mm (1") do not damage the insulation.

Slide gland nut (pos. 215) and large sleeve (pos. 214) over the metal, braid. Slightly form, the braid outward. Now push the small sleeve (pos. 213) under the braid so the latter is gripped between the two sleeves.



Push rubber seal (pos. 212) over the lead end, from which the braid had been removed. The Lead termination should be prepared as in the unscreened version (Fig. 8) with the metal sleeve, and solder connection.

After preparing the lead in this way, insert it in the screened distributor head and fasten with nut (pos, 215). When all leads have been thus fastened, place the screened distributor head on the VERTEX and secure with the two fastening screws.

## 2. Horizontal Lead outlets

The screening for units with horizontal lead outlets is fitted as follows:

(See Fig.10)

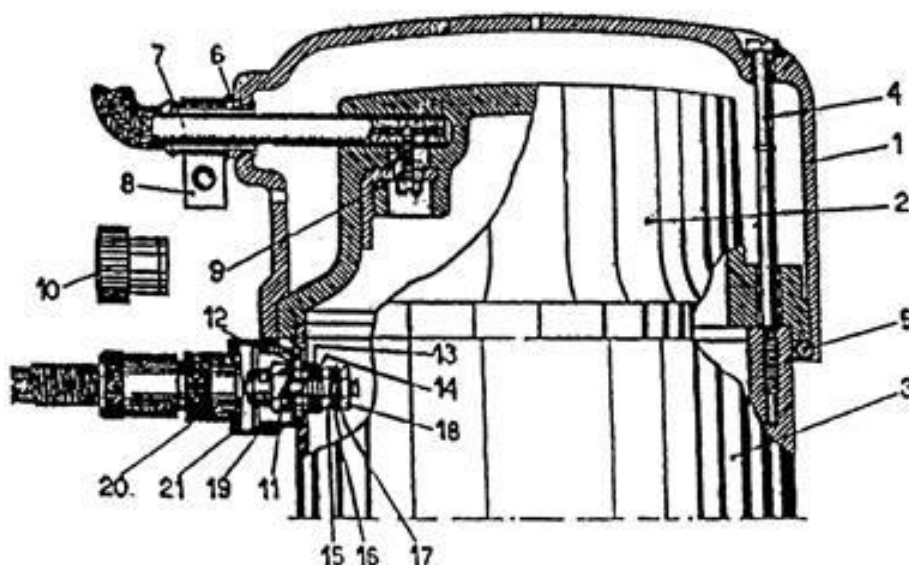


Fig. 10

### Radio screening type L.R.O.

- |  |                              |
|--|------------------------------|
| 1. Screening Hood                                  | 11. Primary Connection Screw |
| 2. Distributor Head                                | 12. Insulating Washer        |
| 3. VERTEX housing                                  | 13. Insulating Washer        |
| 4. Fastening Screw                                 | 14. Washer                   |
| 5. Spring Ring                                     | 15. Flat Nut (1530A)         |
| 6. Connection Sleeve                               | 17. Spring Washer            |
| 7. Ignition Lead                                   | 18. Flat Nut                 |
| 8. Clamp   | 19. Threaded Sleeve          |
| 9. Pointed Screw                                   | 20. Connection Sleeve        |
| 10. Insulating nut (for standard design of VERTEX) | 21. Screw Cap                |

### Short-Circuit Terminal

First detach VERTEX head 2 from the housing. Then unscrew insulating nut 10 of primary connection and replace the unscreened primary lead with a screened one. Remove items 13 to 18 as well as the existing primary connection screws.

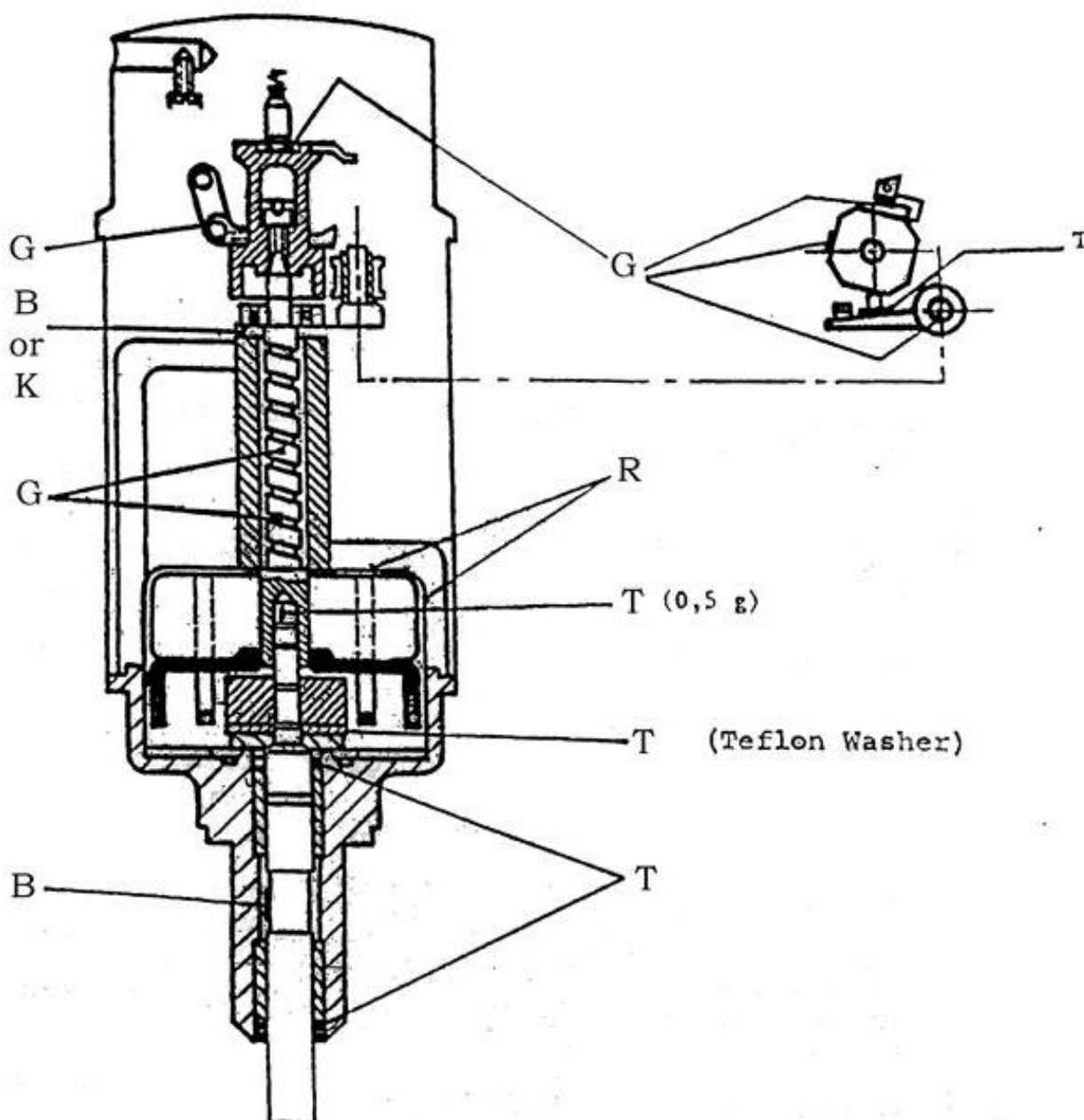
Insert large insulating washer 12 in threaded sleeve 19 and secure both parts with the new primary connection screws 11, and fasten the previously dismantled items 13 to 18 to the VERTEX. Insert the new screened primary connection lead in connection sleeve at the VERTEX with screw cap 21.

### Ignition Leads

Fit screening hood 1 on head 2, then insert the separate ignition leads 7 and secure them with pointed screws 9. Make sure that the pointed screws really penetrate the leads and that there is good contact.

Pull the metal braiding over sleeve 6 and secure with clamp 8. Insert spring ring 5 in the groove of the screening hood. Its purpose is to prevent head 2 from falling out, and at the same time to provide a metallic seal between screening hood 1 and housing 3. The assembled distributor head should now be attached to the housing with screws 4.

## LUBRICATING CHART



| <u>LETTER</u> | <u>SUPPLIER</u>   | <u>BRAND</u>     |
|---------------|---|------------------|
| G             | Mill 3 HMP  | CG (milloil)     |
| B             | Walzlagerfett   | Ft 1 v 4 (Bosch) |
| K             | Walzlagerfett   | SKF 28 (Walther) |
| R             | Rust Ban 623  | (Esso-Standard)  |
| T             | Felt and Teflon washers are assembled dry - see para. e, p.17. All steel surfaces should be coated with a thin film of "G". |                  |

### III TESTING

#### A. Mechanical Testing

|                            | Number of Poles of the Pole Wheel |       |       |
|----------------------------|-----------------------------------|-------|-------|
|                            | 4                                 | 6     | 8     |
| a. Break angle in degrees: | 12±2°                             | 13±3° | 12±2° |

a. Cam: the separate contact opening at the cam: should occur with a variation of  $\pm 0.5^\circ$ .

b. Breaker:

1. Contact gap (speeds up to 3,500 r.p.m.)  
0.3-0.4 mm (0.012"-0.016"), (speeds over 3,500 r.p.m.)  
0.25-0.3 mm (0.010"-0.012")
2. Play between stop-screw and breaker lever with open contacts 0.02-0.05 mm (0.0008" - 0.002")
3. Contact force with short (19 mm) (¾") reinforcement spring 350-500 grams (12-18oz)  
with long (43 mm) (1 11/16") reinforcement spring 450-550 grams (16-19 oz)
4. The flat spring at the breaker lever should not be twisted and should swing freely without rubbing against the breaker lever or adjacent parts. The reinforcement spring should fit well. The Fiber lug on the breaker lever should be in contact with the cam over the whole length.

d. Cam lubricating felt: contact force on the highest point of the cam 40-60 grams (1.4-2.1 oz).

e. Axial play (without assembled coupling member) 0.3-0.5 mm (0.012"-0.020")

f. Minimum gap between cam and contact-breaker plate 0.5 mm (0.02")

g. The position of segment of distributor rotor at the instant of break:

1. Standard Model

The segment of the distributor rotor should completely cover the distributor-head electrode.

## 2. Racing Models and models for more than 2500 r.p.m.

The leading half of the distributor-rotor segment should completely cover the electrode in the distributor head, and the break must occur not later than the position:

electrode = centre of rotor segment

## 3. Aviation Models

The break must take place at the position:

Electrode = centre of rotor segment, or up to  $1\frac{1}{2}^\circ$  earlier.

h. Distributor rotor: It should be possible to turn the distributor rotor on the cam not more than 1 mm (0.04") (measured at the outermost point of the distributor-rotor segment). For models with speed limiter the distributor rotor should have no play on the cam (fit well, but not jam; should be withdrawable by hand).

# B. Electrical Testing

## a. Automatic advance Unit

This test is carried out with a normal spark stroboscope with angle measurer. Spark gap: 4 - 5 mm (0.16"-0.2"). The direction of rotation always refers to the driving side.

The VERTEX is usually mounted vertically on the spark stroboscope. If, however, it is fitted in the engine in another position, it is essential to test the automatic unit in this position.

Before measuring the advance curve, drive the VERTEX two or three times up to the maximum speed of 4500 r.p.m. for a short time and back to zero. See that the centrifugal weights return to their resting position without jamming.

When measuring the curve, set the stroboscope scale to  $0^\circ$  at a speed of 180 to 200 r. p.m. and increase the speed until the displacement is a maximum of  $1/4^\circ$ . This speed is regarded as the speed for  $0^\circ$  displacement.

All the angles plotted on the graph sheet with increasing speed must be measured from this point (graph sheets for the various VERTEX types can be obtained from the manufacturer).

Throughout the speed range there should be no oscillation of the spark on the graduated disc. On operating the automatic advance unit with increasing and decreasing speeds, the return movement to  $0^\circ$  should take place without delay.

Abnormal noises, such as knocking of the automatic advance unit, pole wheel, driving shaft, etc. are not permissible.

Abnormal vibration of the Magneto, which is due to out-of-balance of the rotating parts (e.g. incorrect distribution of the centrifugal weights), is also not permissible.

The discrepancy between individual sparks on the graduated disc should not be more than  $\pm 1^\circ$  (depending on the cam division and its accuracy of running).

**b. Measuring the Ignition Power**

The ignition power comprises the measurement of the minimum and maximum speeds without misfiring, measured at the ionised spark test gap with the Magneto to be tested in the cold condition. The measurements should be made with unscreened high-tension leads of 1 metre in length.

| Measured Values Spark gap in <u>mm.</u><br>(Without Misfiring) | Speed<br><u>range</u> | No. of poles<br><u>on pole wheel</u> |      |      |
|--|-----------------------|--------------------------------------|------|------|
|  |                       | 4                                    | 6    | 8    |
| 1. Standard model 8mm (5/16")                                  | min.                  | 100                                  | 90   | 85   |
|  | max.                  | 3000                                 | 2500 | 2000 |
| 2. Aviation model 8mm (5/16")                                  | min.                  | 100                                  | 90   | 85   |
|  | max.                  | 3000                                 | 3000 | 3000 |
| 3. Racing model 8mm (5/16")                                    | min.                  | 100                                  | 90   | 85   |
|  | max.                  | 4000                                 | 4000 | 4000 |

The term "without misfiring" means that at least 30 consecutive sparks take place.

The term "minimum speed" means that the VERTEX produces the necessary spark length not later than this speed.

The term "maximum speed" means that the VERTEX still produces the necessary spark length at this speed.

**c. Primary connection**

At the primary connection terminal the Magneto can be switched off or short-circuited. While the apparatus is running, short circuit the terminal several times with a lead by connecting it to the housing; this must cause the sparks to cease entirely.

**d. Trial Run**

**1. Standard Models**

Run for one hour at 1500 r. p.m. and 7 mm (9/32") spark gap. After this, 1/4 hour at 3000 r.p.m. and 7 mm (9/32") spark gap. During the trial run watch out for smoke and steam emission. Such units are not permissible.

**2. Aviation and Racing Models**

Run for 3 hours at 1500 r. p.m. and 8 mm (5/16") spark gap. After this, 1/4 hour at max. speed (see para. b, p. 25) and 4 mm (5/32") spark gap.

During the entire trial run the VERTEX must operate without misfiring. Units which emit smoke and steam are not permissible. After the trial run these units should undergo the following insulation test:

Disconnect coil earthing connection at the contact-breaker plate.

Put the breaker in the open position.

Test, coil connection at 1000 V, 50 cps  
against housing.

Retighten connection well.

After the trial run the Magneto should be checked again in accordance with para, a, on p. 24.

e. Speed Limiter

To assemble the speed limiter, remove the distributor head. Mount the speed limiter under the cam fastening screw and adjust with a spark gap of 5 mm (0.2") in accordance with para. 3 , p.12 (fix the VERTEX without distributor head on the spark stroboscope and connect the high-tension lead of the coil to the spark test gap).

f. Final Assembly

All screws and nuts not secured with wire should be secured with lacquer (paint the head part with quick-drying lacquer). Assemble the distributor head, driving member and remaining parts. For installation instructions see para. c on p. 3.

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