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INSTRUCTION BOOK

No. 1489.*

COIL REPLACEMENT MAGNETOS

TYPE J

AND

MAGNETO-COIL IGNITION SETS

TYPE JD

Patents pending.

THE BRITISH THOMSON-HOUSTON CO., LTD.,

ENGLAND.

EDITION C. 0239.

* *Cancels Edition B.*

(see back page)

IMPORTANT.

The apparatus described in this Instruction Book was designed, manufactured, and tested with care and, with proper attention, should give the purchaser the service that he may reasonably expect.

The purpose of this Instruction Book is to explain the functions of the apparatus, and the manner in which it should be adjusted and maintained.

If these instructions are not clear, or appear incomplete in any particular, and you desire further information, this will be promptly supplied upon request.

Please address such enquiries to the nearest BTH Magneto Service Station, the BTH Co., Ltd., or the Engine Builder concerned, mentioning the particulars stamped upon the apparatus.

COIL REPLACEMENT MAGNETOS

TYPE J

AND

MAGNETO-COIL IGNITION SETS

TYPE JD

The Type J Magneto is a half-engine-speed magneto that is directly interchangeable with the orthodox distributor head normally supplied on multi-cylinder engines having coil ignition systems.

The Type JD Magneto-coil Ignition Set has been designed for high-class cars where alternative magneto and coil ignition is desired. It provides all the desirable features of both systems without the initial expense of installing two separate and distinct ignition equipments.

The distributor, contact-breaker, and automatic timing mechanism of the Type JD half-engine-speed magneto are used for both coil and magneto ignition.

STANDARD FORMS.

Types J and JD Magnetos are standardized in three forms as shown in the outlines in Figs. 1, 2, and 3.

Fig. 1.—Standard form for coil replacement purposes with radial lead type distributor.

Fig. 2.—As above, but with vertical type distributor.

Fig. 3.—Standard form with vertical type distributor, for new designs of engines—radial lead type distributor can be supplied (4-cylinder only) if desired.

Special forms are available for various makes of engines, details of which may be obtained on request.

TYPE J MAGNETO.

DESCRIPTION.

The Type J Magneto is of the rotating-magnet pattern and incorporates an automatic timing mechanism operating in an oil-bath. The main housing is an aluminium die-casting and the armature windings are secured to the poles by screws. Removal and replacement of the armature windings can be effected without further dismantling of the magneto, Fig. 8.

Provision may be made for manual as well as automatic timing control, the standard manual adjusting range being 20° on the engine crank-shaft.

The automatic timing mechanism is enclosed in the lower end of the housing in an oil-bath with leather seals to prevent oil leakage.

Two filling holes with screws are provided. The design is similar in principle to the standard governor mechanism on BTH coil ignition equipments, but necessarily is of more substantial construction.

INSTALLATION AND TIMING.

Either one of two conditions will be encountered in the installation of a Type J magneto.

(1) Replacement of an existing coil ignition equipment, or
(2) Installation on an engine specially designed to accommodate this type of magneto.

Important.

(1) *On account of the higher inertia forces when compared with the ordinary distributor head unit, it is strongly recommended that hardened steel pinions and driving gears are used for the Type J magneto.*
(2) *In no circumstances may the existing coil ignition cut-out switch be used in conjunction with the Type J magneto ; a new magneto-type ignition switch must be used.*

When an existing coil ignition equipment is to be replaced by the magneto, the method of mounting and timing is as follows :—

(1) Remove the existing distributor head and driving gear.
(2) Slacken the timing lever clamp on the magneto mounting shank.
(3) Turn the engine until the piston of No. 1 cylinder is at the top of its compression stroke.
(4) Move the ignition control lever at the driver's seat to within 5 to 10 degrees of the fully advanced position.
(5) Remove the distributor moulding from the magneto.
(6) Insert the magneto into the bore in the engine and turn the magneto in its seating so that the contact lever heel approaches the leading edge of a cam lobe and until the contacts *just separate.*
(7) Without moving the magneto, move the timing lever clamp to the desired position for fixing to the engine. Insert and secure the fixing screws. If variable manual control is provided, the timing lever should be moved towards the advance position so that the extremity of the timing slot is within $\frac{1}{16}$ of an inch of the fixing screw or stud.
(8) The control rod should now be attached to the timing lever clamp.
(9) The timing lever should now be securely tightened by the clamping screw on to the magneto shank.

(10) Replace the distributor moulding and connect the plug lead of No. 1 cylinder to the distributor terminal adjacent to the rotating distributor electrode.

(11) Connect up the other terminals of the distributor, in the order the distributing electrode passes them when rotating, to the remaining cylinders in their firing sequence.

NOTE.—In many cases the existing distributor head timing lever or holding-down clamp may also be used for fixing and controlling the magneto; but, levers used with distributors having vacuum control, or double levers having micrometer adjustment, are not suitable for magneto fixing.

When an engine is specially designed to accommodate this type of magneto with the larger diameter shank, three fixing studs are usually provided in the engine casting as shown in Fig. 3. The magneto is then installed as follows:—

(1) Slacken, but do not remove, the timing lever clamping screw, and locate the magneto in the most suitable position on the fixing studs. Turn the timing lever to a position convenient for linking up to the manual control rod.

(2) Replace on the three studs in the order named, the steel bushes, thick plain washers, Thackeray washers, thin plain washers, lockwashers, and nuts. See that the steel bushes locate in the slots in the clamping ring before tightening the nuts.

The slotted clamping plate should be turned in the opposite direction to the rotation of the magneto until the ends of the slots are within $\frac{1}{16}$ of an inch of the bushes, that is, just short of the fully advanced position.

The magneto may now be timed in the same way as previously described for a coil replacement magneto, and the timing lever clamping screw and nuts fixing the clamping plate, tightened up.

NOTE.—

(1) The above instructions provide for a fully advanced ignition timing (including automatic timing control) of approximately 30 degrees on the engine crankshaft before the piston reaches the top of its compression stroke.

(2) The standard automatic timing mechanism provides an automatic timing range of 25° on the engine crankshaft.

(3) The ignition timing will vary for different engines and subsequent minor adjustments can easily be made if it is found that the ignition appears to be either too advanced or too retarded.

(4) The above are given as general instructions and should be followed in the absence of more precise instructions given by engine makers for timing their particular engines.

MAINTENANCE.

The following periodical attentions are required :—

Immediately after installation and every 500 miles, or 20-30 hours' running, give one turn to the driving spindle grease cup. When necessary, replenish this cup with good quality grease such as Price's Belmoline " C." In some cases, a self-lubricating bearing is used, therefore no grease cup is provided.

Every 2000 to 3000 miles, or 30-50 hours' running, lubricate the contact lever bearing and cam lubricating pad. Two drops of light machine oil will generally be adequate on each occasion. Excess of oil should be avoided and any surplus oil should be wiped away, otherwise it may reach the contacts.

Every 5000 miles, or 100 hours' running :—

(1) Check the gap between the contacts. If necessary, adjust to 0·018" or to gauge attached to spanner provided. At the same time clean the inside of the distributor moulding, also the distributor electrode holder, free from oil or dust deposit.

(2) Remove *both* plug screws from oil filling holes in the automatic timing mechanism and add ½ oz. (14 gms.) of Vacuum Oil Co's. cylinder oil EF 212. Good quality engine oil, such as Mobiloil " BB," may be used as an alternative. Allow a few minutes for any surplus oil to overflow before replacing the plug screws.

Periodically, particularly after washing down the car, wipe the outsides of the distributor and winding cover mouldings free from dust, dirt, or moisture.

DETECTION OF FAULTS.

If trouble occurs, it is advisable to make sure that the ignition system is actually at fault before making any adjustments.

MISFIRING.

(1) Examine the contact-breaker ; the gap should be 0·018" and the points clean. Also check that the contact-breaker lever movement is quite free.

(2) Examine the sparking plugs and check their gaps which should be set between 0·018" and 0·025" wide. If the plugs have been in service a long time, they may require cleaning or replacing.

(3) Examine the high-tension cables for perished or chafed insulation.

(4) Examine inside of distributor for dirt or deposit.

(5) Remove short-circuiting lead from magneto to ascertain whether abrasion or chafing of this lead causes intermittent short-circuiting to some part of the frame.

TYPE JD MAGNETO-COIL IGNITION SET.

DESCRIPTION.

This magneto-coil ignition set comprises the following :—

(1) A Type JD magneto.

(2) An ignition coil.

(3) A combined high- and low-tension changeover switch controlled from the dashboard, by means of which the driver can quickly change from one form of ignition to the other.

TYPE JD MAGNETO.

This only differs from the Type J magneto previously described in that an additional low-tension terminal is provided on the body to permit the magneto to be switched out of action while running on the coil. As the contact-breaker of the magneto is used for both magneto and coil ignition, tungsten contacts are fitted.

IGNITION COIL.

The ignition coil, Fig. 10, is specially designed to suit varying climatic conditions. It is mounted in a tubular container of insulating material and alternative base fixings are available as shown in Fig. 4. A ballast resistance is provided in the top of the container to prevent damage to the windings, and rapid discharge of the battery, should the ignition switch be inadvertently left on when the engine is stationary.

COMBINED HIGH- AND LOW-TENSION CHANGEOVER SWITCH.

This component is shown in Figs. 5 and 9 and consists of three main parts ; the rotor, the body, and the base, all made of fabrolite insulating compound.

The rotor, or movable member of the switch, is carried on a steel shaft which is extended at one end for the control lever. The rotor has three positions corresponding to " Coil," " Off," and " Magneto," and marked " C," " Off," and " M " respectively as seen through the small celluloid window in the body of the switch.

With the changeover switch in position " M " ignition is provided by the magneto. The high-tension terminals D and M, Fig. 6, are electrically connected by means of the metal segment moulded in the rotor, while the low-tension terminals CB and M are bridged by the laminated brush also attached to the rotor.

With the changeover switch in position " C " ignition is provided by the coil. The high-tension terminals D and C, Fig. 6, are connected together, also the low-tension terminals CB and C. It should be noted that the distributor, contact-breaker, and automatic timing mechanism on the magneto are also used when the coil is operating.

MAINTENANCE.

MAGNETO.

The instructions given on page 6 for maintaining the Type J magneto also apply to the Type JD magneto.

COIL AND CHANGEOVER SWITCH.

These components require no periodical attention beyond an occasional inspection to see that the terminals are kept tight and free from deposit.

DETECTION OF FAULTS.

If trouble occurs, it is advisable to make sure that the ignition systems are actually at fault before making any adjustment.

(1) First ascertain whether the ignition is faulty on both coil and magneto by changing over from one system to the other. If the trouble exists with both systems, an examination should be made of those parts common to the two systems, namely, sparking plugs, distributor, and contact-breaker, in accordance with the instructions given on page 6.

(2) Should the fault be revealed as being on the magneto system only :—

(a) Check the high-tension cables from the magneto to the changeover switch. This may be done by disconnecting the two high-tension cables from the magneto (one on the centre of the distributor, the other on the winding cover) and bridging these terminals with a short length of high-tension cable. Satisfactory ignition will indicate that the insulation of the high-tension cables in question is faulty.

(b) If the fault persists, next disconnect the low-tension cables from the magneto (terminals CB and M, Fig. 6) and bridge these terminals with a short length of insulated wire. Should this remove the trouble, then the low-tension cables in question should be examined for a short-circuit to earth.

(3) Should the fault be revealed as being on the coil system only :—

(a) Remove the high-tension cable from the centre distributor terminal and connect this terminal direct to the high-tension terminal of the ignition coil. Satisfactory ignition will indicate a defect in the high-tension cables to terminals D and C, Fig. 6, of the changeover switch.

(b) If necessary, next examine the low-tension connections to the switch, ignition coil, and " CB " terminal on the magneto. A loose connection at any of these points will result in faulty ignition on the coil system.

(c) Next disconnect the low-tension cables from the " CB " terminals on the magneto and ignition coil, and connect these terminals direct by means of a separate length of insulated wire. Improved ignition will indicate an " earth " on one or the other of these low-tension cables.

(d) A faulty battery or battery connections should not be overlooked in the case of ignition trouble on the coil system only.

If at any time trouble occurs which users are unable to overcome, they are urged to communicate with The British Thomson-Houston Co., Ltd., when advice and information will be gladly given.

ORDERING INSTRUCTIONS.

When ordering a Type J magneto or a Type JD magneto-coil ignition set, it is essential to give the following particulars :—

(1) Number of cylinders.

(2) Direction of rotation of magneto (clockwise or counter-clockwise) when looking at the driving end.

(3) If manual ignition control is required, or only automatic control.

(4) In the case of the Type JD magneto-coil set, it is also necessary to specify the ignition coil voltage and type of mounting desired (see Fig. 4).

NOTICE.

Replacements are obtainable from any BTH Magneto Service Station. The Service Station will also supply instructions should it be necessary to return apparatus to our Works for repairs or other reason.

If you are not in the vicinity of a Service Station please communicate with :—The BTH Co., Ltd., or the Engine Builder concerned.

Compliance with this request will save delay and inconvenience.

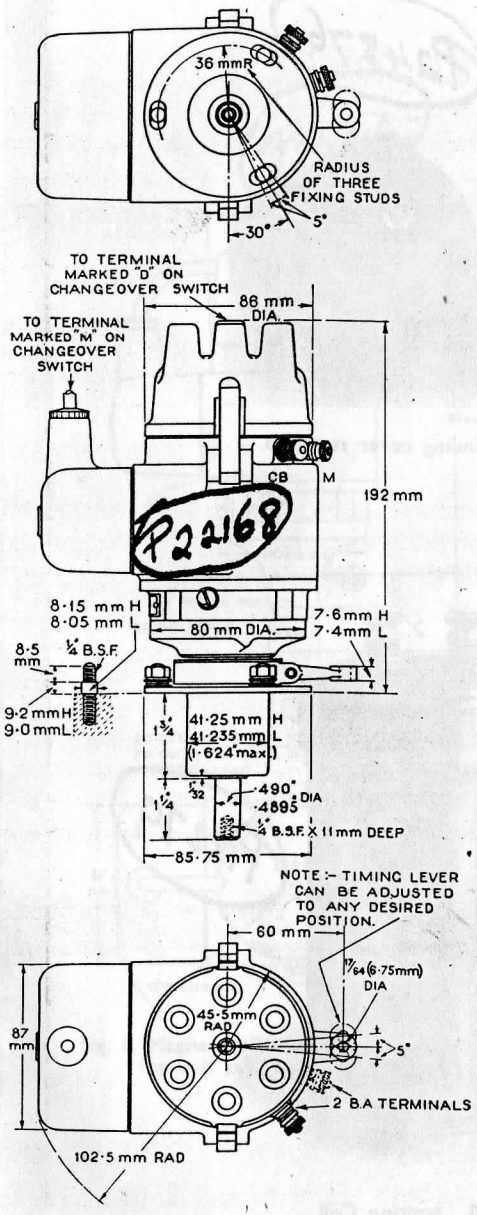

Fig. 3. Magneto for new designs of engines.

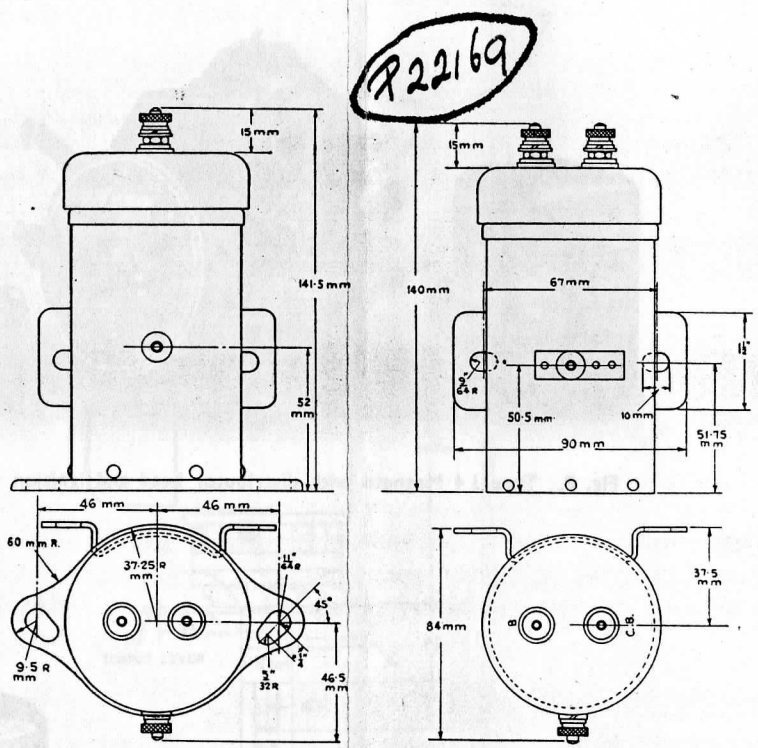

Fig. 4. Ignition coil showing alternative methods of fixing.

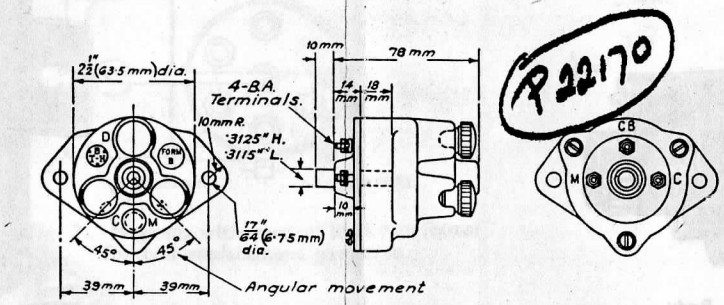

Fig. 5. Changeover switch.

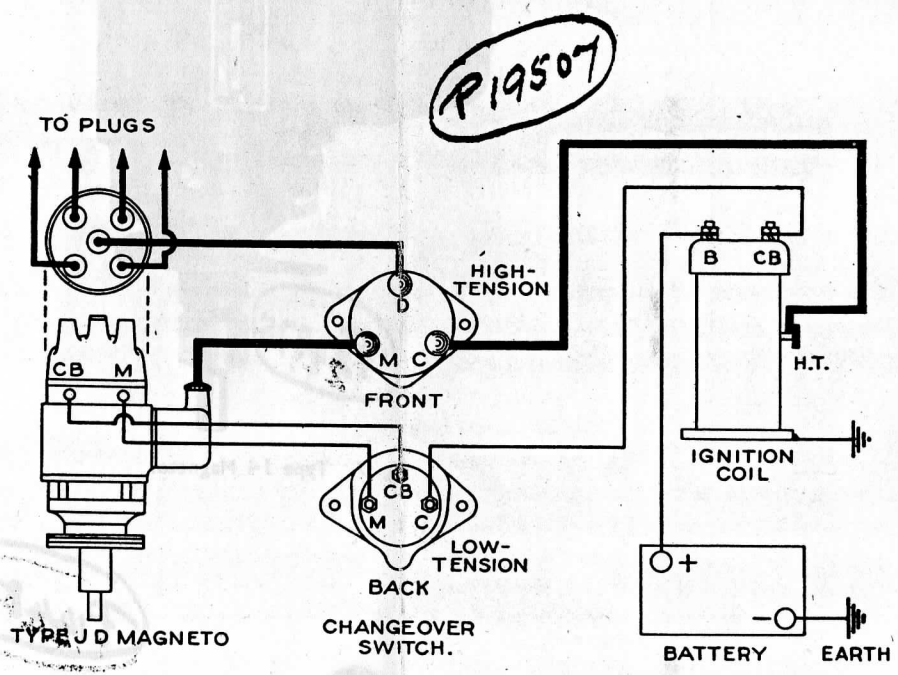

Fig. 6. Connection diagram of Type JD Magneto-coil Ignition Set.

NOTE :—Read carefully the instructions on page 8 before wiring up.

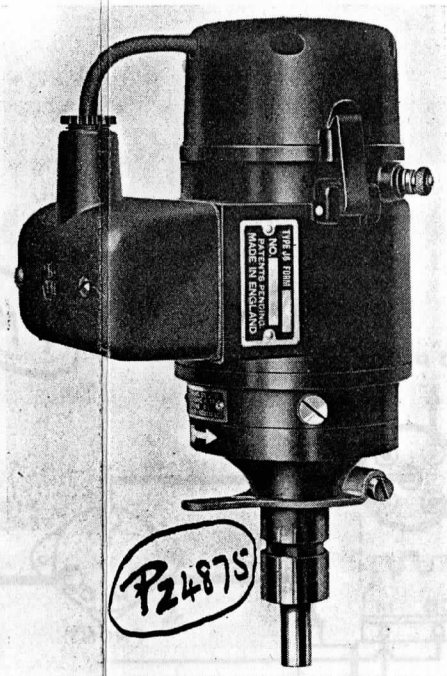

Fig. 7. Type J 4 Magneto.

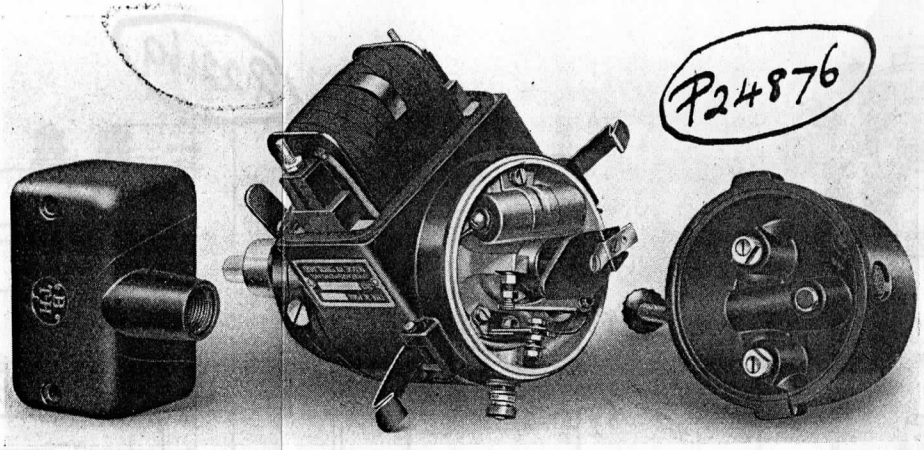

Fig. 8. Type J 4 Magneto with distributor head and ignition winding cover removed.

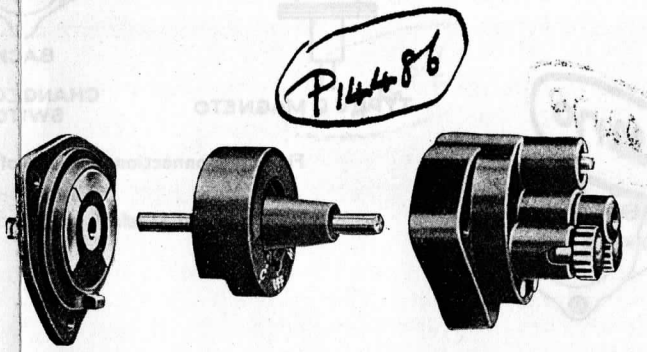

Fig. 9. Combined high- and low-tension changeover switch dismantled.

Fig. 10. Ignition Coil.

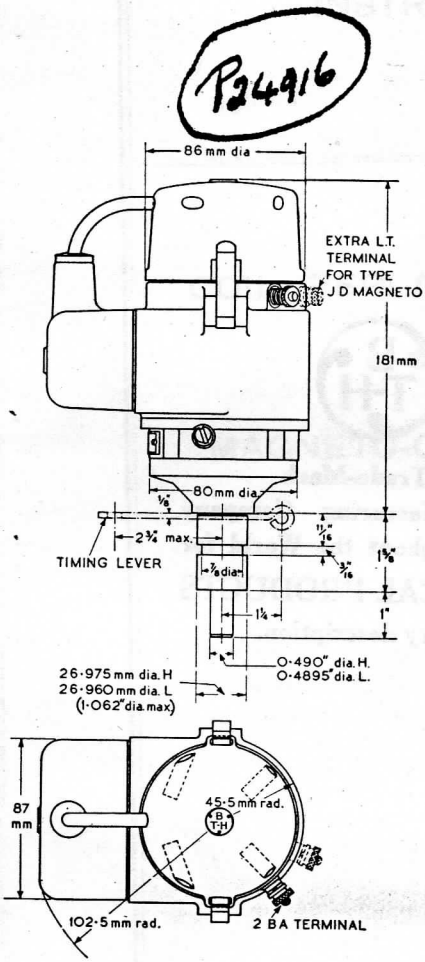

Fig. 1. Magneto with radial lead distributor for coil replacement purposes.

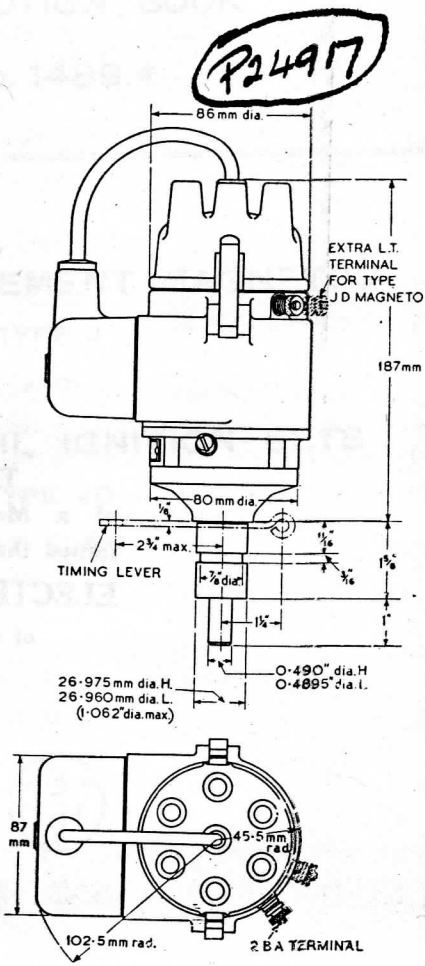

Fig. 2. Magneto with vertical lead distributor for coil replacement purposes.