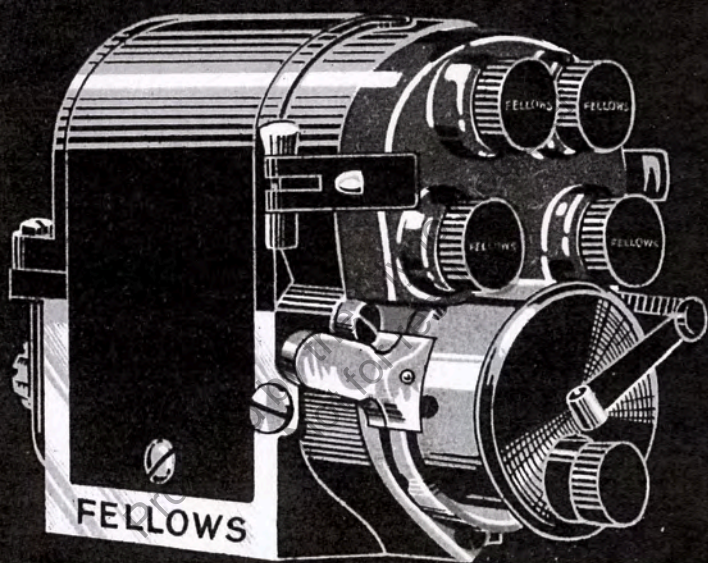
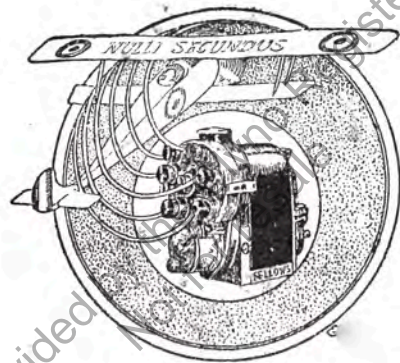


FELLOWS

BRITISH MADE



MAGNETOS



Provided by the British Library

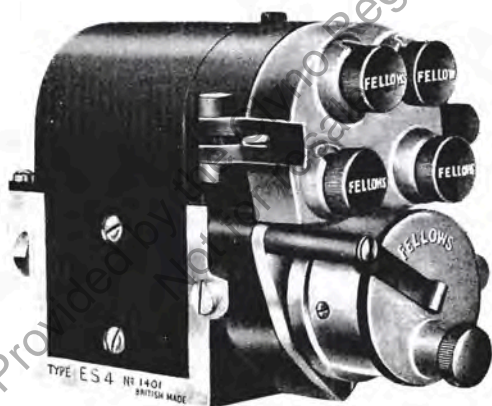
F. M. C.

Fellows

MAGNETOS

BRITISH MADE

TYPES "E.S.4" and "E.S.6"



TYPE "E.S.4"

FELLOWS MAGNETO CO., LTD.

CUMBERLAND AVENUE
PARK ROYAL
LONDON, N.W.10

Telephones : "Willesden" 1560, 1561, 1502

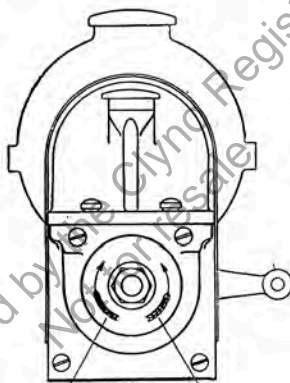
Telegrams : Quixmag, Phone, London"

Code : Marconi International

When ordering, the following particulars must be given on the order.

For Magnetos.

1. The type of Magneto.
2. Direction of rotation viewed from the Driving end.
3. State whether taper or parallel spindle.



Right Hand.

Left Hand.

For Spares.

1. Type, rotation and serial number stamped on the base of the Magneto must be given.
2. Catalogue number of required part.

Fellows Magnetos stand for Efficiency and Long Wear.



NOTE SOME OF THEIR ADVANTAGES.

Design.

Built on long tried designs.
Simple and neat appearance.
Reliability in action.
Dirt and waterproof, being entirely enclosed.
Smooth and silent running.
High electrical efficiency.

Accessibility.

Although the Magneto is enclosed, all parts subject to wear, such as carbons, platinum screws, etc., are easily accessible.

Efficiency.

Easy starting with the Magneto is assured, as same produces a hot spark at the lowest possible speed.

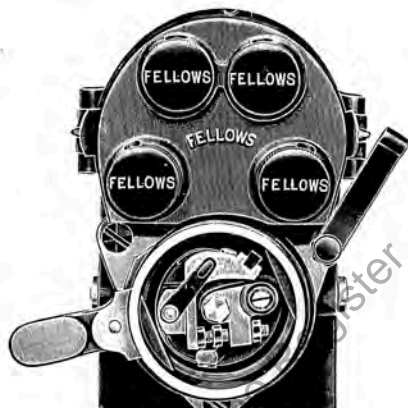
Workmanship.

British throughout.
Absolute interchangeability of parts.
A highly finished and reliable article.

Testing.

Before being finally passed, each Magneto undergoes a far more strenuous test than it could possibly be subjected to in actual use; in fact, the Government's Aircraft Test Schedule is now our standard.

Description and Action of the Magnetos, Types E.S.4 and E.S.6.



THE types E.S.4 and E.S.6 are suitable for 4 and 6 cylinder engines respectively.

The two types are of course high tension machines, and the current is generated in the winding of the armature without the use of a coil.

The armature rotates between the pole shoes of steel magnets which form the magnetic field. This armature is wound in two sections, one, the primary winding, consisting of a few turns of thick wire, the other, the secondary winding, composed of a large number of turns of fine wire. The high tension current is produced by the interruption of the primary current by means of the contact breaker, at the proper moment.

At every half turn of the armature such an interruption takes place, causing a high tension current to be produced, twice every revolution, in the secondary winding.

The timing of the ignition can be adjusted, within a range of 25% relative to the armature spindle, by means of the timing lever, and the breaking of the primary circuit made to occur early or late as desired.

Timing of the Magneto to the Engine.

THE Magneto produces a spark only with the armature in a certain position, and the engine can only be ignited with the piston in a certain position. Therefore the Magneto should be positively driven either by gears or couplings, and the speed is to be in accordance with the number of cylinders of the engine.

In the type E.S.6, which is suitable for six-cylinder engines, two sparks are obtained during each turn of the armature, whereas the engine in two revolutions of the crankshaft requires six sparks, therefore the ratio of the gearing between the Magneto and the crankshaft must be equal to 3×2 , that is, *the magneto must be driven at $1\frac{1}{2}$ times the speed of the crankshaft.*

In the type E.S.4 two sparks are produced during each turn of the armature, and as the engine in this case requires four sparks per two revolutions of the crankshaft, the ratio of gearing between the crankshaft and the Magneto must be 1×1 , i.e., the Magneto armature must be rotated at the same speed as the crankshaft.

The correct method of timing is as follows:—

The Magneto should first of all be screwed down on its bed-plate on the engine, and the coupling or gear wheel fitted loosely on the driving spindle of the Magneto. Now turn the engine slowly by hand until the piston of No. 1 cylinder comes on to compression stroke and is brought into full advance position. This position is usually marked on the fly-wheel; if not, the makers of the engine will advise.

The timing lever of the Magneto should be fully advanced and the Magneto armature revolved in the proper direction until the fibre heel on the contact breaker touches the cam and the platinum points are just about to open.

The coupling is now securely fastened to the Magneto, and the same in turn to the driving shaft, care being taken to see that the position of the Magneto armature or the engine is not disturbed. After this has been done the cables have to be connected from the Magneto distributor to the sparking plugs.

A wiring diagram is given on page 12, making no explanation necessary.

It must, however, be particularly noted that the cables are connected, not according to the order in which the various cylinders of the motor are placed, one behind the other, but in accordance with the sequence of firing. After the cables have been correctly connected, the Magneto is ready for use.

General Notes.

Switch.

THE Magneto is switched off in the usual way by connecting a switch by means of a cable with the short circuiting terminal on the Magneto, the other terminal of the switch being connected to the chassis frame, and when the switch is closed the primary winding of the Magneto is short circuited, rendering the Magneto ineffective.

Contact Breaker.

THE most delicate part of the Magneto is the contact breaker, and it is advisable to inspect this occasionally, seeing that the platinum contacts are free from oil, as this causes them to burn away quickly, and the Magneto would not work satisfactorily.

The gap between the two platinum contacts should never be greater than 0.4 mm when fully open.

If it becomes necessary to take the contact breaker off for any adjustment, care must be taken that it is put back with the key properly engaging the keyway.

Attention should be given to the bell-crank lever, which works in a fibre bush. Under varying climatic conditions it may occasionally happen that this bell-crank lever becomes stuck up owing to the swelling of the fibre bush, but by very slightly increasing the bore of the fibre bush this defect can be easily remedied.

General Notes.

Distributor.

THE distributor should be removed occasionally to ascertain if any carbon dust has accumulated from the normal wear of the carbon. This dust may cause shorting from one segment of the distributor to the other, the result being that the spark would not occur in the proper cylinder. Any carbon that has accumulated should be removed by cleaning with petrol.

Lubrication.

THIS matter has been well arranged for in the design of this machine, the designer having seen in years of experience the trouble caused through over lubrication and, occasionally, under lubrication.

Very few motorists seem to strike the happy medium in respect of oiling the Magneto, so to overcome this difficulty the lubrication is absolutely automatic as far as the driver is concerned, and no oiling is necessary.

The method we have adopted is that of using a semi-solid lubricant in a chamber adjacent to the ball races, which gradually flows into the latter.

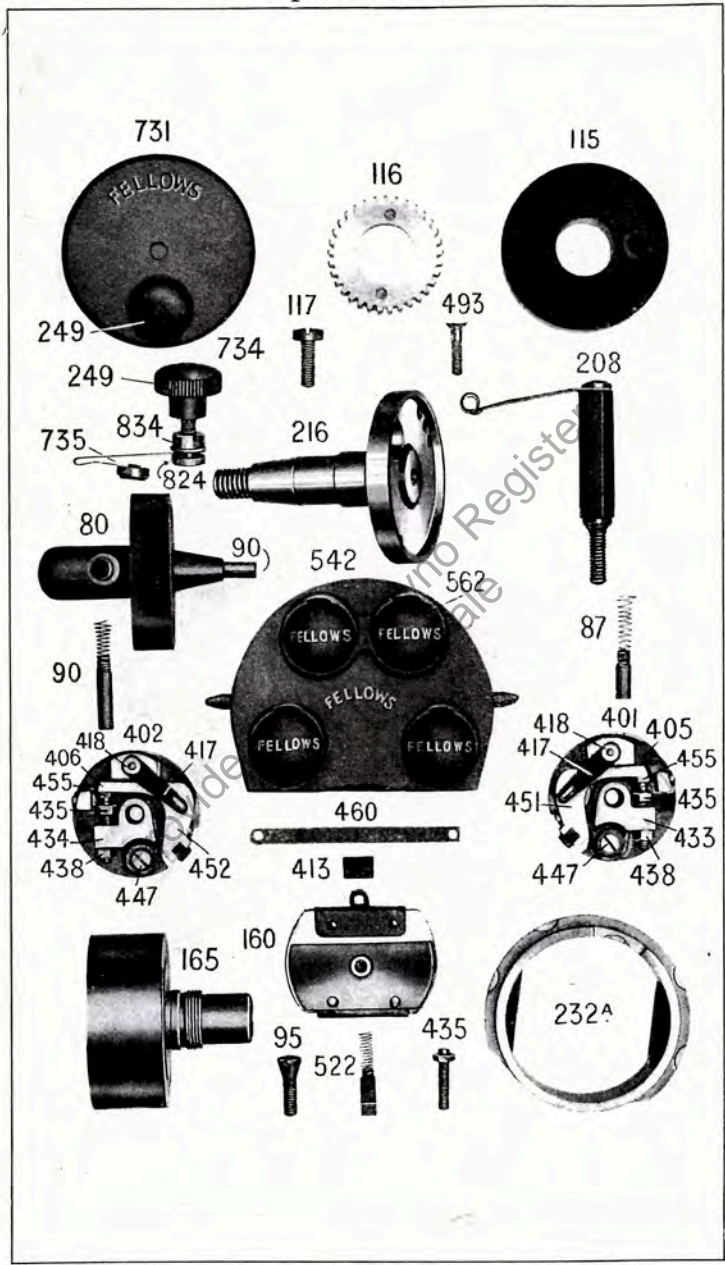
It is well to note that this automatic lubrication will last for several years without replenishing.

Apart from any of the slight adjustments mentioned, if the Magneto is not giving satisfaction, it is advisable to return the Magneto to the makers, as they can only guarantee Magnetos which have not been tampered with beyond the adjustments previously mentioned.

Spare Parts For Types E.S.4 and E.S.6.

E.S.4.	E.S.6.	
80	81	Complete carbon holder without safety spark gap.
93	94	Safety spark gap.
87	87	Carbon and spring for conducting tube.
90	90	Carbon and spring for slip ring.
95	95	Fastening screw for carbon holder.
101	101	Dust cover for right hand magneto.
102	102	Dust cover for left hand magneto.
117	117	Fastening screw for dust cover 101 and 102.
118	118	Washer for fastening screw 117.
167	167	Frame carbon screw with carbon and spring.
167A	167A	Carbon with spring for frame carbon screw.
173	174	Clip spring for distributor disc.
175	175	Fastening pin for spring 173 and 174.
208	208	Spring carrier for fastening the contact breaker end cap.
231	231	Complete timing lever for left hand magneto.
231A	231A	Segment ring with segments for left hand magneto.
232	232	Complete timing lever for right hand magneto.
232A	232A	Segment ring with segments for right hand magneto.
706	706	Timing lever arm with screw 709.
709	709	Fastening screw for lever arm 706.
824	824	Bolt for short circuiting terminal.
834	834	Hexagon nut for short circuiting terminal.
249	249	Nut for fastening short circuiting terminal.
731	731	End cap for short circuiting terminal on timing lever.
734	734	Complete short circuiting terminal.
735	735	Short circuiting spring with contact plate.
350	350	Hexagon nut for front armature spindle.
351	351	Washer for nut 350.
401	401	Complete contact breaker, left hand.
402	402	Complete contact breaker, right hand.
405	405	Contact breaker disc only with spring 417 for left hand magneto.
406	406	Contact breaker disc only with spring 417 for right hand magneto.
413	413	Fibre bush for pivot of bell crank lever.
417	417	Flat spring for contact lever.
418	418	Washer for flat spring 417.

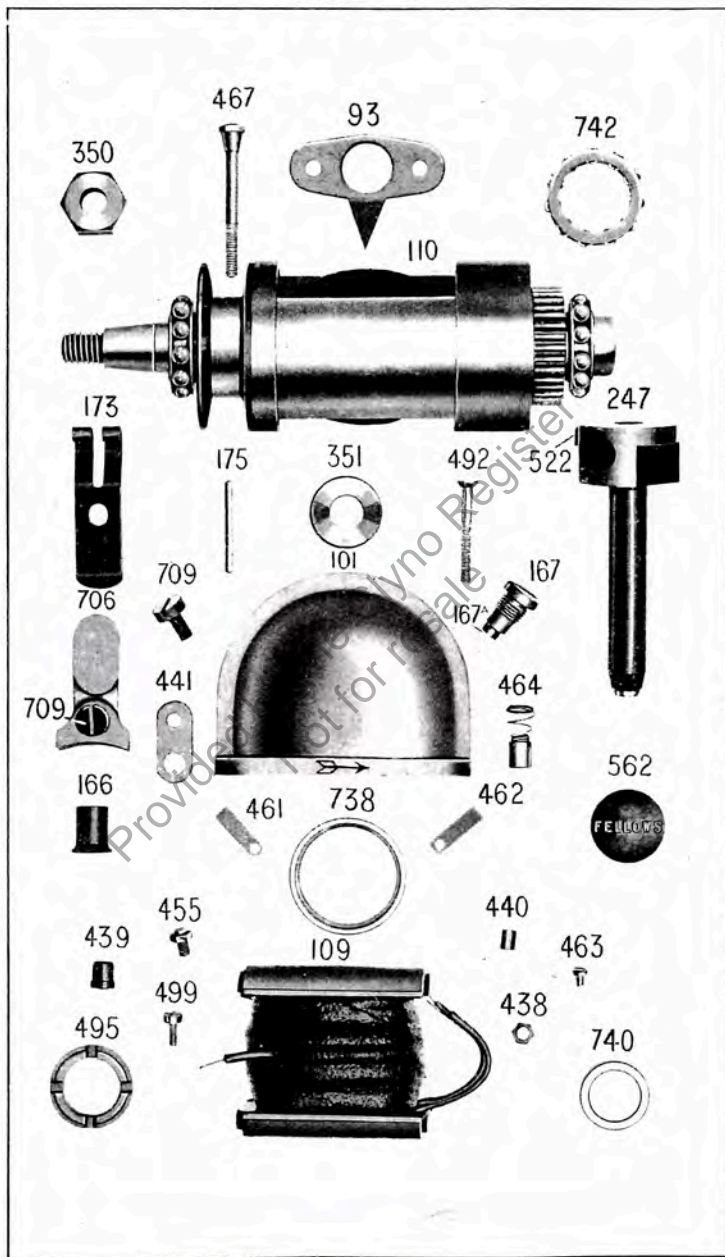
Spare Parts.



Spare Parts For Types E.S.4 and E.S.6.

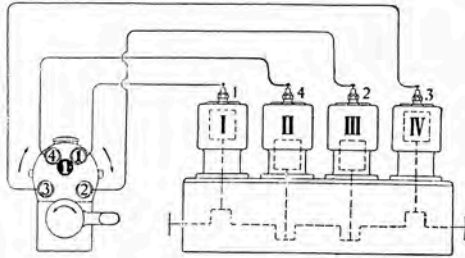
E.S.4.	E.S.6.	
433	433	Contact piece for contact breaker 401.
434	434	Contact piece for contact breaker 402.
435	435	Long platinum screw for contact piece 433 and 434.
438	438	Nut for platinum screw 435.
447	447	Fastening screw for contact piece.
451	451	Contact breaker lever for left hand magneto.
452	452	Contact breaker lever for right hand magneto.
455	455	Platinum screw for contact breaker lever 451 and 452.
460	460	Flat spring for contact breaker lever 451 and 452.
461	461	Auxiliary spring on contact breaker lever 451 and 452.
462	462	Auxiliary spring for contact breaker disc 405 and 406.
463	463	Fastening screw for the springs 460, 461 and 462.
464	464	Carbon with spring for contact breaker.
247	248	Rotating distributor piece with carbon and spring.
522	522	Distributor carbon and spring.
542	577	Distributor disc with insulated terminal nuts.
562	562	Insulated terminal nut.
467	467	Contact breaker fastening screw.
109	109	Wound armature core.
110	111	Complete armature.
115	115	Slip ring.
116	116	Full speed wheel.
495	495	Full speed wheel locking nut.
216	216	Driving spindle and disc.
160	160	Condenser.
165	165	Condenser case.
166	166	Bush for condenser.
493	493	Short armature screw.
492	492	Long armature screw.
499	499	Condenser earthing screw.
440	440	Small insulating bush in contact breaker.
441	441	Mica insulation plate in contact piece.
439	439	Large insulating bush in contact breaker.
738	739	Outer ball race ring.
740	741	Inner ball race ring.
742	743	Ball race cage.

Spare Parts

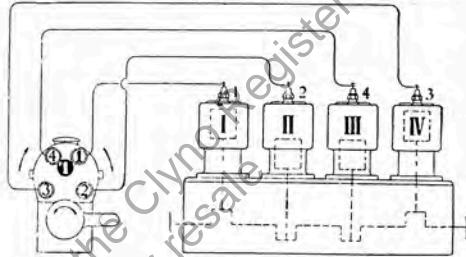


Wiring Diagram for 4-Cylinder Motors for either direction and sequences of firing.

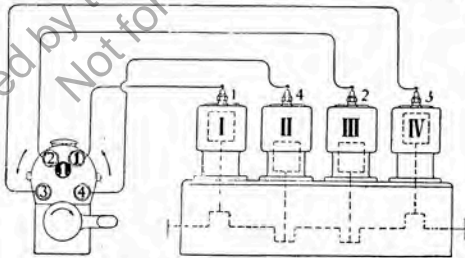
Magneto, right-hand.
Sequence of firing
I, III, IV, II.



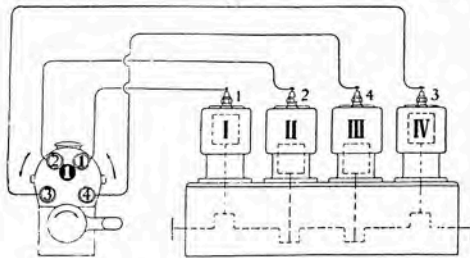
Magneto, right-hand.
Sequence of firing
I, II, IV, III.



Magneto, left-hand.
Sequence of firing
I, III, IV, II.



Magneto, left-hand.
Sequence of firing
I, II, IV, III.



Spare Part Case No. 167.
Fellows Type E.S.4.



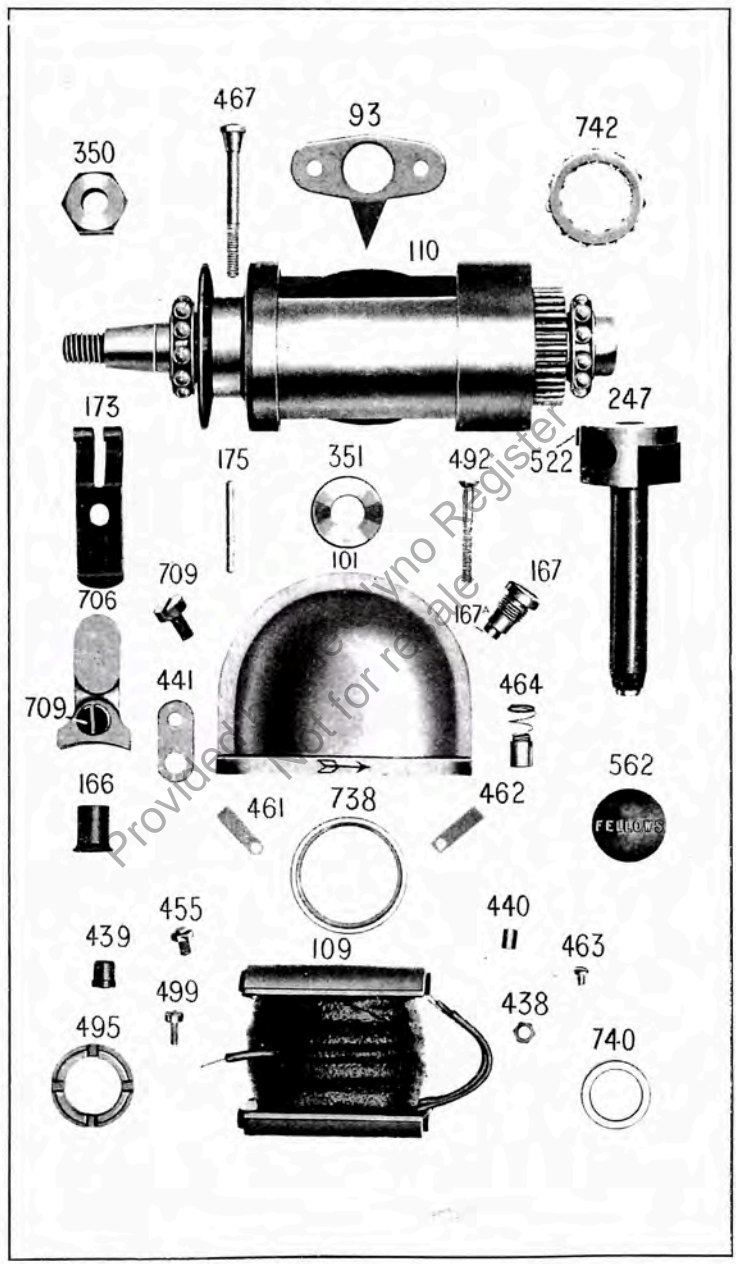
Contents.

- | | | |
|--|-----------------------------|---|
| 1 Nut No. 530. | For Armature Spindle. | 2 Strengthening Springs Nos. 461 and 462. |
| 1 Washer No. 351. | | 1 Contact Breaker Carbon and Spring No. 464. |
| 2 Fastening Screws No. 117 | fastening Cover. | 2 Screws No. 463. |
| 1 Carbon Holder No. 80 | without Brass Piece No. 93. | 1 Screw No. 447. |
| 1 Carbon with Spring No. 90. | | 1 Washer for Screw No. 447. |
| 1 Carbon with Spring No. 87. | | 1 Holding Spring No. 173. |
| 2 Screws No. 95. | | 1 Fastening Pin No. 175. |
| 1 Rotating Distributor Piece No. 247. | | 2 Insulating Connecting Terminals No. 562. |
| 1 Carbon with Spring No. 522. | | 1 Short Circuiting Terminal No. 734 without Spring No. 735. |
| 1 Complete Contact Breaker No. 401 or 402. | | 1 Stop Screw for Timing Lever. |
| 1 Contact Breaker Fastening Screw No. 467. | | 1 Screw No. 709. |
| 1 Contact Breaker Flat Spring No. 460. | | 1 Frame Carbon and Screw Nos. 167. |
| | | 1 Magneto Spanner. |

Spare Parts For Types E.S.4 and E.S.6.

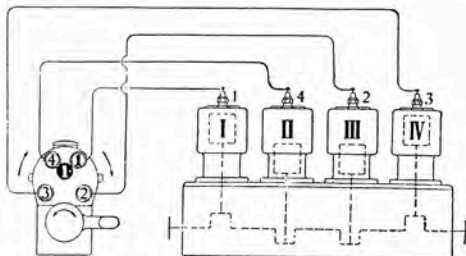
E.S.4.	E.S.6.	
433	433	Contact piece for contact breaker 401.
434	434	Contact piece for contact breaker 402.
435	435	Long platinum screw for contact piece 433 and 434.
438	438	Nut for platinum screw 435.
447	447	Fastening screw for contact piece.
451	451	Contact breaker lever for left hand magneto.
452	452	Contact breaker lever for right hand magneto.
455	455	Platinum screw for contact breaker lever 451 and 452.
460	460	Flat spring for contact breaker lever 451 and 452.
461	461	Auxiliary spring on contact breaker lever 451 and 452.
462	462	Auxiliary spring for contact breaker disc 405 and 406.
463	463	Fastening screw for the springs 460, 461 and 462.
464	464	Carbon with spring for contact breaker.
247	248	Rotating distributor piece with carbon and spring.
522	522	Distributor carbon and spring.
542	577	Distributor disc with insulated terminal nuts.
562	562	Insulated terminal nut.
467	467	Contact breaker fastening screw.
109	109	Wound armature core.
110	111	Complete armature.
115	115	Slip ring.
116	116	Full speed wheel.
495	495	Full speed wheel locking nut.
216	216	Driving spindle and disc.
160	160	Condenser.
165	165	Condenser case.
166	166	Bush for condenser.
493	493	Short armature screw.
492	492	Long armature screw.
499	499	Condenser earthing screw.
440	440	Small insulating bush in contact breaker.
441	441	Mica insulation plate in contact piece.
439	439	Large insulating bush in contact breaker.
738	739	Outer ball race ring.
740	741	Inner ball race ring.
742	743	Ball race cage.

Spare Parts

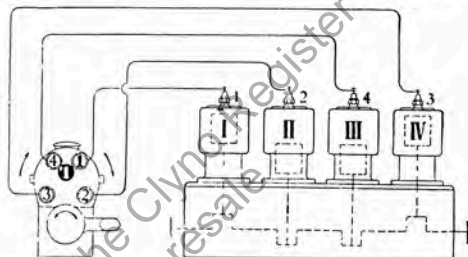


Wiring Diagram for 4-Cylinder Motors for either direction and sequences of firing.

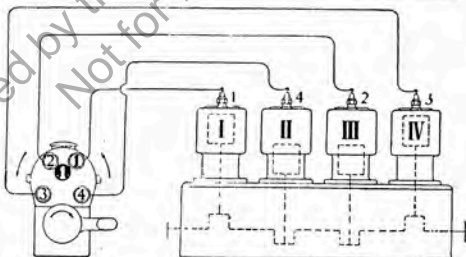
Magneto, right-hand.
Sequence of firing
I, III, IV, II.



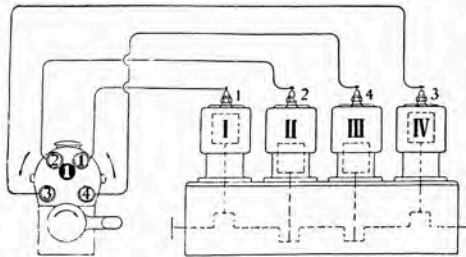
Magneto, right-hand.
Sequence of firing
I, II, IV, III.



Magneto, left-hand.
Sequence of firing
I, III, IV, II.



Magneto, left-hand.
Sequence of firing
I, II, IV, III.



Spare Part Case No. 167.
 Fellows Type E.S.4.



Contents.

- | | |
|--|--|
| <p>1 Nut No. 530. <small>For Armature Spindle.</small></p> <p>1 Washer No. 351.</p> <p>2 Fastening Screws No. 117 fastening Cover.</p> <p>1 Carbon Holder No. 80 without Brass Piece No. 93.</p> <p>1 Carbon with Spring No. 90.</p> <p>1 Carbon with Spring No. 87.</p> <p>2 Screws No. 95.</p> <p>1 Rotating Distributor Piece No. 247.</p> <p>1 Carbon with Spring No. 522.</p> <p>1 Complete Contact Breaker No. 401 or 402.</p> <p>1 Contact Breaker Fastening Screw No. 467.</p> <p>1 Contact Breaker Flat Spring No. 460.</p> | <p>2 Strengthening Springs Nos. 461 and 462.</p> <p>1 Contact Breaker Carbon and Spring No. 464.</p> <p>2 Screws No. 463.</p> <p>1 Screw No. 447.</p> <p>1 Washer for Screw No. 447.</p> <p>1 Holding Spring No. 173.</p> <p>1 Fastening Pin No. 175.</p> <p>2 Insulating Connecting Terminals No. 562.</p> <p>1 Short Circuiting Terminal No. 734 without Spring No. 735.</p> <p>1 Stop Screw for Timing Lever.</p> <p>1 Screw No. 709.</p> <p>1 Frame Carbon and Screw Nos. 167.</p> <p>1 Magneto Spanner.</p> |
|--|--|

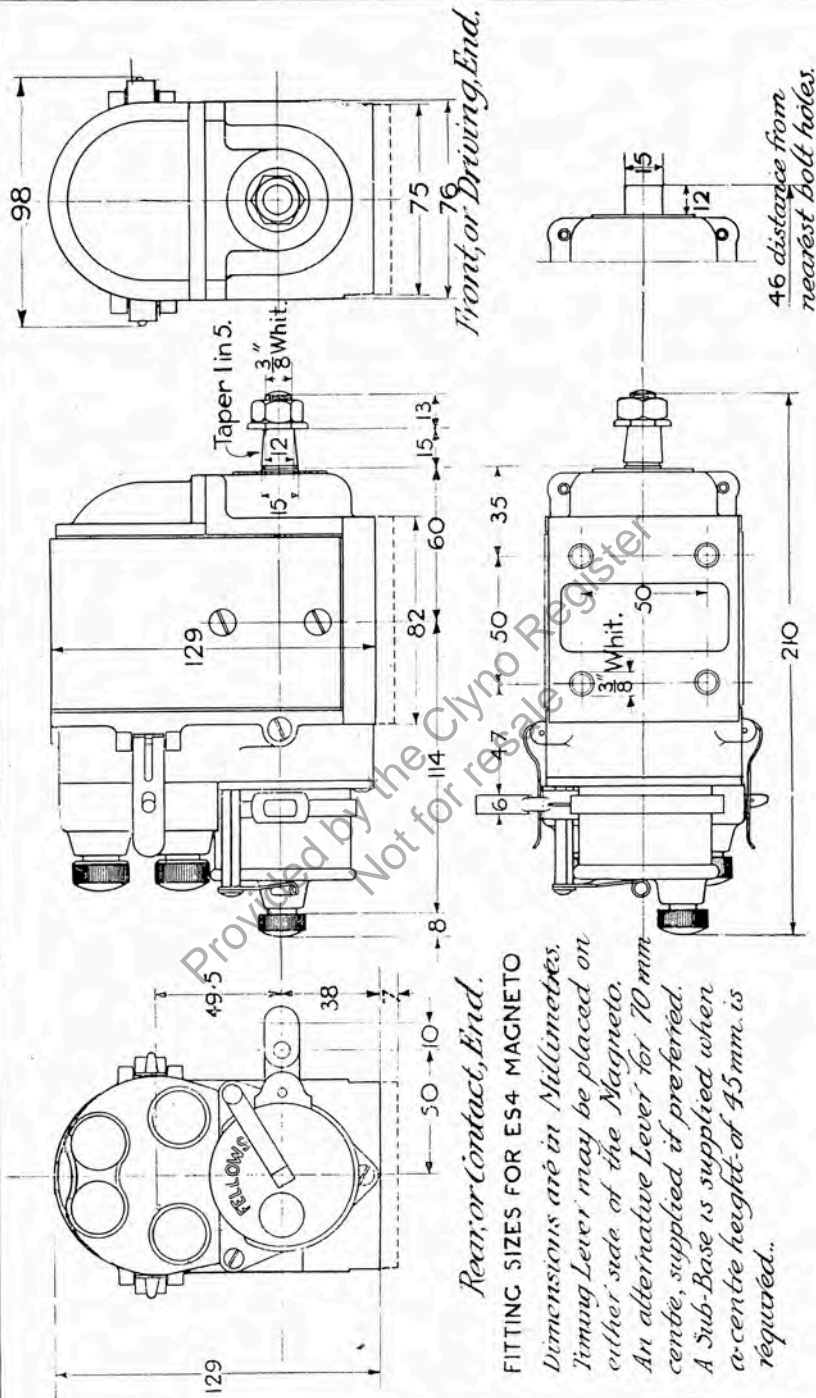
Spare Part Case No. 168.
 Fellows Type E.S.6.



Contents.

- | | | |
|----------------------------|---------------------|---------------------------|
| 1 Nut No. 530 | For Armature | 2 Strengthening Springs |
| 1 Washer No. 351 | Spindle | Nos. 461 and 462. |
| 2 Fastening Screws No. 117 | fastening cover. | 1 Contact Breaker Carbon |
| 1 Carbon holder No. 80 | without Brass Piece | and Spring No. 464. |
| No. 94. | | 2 Screws No. 463. |
| 1 Carbon with Spring | No. 90. | 1 Screw No. 447. |
| No. 87. | | 1 Washer for Screw No. |
| 2 Screws No. 95. | | 447. |
| 1 Rotating Distributor | | 1 Holding Spring No. |
| Piece No. 248. | | 174. |
| 1 Carbon with Spring | | 1 Fastening Pin No. 175. |
| No. 522. | | 2 Insulating Connecting |
| 1 Complete Contact | | Terminals No. 562. |
| Breaker No. 401 or 402. | | 1 Short Circuiting Ter- |
| 1 Contact Breaker Fas- | | terminal No. 734, without |
| tening screw No. 467. | | Spring No. 735. |
| 1 Contact Breaker Flat | | 1 Stop Screw for Timing |
| Spring No. 460. | | Lever. |
| | | 1 Screw No. 709. |
| | | 1 Frame Carbon and |
| | | Screw No. 167. |
| | | 1 Magneto Spanner. |

Dimensions of Type E.S.4.



Front, or Driving, End.

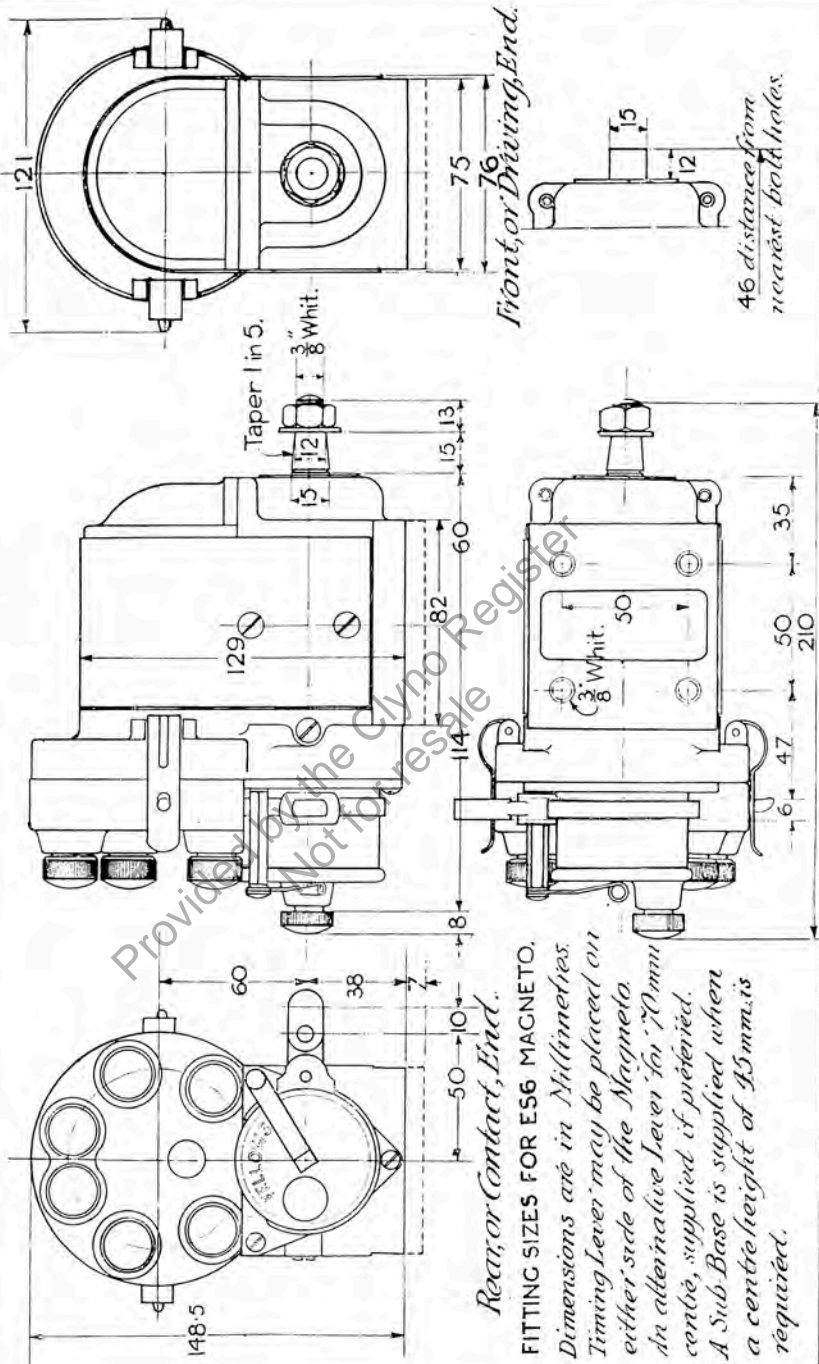
Rear, or Contact, End.

FITTING SIZES FOR ES4 MAGNETO

*Dimensions are in Millimetres.
Timing Lever may be placed on either side of the Magneto.
An alternative Lever for 70 mm centre, supplied if preferred.
A Sub-Base is supplied when a centre height of 45 mm. is required.*

45 distance from nearest bolt holes.

Dimensions of Type E.S.6.



Rear, or Contact, End.

FITTING SIZES FOR ES6 MAGNETO.

*Dimensions are in Millimetres.
Timing Lever may be placed on either side of the Magneto.
An alternative Lever for 70mm comb, supplied if preferred.
A Sub Base is supplied when a centre height of 45mm. is required.*