Instructions No. 2921

FAIRBANKS-MORSE

TYPE FM-X ONE CYLINDER MAGNETOS FOR WISCONSIN MOTOR CORPORATION

Field Service and Adjustment Information

GENERAL DESCRIPTION

The one cylinder magnetos whose parts are listed on Pages 2 and 4 of this instruction sheet were built specifically for application on Wisconsin single cylinder engines. The variations of the Type FM-X1A7 magneto are all of a special base mounting design with a shaft height of 35 mm., and the modifications of the Type FM-X1B7 unit have a special mounting flange. The magnetic and electrical circuits of all units are identical, with a two pole magnetic rotor and a single lobe cam producing one ignition spark per revolution. Rotation of the base-mounting types is counterclockwise when viewed from the drive end, while the flange-mounting magnetos rotate clockwise. All are fitted with dependable, single pawl impulse couplings which facilitate starting by providing an intensified and retarded ignition spark at low engine speeds.

SERVICE PROCEDURE

The table below gives a logical procedure to follow when an engine fails to start, is hard to start, or misses in operation. Since the use of this table locates the trouble in many cases before the magneto is reached, it prevents all-too-common maladjustment of parts in good condition. Type FM-X magnetos are built in sealed frames which should be opened only when it is certain that the ignition spark produced is unsatisfactory. This condition may be determined by ignition spark tests which are easily made in the field.

TESTING THE IGNITION SPARK

With a properly adjusted spark plug in good condition, the ignition spark should be strong enough to bridge a short gap in addition to the actual spark plug discharge. This may be determined by holding the end of the ignition cable not more than 1/16 in. away from the spark plug terminal. The engine should not misfire when this is done. Ignition tests made while any part of the system is wet are useless.

TESTING THE MAGNETO SPARK

Remove the ignition cable from the end cap socket and insert a short piece of stiff wire. Bend this wire to within 1/8 in. of the engine block. Turn the engine over slowly and watch carefully for the spark which should occur at the instant the impulse coupling releases. If a strong spark is observed, it is highly recommended that the magneto be eliminated as the source of the difficulty and that the cable, terminals, and spark plug be thoroughly inspected.

ADJUSTMENT OF BREAKER POINTS

Remove the magneto end cap and compare the arrangement of parts with the drawings of Fig. 1. The breaker points should then be inspected for evidence of pitting or pyramiding. A small tungsten file or fine stone may be used

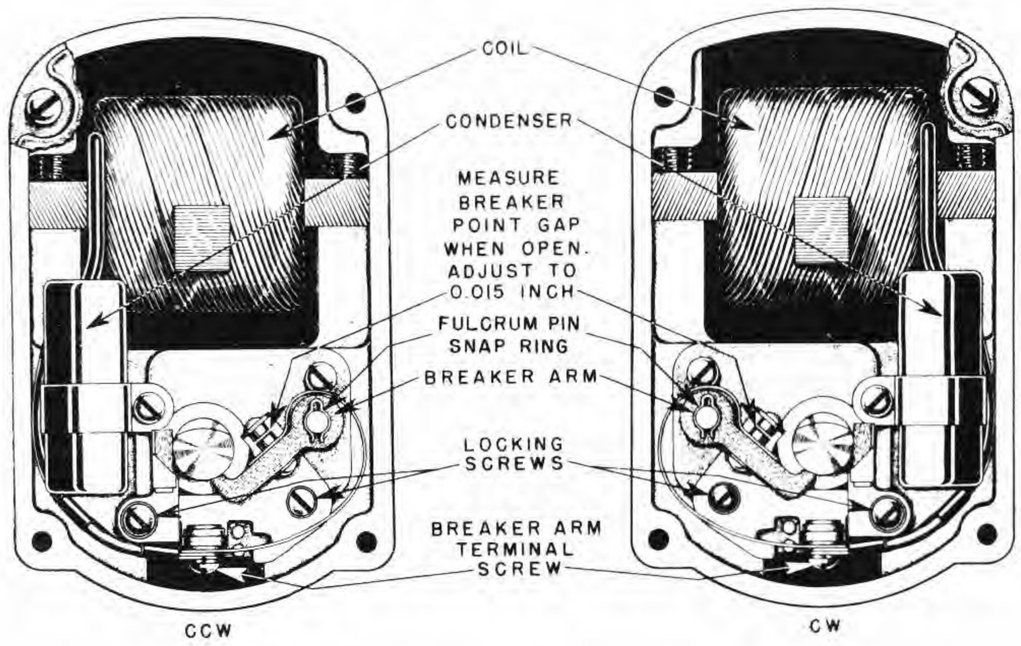


Fig. 1. End Views of Type FM-X Magneto

to resurface the points, except in the case of badly worn or pitted points, which should be replaced. Removal of worn points may be accomplished by removing the fulcrum pin snap ring, the breaker arm terminal screw, and the contact support locking screws, all of which are identified in Fig. 1. If it is necessary to resurface or replace the breaker points, it will also be necessary to adjust them to their proper clearance, which is 0.015 in. at full separation. This adjustment is made in the following manner: Loosen the contact support locking screws, then move the contact support until the proper breaker point clearance is obtained. This is accomplished by means of a screwdriver inserted in the horizontal slot at the bottom of the contact support and pivoted between the two small bosses on the bearing support. Lock the assembly in place by tightening the locking screws and make a final measurement of the breaker point gap after the locking screws are tightened.

SEALING MAGNETO

Type FM-X magnetos are sealed at the factory against the entry of dust and moisture through the use of a varnish-coated gasket joint. Opening the magneto for breaker point adjustment or other service necessitates resealing of the magneto upon reassembly. The surfaces between the magneto frame and the end cap should be cleaned thoroughly, a new gasket should be provided, and the joint should be sealed with a coating of FMC02 Gasket Sealing Varnish.

SPECIAL DRIVE GEAR

Flange mounting magnetos for Wisconsin motors require

TROUBLE	POSSIBLE CAUSE	SUGGESTED REMEDY
A. Flooding	Hot or cold engine; over-rich fuel mixture.	Dry out cylinder. Crank engine slowly with fuel shut off; or let engine stand idle for a short time.
B. Insufficient fuel or air	Empty fuel tank; clogged fuel supply line; clogged air intake.	Replenish fuel supply. Clean fuel system and check carburetor. Clean air intake system.
C. Ignition connections	Loose or corroded terminals; broken cable; short circuited switch.	Clean or replace cable terminals. Inspect soldered or clamped joints. Test and replace cable.
D. Spark plug	Corroded, worn or damaged points; cracked or carbonized insulator.	New plug. Clean points and insulator. Adjust points to recommended opening. Never attempt to adjust center electrode.
E. Magneto	Points, impulse coupling.	See instructions beginning "TESTING THE IGNITION SPARK".

a drive gear fitted to the impulse coupling by means of an extended rotor shaft. To engage the slotted drive gear correctly with the drive lugs of the coupling, the magneto rotor should be turned by hand until the coupling pawl engages the stop pin in the flange, the coupling drive lugs then being in the position shown by A of Fig. 2. The drive gear should then be fitted to the coupling so that the marked tooth is on the upper edge of the gear as shown in B of Fig. 2.

RADIO-SHIELDED MAGNETOS

Applications which require complete radio shielding of the ignition system are equipped with a Type FM-XE or a Type FM-XCE magneto. These magnetos are similar to standard models except that the plastic end cap is replaced by an all-metal cover through which the high-tension lead is conducted by means of a special insulated socket. Detailed information covering these units can be obtained upon inquiry.

GROUND SWITCHES

Magnetos for Wisconsin Motor Corporation one cylinder engines are furnished with either a push button or a turn button switch. Both designs function to ground the primary circuit of the magneto when the engine is to be stopped. The switch must be kept closed until the engine is completely at a standstill.

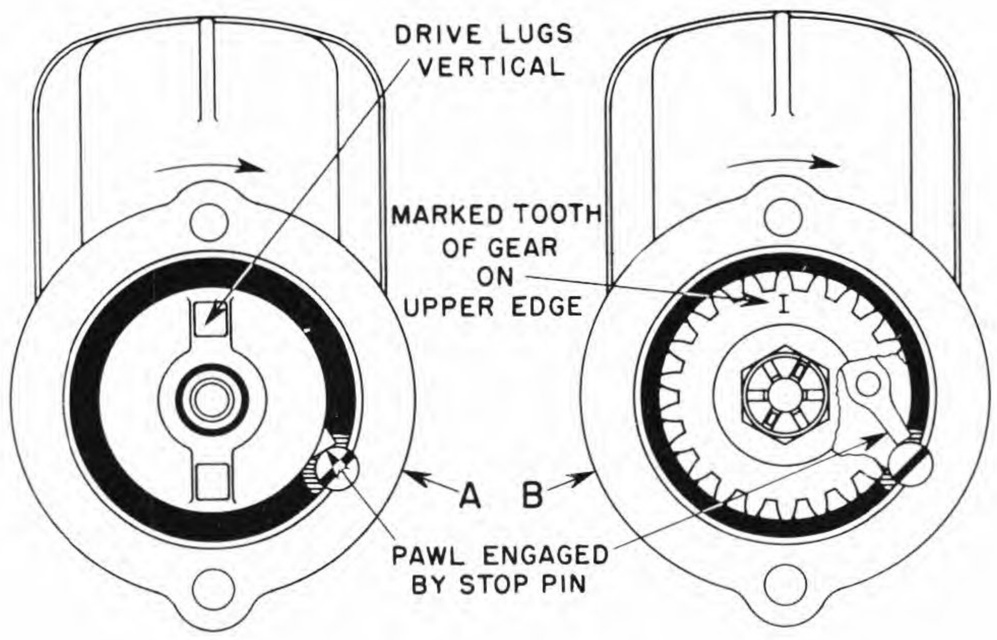
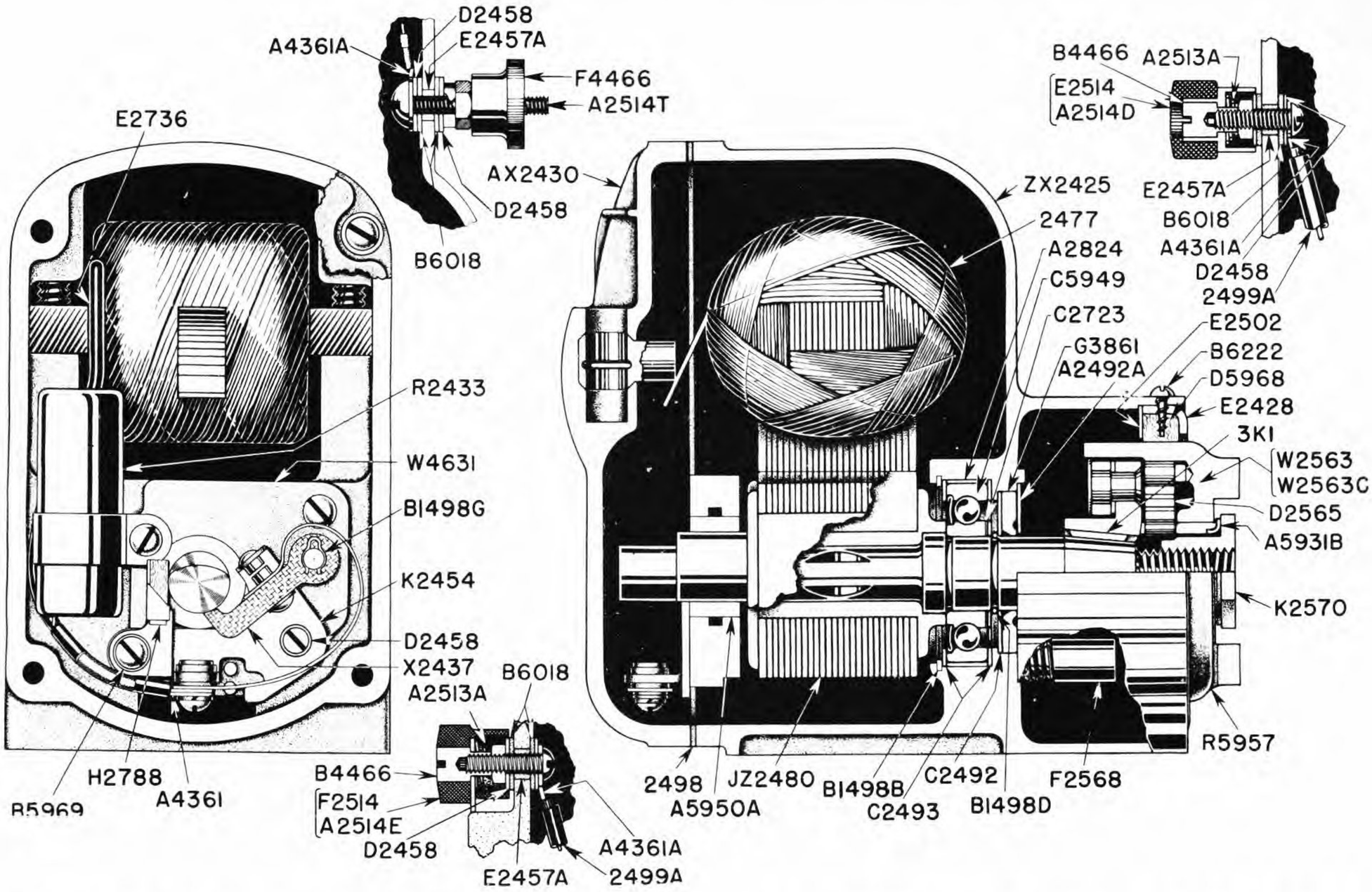


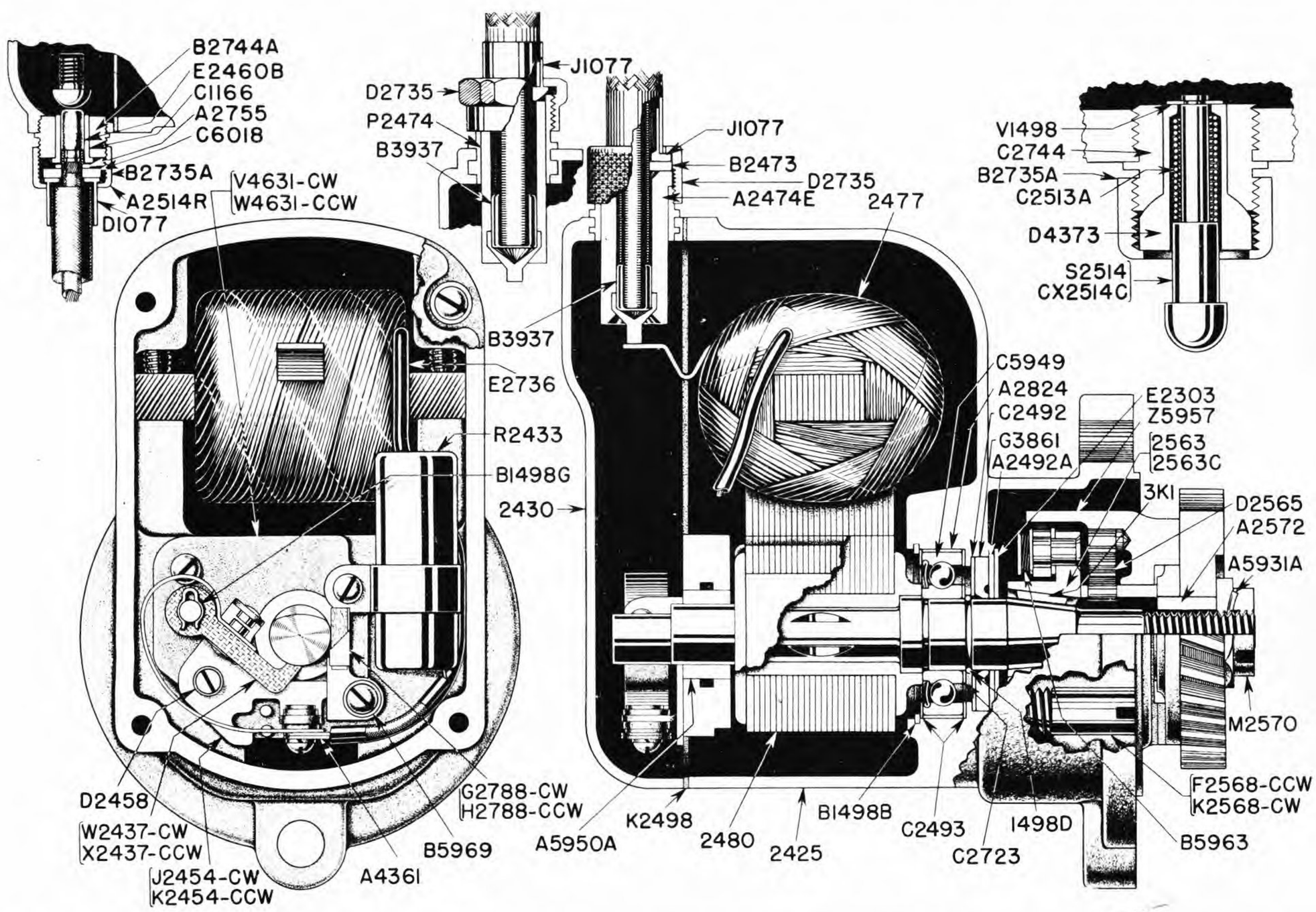
Fig. 2. Mounting Drive Gear

Order by Part No.	Name of Part	Number Used										
		FM-XLA7 (Base)	FM-XLA7E (Base)	FM-XLA7F (Base)	FM-XE1A7 (Base. RS)	FM-XE1A7F (Base.RS)	FM-XL1B7E (Flange)	FM-XE1B7 (Flange.RS)	FM-XE1B7F (Flange.RS)	FM-XC1B7 (Flange)	FM-XC1B7D (Flange)	FM-XCE1B7P (Flange.RS)
D1077	Ground Switch Ferrule (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
J1077	Cable Outlet Ferrule	...	...	...	1	1	...	1	1	...	...	1
C1166	Ground Switch Insulating Bushing (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
V1498	Ground Switch Snap Ring (Inc. in CX2514C)	...	...	...	...	1	...	...	...	...	...	1
B1498B	Rotor Drive End Bearing Snap Ring	1	1	1	1	1	1	1	1	1	1	1
B1498D	Rotor Drive End Shaft Snap Ring	1	1	1	...	...	1	...	...	1	1	...
C1498D	Rotor Drive End Shaft Snap Ring	...	...	...	1	1	...	1	1	...	...	1
B1498G	Fulcrum Pin Snap Ring	1	1	1	1	1	1	1	1	1	1	1
E2303	Oil Slinger Baffle Disc	...	...	...	...	...	1	1	1	1	1	1
RX2425	Frame	...	...	...	...	...	1	1	1	1	1	1
ZX2425	Frame	1	1	1	1	1	...	...	...	...	...	...
E2428	Impulse Coupling Housing Cupped Washer	1	1	1	1	1	...	...	...	...	...	...
AX2430	End Cap	1	1	1	...	...	1	...	...	1	1	...
A2430A	End Cap	...	...	...	1	...	...	1	...	...	...	...
J2430A	End Cap	...	...	...	...	1	...	...	1	...	...	1
10S10D	End Cap Screw (#10-24x5/8")	4	4	4	4	4	4	4	4	4	4	4
R2433	Condenser Complete	1	1	1	1	1*	1	1	1	1	1	1*
8S4D	Condenser Mounting Screw (#8-32x1/4")	1	1	1	1	1	1	1	1	1	1	1
W2437	Breaker Arm Assembly, CW (Inc. J2454)	...	...	...	...	...	1	1	1	1	1	1*
X2437	Breaker Arm Assembly, CCW (Inc. K2454)	1	1	1	1	1*	...	...	...	...	...	...
6S5A	Breaker Arm Terminal Screw (#6-32x5/16")	1	1	1	1	1	1	1	1	1	1	1
6LW2	Breaker Arm Terminal Screw Lockwasher (#6)	1	1	1	1	1	1	1	1	1	1	1
8S6N	Stationary Contact Support Locking Screw (#8-32x3/8")	1	1	1	1	1	1	1	1	1	1	1
8LW3	Stationary Contact Support Locking Screw Lockwasher. (#8)	1	1	1	1	1	1	1	1	1	1	1
6S6N	Stationary Contact Support Locking Screw (#6-32x3/8")	1	1	1	1	1	1	1	1	1	1	1
6LW2	Stationary Contact Support Locking Screw Lockwasher. (#6)	1	1	1	1	1	1	1	1	1	1	1
J2454	Stationary Contact Support Assembly, CW (Inc. in W2437)	...	...	...	...	...	1	1	1	1	1	1
K2454	Stationary Contact Support Assembly, CCW (Inc. in X2437)	1	1	1	1	1	...	...	...	...	...	...
E2457A	Primary Ground Insulating Bushing (Inc. in A2514)	1	1	1	1	...	1	1	...	1	1	...
D2458	Primary Ground Flat Washer (Inc. in A2514)	2	2	2	2	...	2	2	...	2	2	...
D2458	Contact Support Locking Screw Plate Washer	1	1	1	1	1	1	1	1	1	1	1
E2460B	Brush and Spring Assembly (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
B2473	End Cap Cable Rubber Seal	...	...	...	1	...	...	1	1	...	...	...
P2474	Cable Outlet	...	...	...	1	1*	...	1	1	...	...	1*
A2474E	Cable Outlet	...	...	...	1	...	...	1	1	...	...	...
L2477	Coil Complete	...	1	...	...	...	1	...	...	...	...	...
M2477	Coil Complete	1	...	1	...	...	...	...	...	1	...	...
BX2477	Coil Complete	...	...	...	...	...	...	...	...	...	1	...
A2477A	Coil Complete	...	...	...	1	1*	...	1	1	...	...	...
D2477A	Coil Complete	...	...	...	...	...	...	...	...	...	...	1*
25SS12A	Coil Bridge Setscrew (#1/4-20 x 3/4")	2	2	2	2	2	2	2	2	2	2	2
GZ2480	Magnetic Rotor Complete	...	...	...	...	...	...	...	...	1	1	1
JZ2480	Magnetic Rotor Complete	1	1	1	1	1	...	...	...	...	...	...
KZ2480	Magnetic Rotor Complete	...	...	...	...	...	1	1	1	...	...	...
C2492	Inner Retaining Washer	1	1	1	1	1	1	1	1	1	1	1
A2492A	Outer Retaining Washer	1	1	1	1	1	1	1	1	1	1	1
C2493	Bearing Insulator Washer	2	2	2	2	2	2	2	2	2	2	2
H2498	End Cap to Frame Gasket	1	1	1	...	...	1	...	...	1	1	...
K2498	End Cap to Frame Gasket	...	...	...	1	1	...	1	1	...	...	1
B2499A	Primary Terminal Wire Assembly (7" long)	...	...	...	...	...	...	1	...	1	1	...
D2499A	Primary Terminal Wire Assembly (5" long)	1	1	1	1	...	1	...	...	...	...	...



REPAIR CHART FOR STANDARD BASE-MOUNTING MAGNETOS

END CAP FOR RADIO-SHIELDED BASE-MOUNTING MAGNETOS SHOWN IN LOWER REPAIR CHART



REPAIR CHART FOR RADIO-SHIELDED FLANGE-MOUNTING MAGNETOS

END CAP FOR STANDARD FLANGE-MOUNTING MAGNETOS SHOWN IN UPPER REPAIR CHART

Order by Part No.	Name of Part	Number Used										
		FM-X1A7 (Base)	FM-X1A7E (Base)	FM-X1A7F (Base)	FM-XE1A7 (Base. RS)	FM-XE1A7F (Base.RS)	FM-X1B7E (Flange)	FM-XE1B7 (Flange.RS)	FM-XE1B7F (Flange.RS)	FM-XC1B7 (Flange)	FM-XC1B7D (Flange)	FM-XCE1B7P (Flange.RS)
E2502	Impulse Coupling Outer Shell Flat Washer	1	1	1	1	1	...	...	...	...	...	...
A2513A	Primary Ground Switch Button Spring (Inc. in A2514D,A2514E)	1	1	...	1	...	1	1	...	1	1	...
C2513A	Ground Button Spring (Inc. in CX2514C)	...	...	...	...	1	...	...	...	...	...	1
E2514	Primary Ground Switch Push Button (Inc. in A2514D)	...	...	...	...	...	1	1	...	1	1	...
F2514	Primary Ground Switch Knob (Inc. in A2514E)	1	1	...	1	...	...	...	...	...	...	...
S2514	Ground Button (Inc. in CX2514C)	...	...	...	...	1	...	...	...	...	...	1
A2514D	Push Button Ground Switch Group (Inc. E2457A, D2458, A2513A, E2514, A4361A, B4466, B6018, 6S9N, 6N1)	...	...	...	...	...	1	1	...	1	1	...
A2514E	Turn Button Ground Switch Group (Inc. E2457A, D2458, A2513A, F2514, A4361A, B4466, B6018, 6S9N, 6N1)	1	1	...	1	...	...	...	...	...	...	...
A2514R	Primary Ground Switch Group (Inc. D1077, C1166, E2460B, B2735A, B2744A, A2755, C6018)	...	...	...	...	...	...	...	1	...	...	...
A2514T	Primary Ground Terminal (Inc. E2457A, D2458, A4361A, F4466, B6018, 6S16N, 6N1)	...	...	1	...	...	...	...	...	...	...	...
CX2514C	Primary Ground Switch Group (Inc. V1498, C2513A, S2514, D4373)	...	...	...	...	1	...	...	...	...	...	1
6S9N	Ground Switch Screw (Inc. in A2514D, A2514E)	1	1	...	1	...	1	1	...	1	1	...
6S16N	Primary Ground Screw (Inc. in A2514T) (#6-32 x 1)	...	...	1	...	...	...	...	...	...	...	...
6N1	Ground Switch Nut (Inc. in A2514D, A2514E)	1	1	1	1	...	1	1	...	1	1	...
6LW1	Ground Switch Lockwasher (Inc. in A2514T)	...	...	1	...	...	...	...	...	...	...	...
V2563	Impulse Coupling Hub Assembly, Type UC, CW	...	...	...	...	...	1	1	1	1	...	1
W2563	Impulse Coupling Hub Assembly, Type UCL, CCW	1	1	1	1	1	...	...	...	...	...	...
LX2563	Impulse Coupling Hub Assembly, Type UC-1, CW	...	...	...	...	...	...	...	...	...	1	...
W2563C	Impulse Coupling, Type UCL, CCW (Inc. W2563, D2565, R5957)	1	1	1	1	1	...	...	...	...	...	...
MX2563C	Impulse Coupling, Type UC-8, CW (Inc. V2563, D2565, Z5957)	...	...	...	...	...	1	1	1	1	...	1
EY2563C	Impulse Coupling, Type UC-1, CW (Inc. LX2563, D2565, Z5957)	...	...	...	...	...	...	...	...	...	1	...
D2565	Impulse Coupling Drive Spring, Series U. (Inc. in 2563C)	1	1	1	1	1	1	1	1	1	1	1
F2568	Impulse Coupling Pawl Stop Pin, CCW	1	1	1	1	1	...	...	...	...	...	...
K2568	Impulse Coupling Pawl Stop Pin, CW	...	...	...	...	...	1	1	1	1	1	1
K2570	Impulse Coupling Nut	1	1	1	1	1	...	...	...	...	...	...
M2570	Impulse Coupling Nut	...	...	...	...	...	1	1	1	1	1	1
A2572	Impulse Coupling Bushing	...	...	...	...	...	1	1	1	1	1	1
C2723	Thrust Bearing Shim (Use as needed)	2	2	2	2	2	2	2	2	2	2	2
D2735	Cable Outlet Nut	...	...	...	1	1	...	1	1	...	...	1
B2735A	Ground Cable Outlet Nut (Inc. in A2514R)	...	...	...	...		...	...	1	...	...	
E2736	Primary Lead Wire Tube (Inc. in 2477)	1	1	1	1	1	1	1	1	1	1	1
E2736B	Primary Terminal Wire Tube (Inc. in B2499A)	...	...	...	...	...	...	1	...	1	1	...
G2736B	Primary Terminal Wire Tube (Inc. in D2499A)	1	1	1	1	...	1	...	...	...	...	...
C2744	Primary Ground Switch Bushing	...	...	...	...	1	...	...	...	...	...	1
B2744A	Ground Cable Outlet Bushing (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
A2755	Ground Switch Wire Terminal (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
G2788	Cam Wick and Holder Assembly, CW (Inc. in V4631)	...	...	...	...	...	1	1	1	1	1	1
H2788	Cam Wick and Holder Assembly, CCW (Inc. in W4631)	1	1	1	1	1	...	...	...	...	...	...
A2824	Rotor Bearing Insulating Strip	1	1	1	1	1	1	1	1	1	1	1
G3861	Rotor Shaft Seal	1	1	1	1	1	1	1	1	1	1	1
B3937	High Tension Cable Terminal	...	...	...	1	1	...	1	1	...	...	1
A4361	Lead Wire Terminal for No. 8 Screw (Inc. in 2433, 2477,2499A)	3	3	3	3	2	3	3	2	3	3	2
A4361A	Lead Wire Terminal for No. 6 Screw (Inc. in A2514D, A2514T)	1	1	1	1	...	1	1	...	1	1	...
D4373	Ground Switch Bushing (Inc. in CX2514C)	...	...	...	...	1	...	...	...	...	...	1
B4466	Ground Screw End Nut (Inc. in A2514D, A2514E)	1	1	...	1	...	1	1	...	1	1	...
F4466	Ground Switch Nut (Inc. in A2514T)	...	...	1	...	...	...	...	...	...	...	...
V4631	Bearing Support Assembly, CW (Inc. G2788, A5950A)	...	...	...	...	...	1	1	1	1	1	1
W4631	Bearing Support Assembly, CCW (Inc. H2788, A5950A)	1	1	1	1	1	...	...	...	...	...	...
8S6G	Bearing Support Screw (#8-32x3/8")	4	4	4	4	4	4	4	4	4	4	4
A5931A	Impulse Coupling Nut Lockwire	...	...	...	...	...	1	1	1	1	1	1
A5931B	Impulse Coupling Nut Lockwasher	1	1	1	1	1	...	...	...	...	...	...
C5949	Rotor Ball Bearing, Drive End	1	1	1	1	1	1	1	1	1	1	1
A5950A	Rotor Sleeve Bearing, Opp. Drive End (Inc. in V4631, W4631)	1	1	1	1	1	1	1	1	1	1	1
R5957	Impulse Coupling Shell, Type UCL, CCW (Inc. in W2563C)	1	1	1	1	1	...	...	...	...	...	...
Z5957	Impulse Coupling Shell, CW (Inc. in MX2563C, EY2563C)	...	...	...	...	...	1	1	1	1	1	1
B5963	Impulse Coupling Pawl Spring (Inc. in LX2563)	...	...	...	...	...	...	...	...	...	1	...
D5968	Impulse Coupling Outer Shell Felt Washer	1	1	1	1	1	...	...	...	...	...	...
B5969	Stationary Contact Support Plate Washer	1	1	1	1	1	1	1	1	1	1	1
B6018	Primary Ground Insulating Washer(Inc.inA2514D, 2514E,A2514T)	2	2	2	2	...	2	2	...	2	2	...
C6018	Ground Switch Insulating Washer (Inc. in A2514R)	...	...	...	...	...	...	...	1	...	...	...
B6222	Impulse Coupling Housing Cupped Washer Screw	2	2	2	2	2	...	...	...	...	...	...
3K1	Key (Rotor Shaft to Impulse Coupling)	1	1	1	1	1	1	1	1	1	1	1

*Fungus-treated parts. Type FM-XCE1B7K magneto is identical to Type FM-XCE1B7P except that it has no fungus-treated parts.

When ordering impulse couplings and hubs, always specify the direction of rotation and lag angle. The lag angle of all magnetos listed is 30° with the exception of Types FM-X1A7E, FM-XCE1B7K, and FM-XCE1B7P. These three units each have a lag angle of 25°.

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