

BENDIX - SCINTILLA

AIRCRAFT MAGNETOS

Types SB9RN, SB9LN, SF9RN, SF9LN
and VAG9-DR, VAG9-DFR, VAG9-DFR5

Service Instructions



Magneto Type SB9RN

The identification numbers of service tools supplied for maintenance of the type of magneto covered by this folder have been changed from the 4- series of numbers, which has been in effect for some time, to an 11- series. For the convenience of those using tools bearing the former series of identification numbers a cross index of both series is contained on page 3F-527.

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BENDIX AVIATION CORPORATION

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SECTION I

NOTE: When applying these instructions for servicing or overhauling nine cylinder "VAG" magnetos read Section VIII first.

GENERAL CONSTRUCTION

The SB9RN, SB9LN, SF9RN, and SF9LN magnetos are identical to the nine cylinder "VAG" magnetos with the exception of the contact breaker. The SB9RN, SB9LN, SF9RN, and SF9LN magnetos employ the "pivotless type breaker," whereas the "VAG" uses the "lever type breaker." The following parts, used also for the current standard replacement purposes on the "VAG" magnetos, are incorporated:

- (1) Cobalt magnet.
- (2) Rubber encased coil.
- (3) Flat type condenser mounted on top of the coil.
- (4) Distributor cylinder with replaceable segments.

All parts are interchangeable between these magnetos and the nine cylinder "VAG" magnetos with the exception of the contact breaker assemblies and their component parts. The housings of the "VAG" magnetos can be modified for the installation of the "pivotless type breaker," if desired. "VAG" magnetos so modified to incorporate the pivotless breaker, cobalt magnet, rubber encased coil, and the replaceable segment type distributor cylinder, will constitute the conversion to the SB9RN, etc., type magnetos.

The following table shows the differences between these magnetos:

VAG9-D or VAG9-DF

2-254	Chrome Magnet
2-306	Tape Wound Coil
2-111Z	Distributor Cylinder
2-63	Contact Point
2-64	Contact Point

VAG9-DR or VAG9-DFR

2-792	Cobalt Magnet
2-751	Rubber Encased Coil
2-696Z	Distributor Cylinder with Replaceable Segments
10-2446	Contact Point
10-2447	Contact Point

SB9RN, SB9LN, SF9RN, SF9LN

2-792	Cobalt Magnet
2-751	Rubber Encased Coil
2-696Z	Distributor Cylinder with Replaceable Segments Pivotless Contact Breaker

(FOR VAG MAGNETO PARTS LIST SEE PAGES 3D-525 THRU 3D-532)

The No. 2-254 Chrome magnet, 2-306 tape wound coil, 2-111Z distributor cylinder, 2-63 contact point, and the 2-64 contact point have been superseded by the No. 2-792 cobalt magnet, 2-751 rubber encased coil, 2-696Z replaceable segment type distributor cylinder, 10-2446 contact point and the 10-2447 contact point, respectively. By installing the above new parts, the VAG9D or VAG9DF magnetos are automatically converted to the higher output VAG9DR or VAG9DFR type magnetos. The only remaining difference from the SB9RN, SB9LN, SF9RN, and SF9LN magnetos, then, is in the contact breaker assemblies. This conversion can be made, if desired, by modifying the "VAG" housings for the installation of the pivotless type breaker.

Rotating Magnet

The rotating magnet is the four pole type. It is made of cobalt steel and is mounted on two single row ball bearings. A four lobe cam is located on the magnet shaft extension and is secured with a Woodruff key, plain washer, lock washer, and a screw. A step is cut in the cam for timing purposes and the flanks adjacent to the lobes are provided with grooves to serve as a lubricant reservoir and assist in keeping the breaker cam follower felt in a moist condition.

The small distributor gear is pressed on the drive shaft end of the magnet and secured in position with a Woodruff key. Adjustment for end play is obtained by placing shim washers of proper thicknesses in back of the inner ball races on the rotating magnet shaft.

Front End Plate

The front end plate supports or carries the large distributor gear and axle, distributor cylinder, and the outside race of the drive shaft ball bearing. Two dowel pins in the front end of the magneto housing locate the position of the front end plate.

The flange mounted magnetos employ a three bolt mounting flange that is integral with the front end plate.

The front end plate is secured to the magneto housing with two screws, four nuts, and lock washers.

The distributor gear and axle assembly is secured to the front end plate with two screws, two nuts, two plain washers, and two lock washers. The axle is provided with slots for the adjustment of the gears.

The oil cup located on top of the front end plate provides lubrication for the drive shaft ball bearing.

Distributor Gear and Axle Assembly

The distributor gear axle is secured to the distributor gear and ball bearing assembly with two nuts and a plain washer. A spacer and shims provide for the adjustment of the end play. The gear should turn freely with the least possible end play between it and the distributor gear axle. Two dog screws are provided on the gear for locating the distributor cylinder after which it is secured with a lock ring.

Magneto Coil

The coil is commonly referred to as the "rubber encased coil." The flat type condenser is secured directly on the top of the coil. The primary and secondary windings are enclosed in a hard rubber case to protect them chiefly from moisture. The sealing compound and rubber casing protect the wires and insulating materials used in the construction of the coil.

The coil primary contact brush assembly is secured at the breaker end of the coil with two screws and two ear lock washers. The high tension carbon brush and spring assembly is located at the front end of the coil.

The coil is secured to the pole shoe extensions with two screws and washers and two clamps.

Magneto Housing

The pole shoes, which transmit the magnetic flux from the rotating magnet to the coil core are integral with the magneto housing. The adaptor and stud assembly for the contact breaker is secured to the housing with three screws and lock washers.

The insulating plate located under the distributor cylinder section is secured to the housing with two screws which also secure the safety gap bridge.

The adaptor and stud assembly supports the pivotless type contact breaker assembly and also the breaker primary brush contact segment. The breaker primary brush contact segment is secured to the adaptor and stud assembly with two screws, plain washers, and insulating washers.

Main Cover with Booster and Ground Terminal Block

The main cover is located by four dowel pins and is fastened to the magneto by two screws.

The booster and ground terminal block is mounted in the extension of the main cover between the distributor blocks. It is secured by two screws.

The booster and ground terminal block carries the ground terminal and the stud for the ground contact and also the booster terminal and the electrode for the booster current. The stud for the ground contact bears on a spring plate secured to the primary bridge on the coil. The electrode for the booster current is held directly over the collector ring for the booster current. There is a small air gap between the electrode and the collector ring.

At the top of the main cover are provided numbers for locating the distributor blocks, an arrow showing the direction of rotation of the magneto, and two letters, "H" and "P," to mark the booster and ground terminals, respectively.

Distributor Blocks

The distributor blocks are mounted so that they are held between the main cover and front end plate. Their lower ends rest upon the magneto housing while the upper ends fit against the top extension of the main cover. They are held in place by spring clamps and are designed as the right and left distributor block as viewed from the drive end.

Breaker Cover

The breaker cover is secured over the contact breaker assembly with a screw which can be locked with a safety pin. It is easily removed providing ready access to the contact points.

Contact Breaker Assembly

The contact breaker assembly is secured to the adaptor and stud assembly with two hold-down springs. For fixed spark requirements, an added clamp assembly is used. Two engraved marks, "R" and "L," are stamped in the adaptor and stud assembly. For clockwise rotation, fixed spark, the clamp

assembly screw is screwed into the hole "R" and for anti-clockwise rotation, fixed spark, the clamp assembly screw is screwed into the hole marked "L." For variable spark requirements, the holes "R" and "L" are not used.

The contact point assembly is secured to its mounting surface in the contact breaker housing with two screws, two plain washers, and two lock washers. An eccentric screw seats in the mounting surface and protrudes through the elongated slot provided in the contact point support. This eccentric screw is used to adjust the contacts for exact timing.

The spark advance lever fits over the rim of the breaker housing. This lever is the split type and employs a clamp screw for securing it to the breaker housing.

The breaker cover fits over the rim of the breaker housing and is located in its proper position with a small block riveted to the cover. This block engages a corresponding slot in the breaker cover housing. The breaker cover is secured to the breaker housing with a knurled head screw which engages a tapped hole provided. A safety pin is used to lock this screw.

Radio Shields

These magnetos are profiled for easy installation of radio shields when required.

SECTION II

ELECTRICAL OPERATION

This section is presented to assist readers in understanding the electrical operation of Scintilla magnetos. (See Electrical Diagram, Page 3F-526)

The rotating magnet has four poles of alternate polarity. Each time the magnet rotates through a quarter turn, the polarity changes and causes the magnetic flux to flow in the opposite direction through the core of the coil. This reversing flux causes an alternating current to flow in the primary winding.

Energy is stored in the magnetic circuit when the current flows in the primary winding. The contact points are in series with the primary winding. When the maximum energy has been stored in the magnetic circuit, the cam lifts the cam follower which in turn separates the contact points. This breaks the primary circuit and causes a rapid change of flux in the magnetic circuit. This flux links the secondary winding which has many turns of fine wire. The rapid change of flux due to the opening of the contact points produces the high tension spark in the secondary winding.

One end of the primary winding is connected to the ground. The other end takes an insulated path through the contact points and then back to the ground. The condenser is connected across or in parallel with the contact points and absorbs the current produced by the self-inductance of the primary circuit during the time the contact points are open, thereby pre-

venting current from arcing across the points which would cause burning and pitting of the points.

One end of the secondary winding is grounded and the other end terminates at the high tension carbon brush. The high tension spark then goes from the high tension carbon brush to the centrally located segment in the booster collector ring. From here, it is conducted through one of the screws which hold the booster collector ring and then to the high tension segment on the distributor cylinder. The spark then jumps to the distributor block electrodes and through the spark plugs and back to the ground.

The booster current comes through the booster cable which is connected to the booster terminal marked "H." From here, the current goes to the booster electrode, booster collector ring, and through one screw which secures the booster collector ring. It then is conducted to the booster segment in the distributor cylinder and across to the distributor block electrodes and spark plugs. The booster segment in the distributor cylinder trails the high tension segment and consequently gives a retarded spark.

The cable from the magneto switch is connected to the terminal marked "P" which is connected to the ground contact stud and the primary bridge of the coil. When the switch is in the "OFF" position, the primary current is not interrupted by the opening of the contact points. Thus the production of high voltage in the secondary is prevented.

SECTION III

INSTALLATION

Before installing this magneto be sure that it has been correctly internally timed.

Timing to the Engine

Turn the engine crankshaft in the direction of normal rotation until the timing disc pointer on the engine indexes with the timing disc set for the full advance firing position of No. 1 cylinder.

Remove the distributor blocks and place the breaker in the full advance firing position. Rotate the magneto drive shaft in the direction of magneto rotation until the timing marks A (see Tolerance Chart) on the large distributor gear are approximately opposite the corresponding timing marks B on the inside of the front end plate when a straight edge such as K placed on the step cut in the cam coincides with the timing marks M on the rim of the breaker cup. In this position the magneto will fire No. 1 cylinder. Mount the magneto on the engine in the above relation of timing marks.

When base mounted magnetos are used, the exact timing of the magneto to the engine is obtained by means of the timing adjustment in the drive couplings.

For flange mounted magnetos, the exact timing is obtained

by turning the magnetos through the range provided in the slots of the mounting flange.

By turning the magneto through the range provided in the slots of the mounting flange of the flange mounted magneto, or by the adjustment of the drive couplings of the base mounted magnetos, adjust the contact points C (See Tolerance Chart) so that they just begin to open. The position where the contact points open should be determined with the 11-851 timing light. If timing light is not available, the position where the contacts open can be checked by placing a .0015" shim stock between them. When the .0015" shim stock is released with a slight pull, the contacts are just beginning to open.

When the above adjustment is made, tighten and lock the mounting studs.

Wiring

Remove the cable piercing screws from the distributor blocks to avoid any possibility of the high tension cables not being fully seated in the base of the cable holes.

Connect cable from the distributor block outlet marked "1" to No. 1 cylinder and then from outlet marked "2" to the second cylinder to fire, etc.

The numerals on the distributor blocks denote the serial firing order of the magneto and have no bearing whatsoever on the engine firing sequence.

Connect booster wire to terminal marked "H" on top of the main cover.

Connect ground wire from magneto switch to terminal marked "P" on top of the main cover.

The numbers on top of the main cover are for the purpose of locating the right and left distributor blocks in their correct position.

SECTION IV

DISASSEMBLY

The following procedure of disassembly is recommended to avoid any possibility of breakage. As the parts are removed, place them in order on the bench to facilitate reassembly.

Distributor Blocks

Remove the distributor blocks after having released their spring clamps.

Magneto Coil Cover

Take out the two fastening screws and lift off cover.

Breaker Cover

Remove safety pin and breaker cover fastening screw, after which the cover can be removed.

Magneto Coil

Remove the two coil fastening screws and clamps after which the coil can be removed. Care must be taken so as not to break or damage the high tension carbon brush when removing the coil. The felt pad under the coil can be taken out with the hand.

Contact Breaker Assembly

Remove the breaker assembly after having taken out the two breaker hold down springs. On fixed spark magnetos, also remove the clamp assembly which secures the breaker cup to the housing.

Remove the contact point assembly after taking out its two securing screws. Inspect the contact point assembly as outlined under "Inspection of Contact Point Assembly," on page 3F-521.

Front End Plate, Rotating Magnet, and Magneto Housing

Remove the front end plate after having taken out its two securing screws and the four lock nuts. Use socket wrench No. 11-1072 for the lock nuts. Tap each side of the front end plate lightly with a rawhide mallet to remove it from the housing.

Remove the distributor cylinder after prying out the lock ring with a small screw driver.

Remove the cup from the end of the large distributor gear hub. Unscrew the lock nuts on the end of the distributor gear axle and lift off the distributor gear. DO NOT loosen the two screws which secure the distributor gear axle to the front end plate unless the axle is damaged and must be replaced. This will maintain the original adjustment for the gears. The top ball and cage assembly and the spacer with the shim washers will come out as loose parts when the distributor gear is lifted from the axle. MAKE SURE that the same SPACER and SHIM WASHERS are used when reassembling as this will give, in the majority of cases, the correct adjustment between the axle and gear.

If the bearings of the distributor gear axle need replacement, the outside race for the bearing which came out as a loose part and, also, the complete bearing and retainer at the other end of the gear hub, must be pressed out. To facilitate this, it is suggested that a small pressing disc of the size and shape shown in Fig. 1 be used. This disc can be placed inside

of the gear hub with its flat face in contact with each outer race as indicated.

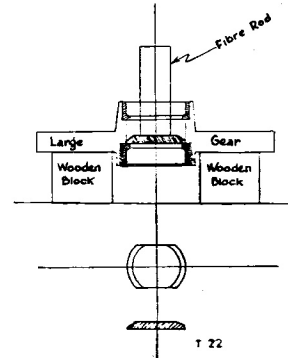


Figure 1

Remove the rotating magnet from the housing and place it on a clean part of the bench to make sure that small chips or particles do not come in contact with it.

Remove the insulating plate from the housing after having taken out its two securing screws which also hold the safety gap bridge.

Replacement of Drive Shaft and Breaker End Ball Bearings

If any one part of a ball bearing is defective and needs replacement, the COMPLETE BEARING MUST BE REPLACED.

The outer ball races are insulated from the magneto by insulating strips and are also backed by washers of the same material as used in the insulating strips.

Remove the outside race from the front end plate with puller No. 11-1002 and remove the inside race from the magnet with puller No. 11-1065.

Remove the outside ball race from the housing with puller No. 11-992 and the inside race from the magnet with puller No. 11-1049. Before removing this inside race, the cam must be taken off with puller No. 11-1060.

Before installing new races in the front end plate and housing, first put in the flat insulating washer in the bottom of the recess for the bearing so that the cut in it will line up with the oil recess. Then spread a few drops of oil evenly over one side of the insulating strip. Bend the strip in a circular form with the oiled side inside and overlap the ends enough to allow the strip to fit loosely into the recess for the outer race. When it is released, it will expand against the walls and the ends should overlap slightly in the recess cut for them. Press in the outside ball race for the front end plate with tool No. 11-976 and the outside ball race for the housing with tool No. 11-970.

For "VAG" magnetos, the No. 11-975 support, which fits in the breaker recess of the magneto, must be used to support the housing when pressing in the outer race of the bearing.

Press on the inside ball race for the drive shaft end bearing with tool No. 11-1032 which is also used for pressing on the small distributor gear. The small distributor gear can be removed with puller No. 11-1037.

Press on the inside ball race for the breaker end bearing with tool No. 11-1036.

SECTION V

INSPECTION

Inspection of Magneto Housing

See that the pole shoes, the adaptor and stud assembly, and all studs are tight in place. Examine the interior of the housing. If it is evident that the rotating magnet rubs, scrape out the

housing slightly. Make sure that all threaded holes, particularly those in the pole shoe extensions for the coil securing screws, are clean and in good condition. Examine the outside race carefully. If it is found unsatisfactory for further service, the complete ball bearing assembly must be replaced. (See "Replacement of Drive Shaft and Breaker End Ball Bearings" on page 3F-520 for tools required.)

Inspection of the Rotating Magnet

Make sure that the magnet shaft is not bent as it is important that the ground surfaces of the pole pieces and the cam pilot extension be within .002" concentric with the bearing pilot seats. (For testing magnet strength, see "Magnetic and Electrical Test.")

Replace any ball bearings which show noticeable wear, roughness, or looseness. The complete ball bearing assembly must be replaced when any one part is defective.

The cam must have a comparatively close fit on its shaft and must run true within .001" full indicator reading. (See Tolerance Chart)

Check the small distributor gear for burrs or excessive wear of the teeth. If this gear is replaced, it is recommended that the large distributor gear also be replaced. When the small distributor gear is meshed with the large distributor gear during reassembly, the backlash should not exceed .006". (See Tolerance Chart)

Remove all chips or particles of dirt which may have adhered to the rotating magnet.

Inspection of the Coil

Examine the rubber housing for cracks and make sure that all screws are staked or provided with lock washers. Make sure that the carbon brush is in good condition. For electrical test of the coil and condenser see "Magnetic and Electrical Test" on page 3F-523.

Inspection of the Front End Plate

See that the felt strips are in place and that the oil cover closes tightly. Clean the oil tube which leads to the drive shaft ball bearing with compressed air. Examine the outer ball race of the drive shaft ball bearing. If it is found unsatisfactory for further service, the complete ball bearing assembly must be replaced.

Inspection of Large Distributor Gear

Examine the large distributor gear for burrs or excessive wear of the teeth. If this gear is replaced, the new small distributor gear should be installed. The gear should turn freely with the least possible end play between it and the axle. The bearings must be cleaned, examined, and repacked with Andok "C" Grease.

Inspection of Main Cover with Booster and Ground Terminal Block

Clean out the oil tube which leads to the breaker end ball bearing with compressed air. Examine the booster and ground terminal block for defects or cracks. Make sure that the felt strips are in good condition and tight in place.

Inspection of Distributor Blocks

See that the electrodes are clean and tight in place. If new electrodes are installed, they must be checked with template No. 11-978 to insure that the required clearance between them and the distributor cylinder segments is maintained. (See Tolerance Chart) Use tool No. 11-1157 for machining distributor block electrodes newly installed.

Inspection of Distributor Cylinder and Booster Collector Ring

Examine the dielectric material for defects or cracks. Check the height of the distributor cylinder segments in gauge No. 11-1133. Segments should be replaced when they have burned away .015" as indicated on the gauge.

Inspection of the Contact Point Assembly

When inspecting the contact points, the breaker main spring should not be raised beyond the point giving $\frac{1}{16}$ " clearance between the movable and stationary contact points. Further tension of the main spring caused by raising it beyond this point will result in the weakening of the main spring.

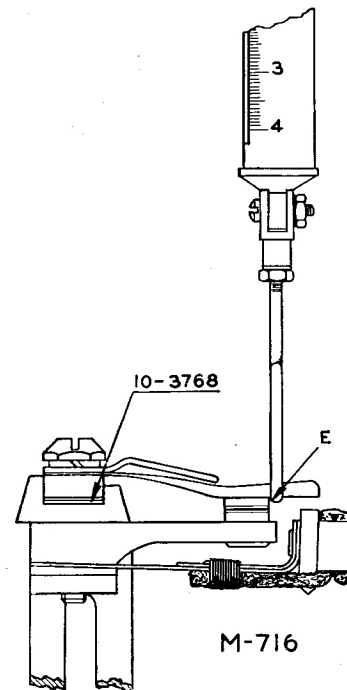


Figure 2

Check the tension of the breaker main spring with gauge No. 11-1217. When making this check, be sure that the hook of the gauge is applied under the main spring adjacent to the contact point "E" as shown in Fig. 2. If the tension of a main spring that has been operated is 15 oz. or more, it is satisfactory for further service. If it is necessary to install a new main spring, its tension should be from 20 to 32 oz.

The No. 10-3768 shims (Fig. 2) are used primarily to line up the contacts squarely to obtain maximum contact surface between the points. The number of No. 10-3768 shims also affects the main spring tension. Main spring tension is decreased by the addition of No. 10-3768 shims and increased by the removal of shims.

Examine the contact points. If the wear seems to be excessive or if the surfaces are rough or pitted, the contact points should be cleaned and polished. To accomplish this, disassemble the contact assembly and use the contact point block No. 11-1248.

Normal operation of the magneto causes a certain amount of wear to take place on the top of the cam follower. This wear is indicated by a small depression worn in the top of the cam follower at the point where it lifts against the main spring. The distance between the lowest point of this depression and the top of the spring on which the cam follower is riveted should be checked at each overhaul. The distance should be $\frac{1}{32}$ " or over. If it is less than $\frac{1}{32}$ " a new cam follower should be installed.

Use the No. 11-1275 assembly tool when assembling the component parts of the contact point assembly. The assembly screw must be tightened to a torque value of 15 to 20 inch pounds, as measured with the No. 11-1681 tension wrench (See Fig. 2).

SECTION VI

REASSEMBLY

Before reassembling, make sure that all parts are clean and free from chips or foreign particles.

Front End Plate

Clean the distributor gear bearings thoroughly and then allow them to dry. Press the complete bearing and retainer into the side of the distributor gear hub nearest the front end plate side and also press in the outside race of the other bearing into the other side of the gear hub. Place the gear on the axle and install the ORIGINAL SPACER AND SHIM WASHERS and also the remaining cage and ball assembly. Secure gear with its plain washer and lock nuts. Do NOT grease the bearings at this time as it is necessary to test the gear for end play. This is done by pressing on the outside diameter of the gear with the thumbs, first applying pressure on one side and then the other. If the end play is too great remove shim washers next to the spacer. The gear must turn freely with the LEAST POSSIBLE END PLAY.

After the correct adjustment for end play has been made, remove the two lock nuts and take out the first cage and ball assembly. Pack Andok "C" Grease into the hub of the gear around the axle. Reinstall the cage and ball assembly after packing it with Andok "C" Grease. Reinstall the two lock nuts and then press on the brass cup after having placed a small amount of grease in it.

Moisten all felt strips with oil.

Rotating Magnet

There are two breaker cam keyways located on the cam pilot and two engraved marks on the rotating magnet back bearing plate, namely, "D" and "G." Place the cam key in the keyway opposite "D" for clockwise rotation and opposite "G" for anticlockwise rotation. Place the cam in position and secure it with its screw, lock washer, and plain washer.

Charge the magnet in magnet charger No. 11-1301 or 11-1302. The 11-1301 Magnet Charger operates on 110 Volts D. C. and the 11-1302 operates on 36 Volt D. C. Pack the ball bearings with Andok "C" Grease or its equivalent. Make sure that all chips or foreign particles have been removed from the magnet and the inside of the magneto housing. Place a light coating of oil on the pole pieces of the rotating magnet and insert the rotating magnet into the housing.

Front End Plate, Rotating Magnet, and Housing

Mesh the chamfered tooth of the small distributor gear (See Tolerance Chart) with the tooth on the large distributor gear marked "D" for clockwise rotation or "G" for anticlockwise rotation.

Secure the front end plate to the housing with its two screws and four lock nuts and washers.

Adjustment of Rotating Magnet Bearings

Adjustment of end play is obtained by placing steel spacing washers back of the inner ball races of the magnet shaft. These washers are available in thicknesses of .0025", .004", .005", .008", .010", and .012". If the inner races are removed, always keep the spacing washers which are already installed in the same position.

If the original spacing washers are kept in place, it will be rarely necessary to adjust the rotating magnet bearings. If either or both of the bearings have been removed or replaced they should be adjusted following the procedure as given below.

Remove one of the inside bearing races and remove about one-half of the steel spacing washers. Replace the race and install the rotating magnet in the housing and front end plate. Determine the amount of end play by using tool No. 11-1138. Install steel spacing washers equal to the amount of end play plus .001". (For example, rotating magnet end play .004" + .001" = .005" or amount of steel spacing washers to be added in back of the inner bearing race.) This adjustment gives the bearings the correct amount of preload.

Adjusting Mesh of Distributor Gears

It will be rarely necessary to adjust the mesh of the gears if the position of the distributor gear axle has not been changed. If new gears are installed, however, it will be necessary to adjust the mesh of the gears as given in the following paragraph.

This is obtained by loosening the two screws and lock nuts which hold the distributor gear axle to the front end plate. Turn the large gear until the round hole in the distributor gear axle flange can be seen through one of the holes in the face of the gear. Place a drift in the hole on the axle flange and turn the flange slightly to the right to raise the large gear (loosen mesh) or to the left to lower large gear (tighten mesh). After adjustment is made, tighten and lock the two screws and nuts holding the distributor gear axle and apply Keystone No. 44 Grease or its equivalent evenly in the teeth of the large distributor gear.

Distributor Cylinder and Insulating Plate

Make sure that the dog screw is tightened and locked in the hole located in the face of the large distributor gear marked "D," for clockwise rotation, and "G" for anti-clockwise rotation. The booster collector ring is secured to the distributor cylinder with two screws. One screw hole is marked "D" and the other "G." The hole marked "D" must face toward the straight line or timing mark on the distributor cylinder for clockwise rotation and for anti-clockwise rotation the hole marked "G" must face towards the straight line or timing mark.

Place the distributor cylinder in position on the large distributor gear having the dog screw in the face of the gear engage a corresponding hole located on the flat surface of the distributor cylinder and then install the lock ring.

Install the insulating plate and the safety gap bridge to the magneto housing with their two securing screws. These screws must be staked after they have been tightened.

Coil

Place the felt pad between the pole shoe extensions in under the coil. Place coil in position and secure with its two screws, clamps, and washers. MAKE SURE the high tension carbon brush is not broken or damaged while installing the coil.

Contact Breaker Assembly

On the inside of the adaptor and stud assembly are two tapped holes, one marked "R" for clockwise rotation, fixed spark, and the other "L" for anti-clockwise rotation, fixed spark. These holes are not used for variable spark requirements.

The contact point assembly is secured to the breaker cup with two screws, plain washers, and lock washers. The eccentric screw protrudes through the slot provided in the support of the contact point assembly.

Install contact breaker assembly into the adaptor and stud assembly and secure with the two breaker hold down springs. Place breaker assembly in the full advance position by turning it as far as possible against the direction of normal rotation of the magneto. For fixed spark requirements, install clamp assembly or the collet which was used in earlier execution magnetos, in the hole located inside the adaptor and stud assembly marked "R" for clockwise rotation and "L" for anticlockwise rotation.

IMPORTANT—*Scintilla pivotless type contact breakers as used in this series magnetos must always be adjusted so that the contacts open at the proper position of the breaker cam in relation to the timing marks in the rim of the breaker cup and not for any fixed clearance between the contacts.*

Place a straight edge such as a steel scale (K) (See Tolerance Chart) on the step of the cam. Turn drive shaft slightly until the scale coincides with the timing marks (M) on the rim of the breaker cup. Holding magnet at this exact position, loosen screws "O" and adjust eccentric "P" until contacts are just starting to open, as determined with No. 11-851 timing light. After making this adjustment recheck to make sure the points are just opening when the scale coincides with the timing marks. If the timing light is not available, the opening of the contact points can be checked by placing a strip of .0015" shim stock between them. When the .0015" shim stock

is released with a slight pull, it indicates that the points are just beginning to open. Tighten the screws (O) and recheck adjustment.

Apply a few drops of standard grade oil, aircraft engine oil, S.A.E. No. 60 (or equivalent grade under Army and Navy specifications) on the cam follower felt. Do NOT give it all it will hold as excess oil will reach the contact points and cause interference with magneto operation. Secure breaker cover with its screw and safety pin.

Main Cover and Distributor Blocks

Secure the main cover with its two screws and install distributor blocks. Number discs are provided on top of the main cover in order that the distributor blocks can be installed on the correct side. All felt strips on the main cover and front end plate should be made moist with oil.

SECTION VII

MAGNETIC AND ELECTRICAL TEST

Mount the magneto on test stand No. 11-700 or an equivalent test stand.

Connect the high tension cables to the 7 mm three point spark rack. Run magneto for two or three minutes. Make sure that the rotating magnet is not rubbing against the pole shoes of the housing. If so, this can be detected by the occurrence of a decided knock which must be eliminated by scraping out the inside of the housing.

Check the coming-in speed with the contact breaker in the full advance position. It should spark consistently at 135 R. P. M. If a variable spark magneto is being tested, also check the coming-in speed with the breaker in full retard position at which position sparks should occur consistently at 250 R. P. M.

Increase the speed to 3000 R. P. M. Observe the spark closely. If missing occurs, it may be caused by:

- Improper breaker adjustment.
- Dirty contact points.
- Faulty or broken connections.
- Defective coil.
- Defective condenser (if contacts arc excessively).

Check the ground connection. No spark should occur at the spark rack if the magneto is short-circuited through the ground wire terminal screw.

Connect the cable from the source of booster current to the booster connection in the magneto. Run the magneto at 150 R. P. M. and observe the booster spark at the spark rack. The booster spark always trails the secondary spark.

Rotating Magnet

Operate magneto for about five minutes at 3500 R. P. M. During this run, short circuit the primary current at least 35 times. Then operate magneto at 400 R. P. M. (This speed

must not vary more than 10 R. P. M.) Hold contact points open by inserting a piece of insulating material between them. Connect ammeter No. 11-1124 in parallel or across the open contact points. The ammeter should not read below 1.8 amperes. If reading is below 1.8 amperes, the rotating magnet must be recharged. Repeat ammeter test. If reading is still below, repeat test with a new coil before rejecting the magnet.

Coil

Before installing the coil in the magneto, check the resistance of the secondary winding with the No. 11-1274 ohmmeter. The reading must be from 4000-7000 ohms.

The final test of a coil must be made an actual running test of the magneto on the test bench. Also, as heat from the engine affects the insulation materials of the coil, the final test should be made at an elevated temperature. This is done by directing a reflector type heater on the magneto while it is being run on the test bench. When the temperature of the coil has reached approximately 165°, the spark gaps should be increased from 7 mm to 9 mm. At 2000 R.P.M., the coil must spark consistently at this temperature and spark gap. Increase the gaps to 10 mm. If consistent sparking occurred with the 9 mm gap, intermittent missing with the 10 mm gap will not be sufficient cause to reject the coil.

It may be found that the coil produces consistent sparking at room temperature with 7 mm gaps, however, if the coil does not spark consistently at the elevated temperature with 9 mm gaps, it should not be used for further service.

Primary Circuit Condenser

The condenser must be tested before it is installed on the magneto. The recommended test is made at an elevated temperature with the No. 11-1400, four hundred volt D.C. megger. The condenser must be heated to 200° F. in an oven. If the reading of the megger for the condenser at 200° F. is less than 50,000 ohms, the condenser is not satisfactory for further service.

SECTION VIII

VAG9-DR and VAG9-DFR MAGNETOS

This section is issued as a supplement to the SB9RN, SB9LN, SF9RN, and SF9LN magneto instructions and covers the servicing of the VAG9DR and VAG9DFR magnetos

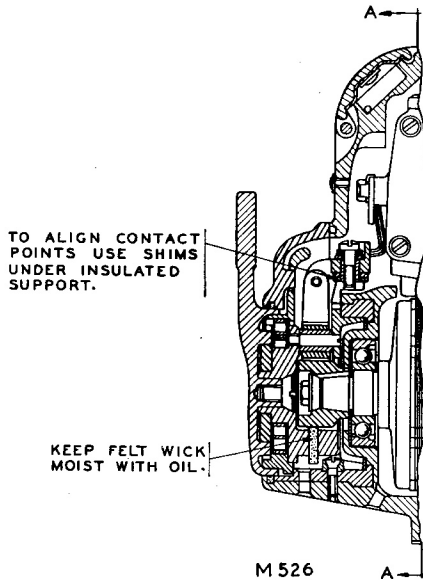


Figure 3

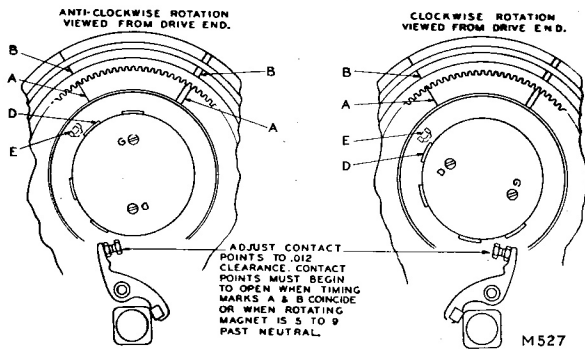


Figure 4

which employ lever type breakers. All instructions given in the preceding pages of this book which cover the SB9RN, SB9LN, SF9RN, and SF9LN magnetos apply also to the VAG9DR and VAG9DFR magnetos with the exception of the contact breaker instructions. This section will cover the instructions for the lever type breaker.

For VAG9DR and VAG9DFR magnetos, the cross-section view of the lever type breaker as shown in Fig. 3 replaces Section A-A of the No. 10-15574 Tolerance Chart on page 3F-525. Figure 4 shows the internal timing for VAG9DR and VAG9DFR magnetos, clockwise and anti-clockwise rotation. All other information on the No. 10-15574 Tolerance Chart on page 3F-525 applies to VAG9DR and VAG9DFR magnetos.

For general information, when the No. 2-792 high output cobalt magnet is installed in the "VAG9D" or "VAG9DF" magnetos which originally employed a chrome magnet, the letter "R" is added, automatically making the type designation "VAG9DR" and "VAG9DFR." When checking the coming-in speeds or primary current values on "VAG" magnetos, make sure the values for the type magnet employed are used. The values when using the No. 2-792 cobalt magnet are given on the No. 10-15574 Tolerance Chart on page 3F-525. For "VAG" magnetos in service which employ a chrome magnet, the minimum primary current value is 1.4 amps at 400 R. P. M. and the coming-in speed for full advance is 120 R. P. M. and for full retard 240 R. P. M.

Lever Type Breaker Assembly Adjustment

Before installing the coil, place breaker assembly temporarily in the magneto for final adjustment. Set the contact points with wrench No. 11-490 so that the clearance between them is .012" as measured with the feeler gauge with which this wrench is provided. With this adjustment, the clear-

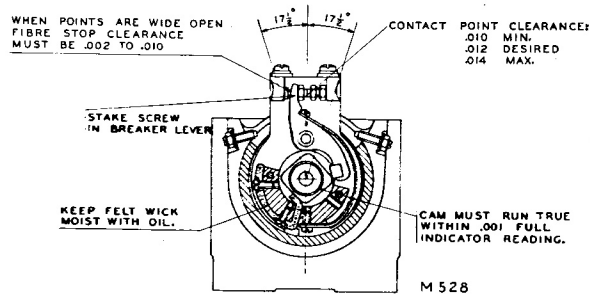


Figure 5

ance between the back of the breaker arm and the fibre stop should be from .002" to .010" when the contact points are wide open. Check this fibre stop clearance for each cam lobe.

Turn the magneto drive shaft until timing marks "A" and "B" (Fig. 4) are approximately opposite each other. Place the breaker assembly in the full advance position. Turn the drive shaft in the direction of rotation until the contact points begin to open. The points should open when the timing marks "A" and "B" are opposite each other or when the rotating magnet is 5° to 9° past its neutral position as measured with timing disc No. 11-1100.

After adjustment is made, remove breaker assembly and install the coil, main cover, distributor blocks, etc. Reinstall breaker assembly.

Other information pertaining to lever type breakers is given in Fig. 5.

M-949

CHECK PRIMARY CURRENT VALUES WITH #11-1124 ANMMETER. VALUE AT 400 R.P.M. MUST BE 1.8 AMPS. OR MORE.

CHECK IN SPEED (7MM. 3PT. GAP) FULL ADVANCE - 135 R.P.M. FULL RETARD - 250 R.P.M.

CHECK RESISTANCE OF COIL SECONDARY WINDING WITH #11-1274 OHMMETER. VALUE MUST BE 4000 - 7000 OHMS.

CHECK CONDENSER WHEN HEATED TO 200 F. WITH #11-1400. MEGGER VALUE MUST BE 50000 OHMS OR MORE.

FOR ANTI-CLW. ROTATION THIS .002 SCREW MUST BE IN HOLE "C". FOR CLW. ROTATION THIS SCREW MUST BE IN HOLE "D".

WHEN REASSEMBLING MAGNETO APPLY KEYSTONE #4 GREASE OR ITS EQUIVALENT EVENLY ON TEETH OF GEAR.

BACKLASH OF GEARS: NEW -.002" TO .003" SERVICE -.007" MAX. CHECK WITH INDICATOR # 11-1221.

DISTRIBUTOR GEAR WHEN ASSEMBLED TO AXLE SHOULD TURN FREELY WITH NO PERCEPTIBLE END PLAY.

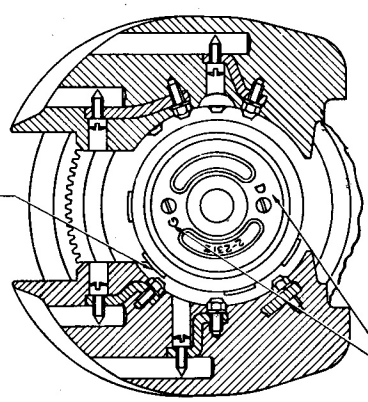
NOTE: WHEN REASSEMBLING MAGNETO PACK ALL BALL BEARINGS WITH ANDOR "C" GREASE.

RELATION OF TIMING MARKS WHEN ENGAGING SMALL GEAR WITH LARGE DIST. GEAR: TIMING MARK ON SMALL GEAR MUST COINCIDE WITH TIMING MARK "G" ON LARGE DIST. GEAR TOOTH FOR ANTI-CLW. ROTATION. FOR CLOCKWISE ROTATION GEAR MARK COINCIDES WITH "D".

CLEARANCE .0015" MIN.

POLE PIECE IS 7° PAST NEUTRAL POSITION WHEN CONTACT POINTS JUST BEGIN TO OPEN.

THE CLEARANCE BETWEEN DISTRIBUTOR BLOCK ELECTRODES AND DIST. CYLINDER SEGMENTS IS CHECKED WITH: GAUGE #11-978 - DIST. BLK. ELECTRODE. GAUGE #11-1135 - DIST. CYL. SEGMENTS.

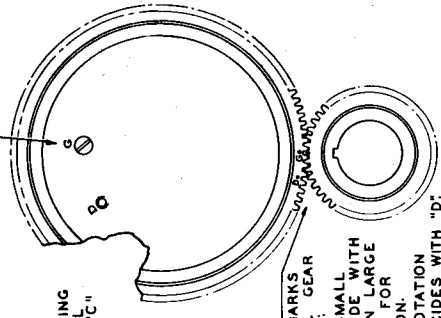
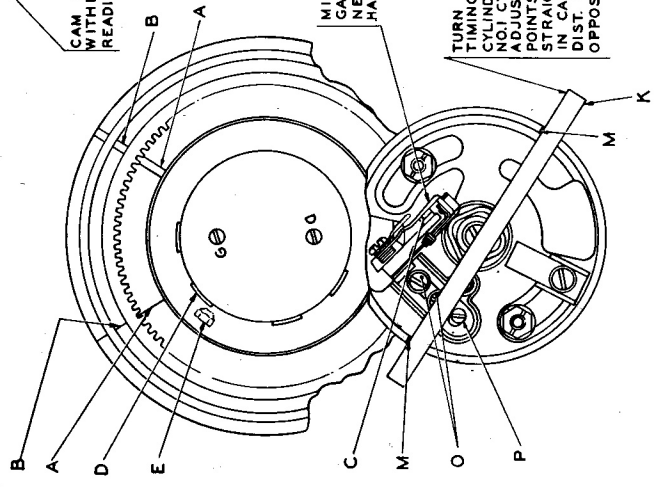


THE TWO HOLES FOR SECURING BOOSTER COLLECTOR RING ARE MARKED "D" & "C". HOLE "C" MUST FACE TIMING MARK ON DIST. CYL. FOR ANTI-CLW. ROTATION. HOLE "D" FOR CLW. ROTATION MUST FACE TIMING MARK.

CAM MUST RUN TRUE WITHIN .002 FULL INDICATOR READING. USE INDICATOR # 11-1221

MIN. TENSION IS 5 OZ. GAUGE # 11-1217. NEW MAIN SPRINGS HAVE 20 - 35 OZ. TENSION.

TURN MAGNETO DRIVE SHAFT UNTIL TIMING MARKS "A" & "B" COINCIDE. DIST. CYLINDER IS NOW IN POSITION TO FIRE. NO.1 CYLINDER. LOOSEN SCREWS "O" AND ADJUST ECCENTRIC "P" SO THAT CONTACT POINTS "C" JUST BEGIN TO OPEN WHEN A STRAIGHT EDGE "M" PLACED AGAINST STEP IN CAM, COINCIDES WITH TIMING MARKS "M". DIST. CYL. SEGMENT "D" WILL NOW BE "E" OPPOSITE NO.1 DIST. BLK. ELECTRODE "E".

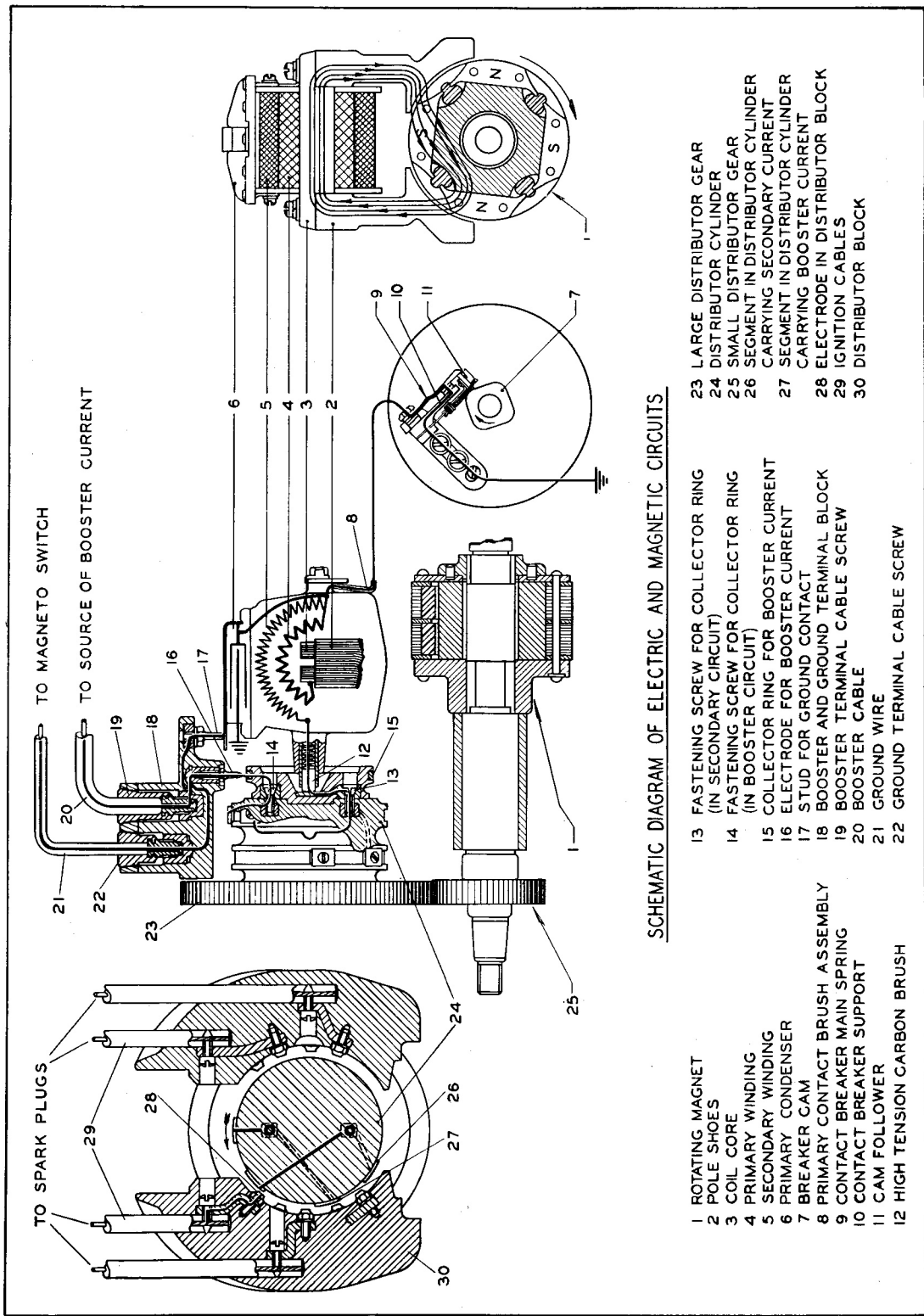


REV.	ITEM	QTY	PART NO.	MATERIAL	REMARKS
L				USED FOR	
K				DATE & APPL.	
J				USED FOR	
H				DATE & APPL.	
G				DATE & APPL.	
F				DATE & APPL.	
E				DATE & APPL.	
D				DATE & APPL.	
C				DATE & APPL.	
B				DATE & APPL.	
A				DATE & APPL.	

SERVICE CHART				MATERIAL SPEC.	
NAME	QTY	DATE	BY	REVISION	REVISION
SE99N					
SB99N					
SB99N					
FRACTIONAL DIMENSIONS MAY VARY.					
DO NOT MANUFACTURE BEFORE APPL.					
MAKE B.	IN. DI.	C. DI.	APPO	SCALE	FINISH SPEC.
1155 (2-24)	1.00	1.00	1:1		
1155 (2-24)	1.00	1.00	1:1		
1155 (2-24)	1.00	1.00	1:1		
DATE	BY	BY	BY	BY	BY

SCINTILLA MAGNETO CO., INC.
SIDNEY, N. Y., U. S. A.
10-15574

M-950



SCHEMATIC DIAGRAM OF ELECTRIC AND MAGNETIC CIRCUITS

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> 1 ROTATING MAGNET 2 POLE SHOES 3 COIL CORE 4 PRIMARY WINDING 5 SECONDARY WINDING 6 PRIMARY CONDENSER 7 BREAKER CAM 8 PRIMARY CONTACT BRUSH ASSEMBLY 9 CONTACT BREAKER MAIN SPRING 10 CONTACT BREAKER SUPPORT 11 CAM FOLLOWER 12 HIGH TENSION CARBON BRUSH | <ul style="list-style-type: none"> 13 FASTENING SCREW FOR COLLECTOR RING (IN SECONDARY CIRCUIT) 14 FASTENING SCREW FOR COLLECTOR RING (IN BOOSTER CIRCUIT) 15 COLLECTOR RING FOR BOOSTER CURRENT 16 ELECTRODE FOR BOOSTER CURRENT 17 STUD FOR GROUND CONTACT 18 BOOSTER AND GROUND TERMINAL BLOCK 19 BOOSTER TERMINAL CABLE SCREW 20 BOOSTER CABLE 21 GROUND WIRE 22 GROUND TERMINAL CABLE SCREW | <ul style="list-style-type: none"> 23 LARGE DISTRIBUTOR GEAR 24 DISTRIBUTOR CYLINDER 25 SMALL DISTRIBUTOR GEAR 26 SEGMENT IN DISTRIBUTOR CYLINDER CARRYING SECONDARY CURRENT 27 SEGMENT IN DISTRIBUTOR CYLINDER CARRYING BOOSTER CURRENT 28 ELECTRODE IN DISTRIBUTOR BLOCK 29 IGNITION CABLES 30 DISTRIBUTOR BLOCK |
|--|--|--|

REV. NO.		CONTINENTAL PART NO.		BENDIX PART NO.		REMARKS	
USE FOR		USE FOR		USE FOR			
DATE & APPL.		DATE & APPL.		DATE & APPL.			
EXCEPTIONAL DISPOSITIONS MAY VARY—							
NAME: CHART-ELECTRIC AND MAGNETIC CIRCUITS, M-950							
MAGNETIC CIRCUITS, M-950							
SPARK PLUGS, M-950							
CHANGES							
NO.	DESCRIPTION	DATE	BY	APP.	SCALE	APPROV. DATE	REVISION
A	REVISION						
SCINTILLA MAGNETO CO., INC. SIDNEY, N.Y., U.S.A.							
10-15574-1							

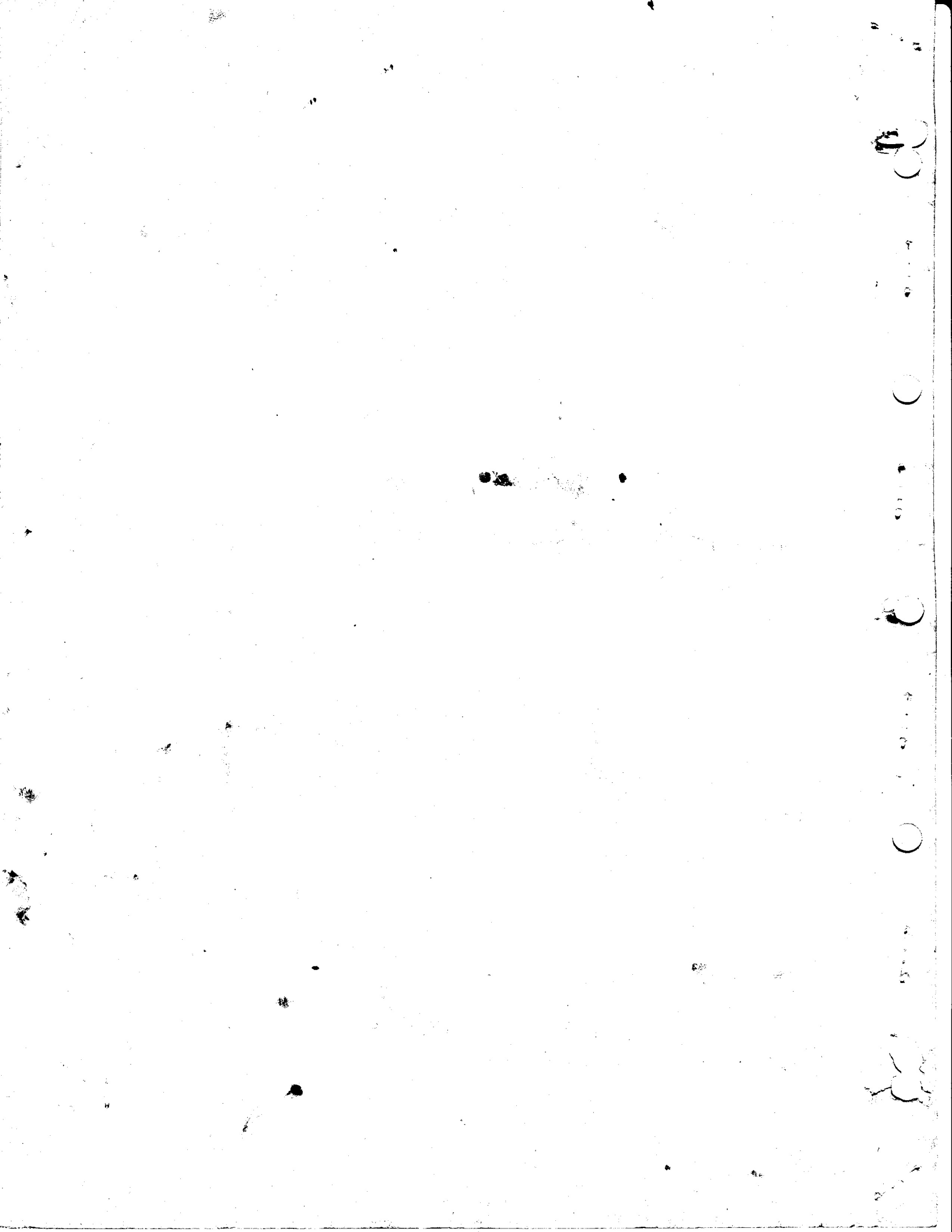
BENDIX-SCINTILLA MAGNETOS

NUMERICAL TOOL LIST

<i>Present Tool No.</i>	<i>Former Tool No.</i>	<i>Description</i>	<i>Application</i>
11-490	4-490	CONTACT POINT WRENCH	To adjust points contact.
11-700	4-17011	TEST STAND	For running test of magneto.
11-851	4-19658	TIMING LIGHT	To determine the position where the contact points open.
11-970	4-134	PRESSING TOOL	To install outside race breaker end ball bearing.
11-975	4-134-1	SUPPORT	To support magneto housing when installing outside race with 11-970 tool.
11-976	4-136	PRESSING TOOL	To install outside race drive end bearing.
11-978	4-140	TEMPLATE	To check height of distributor block electrodes.
11-992	4-218	PULLER	To remove outside race of breaker end ball bearing.
11-1002	4-222	PULLER	To remove outside race of drive end ball bearing.
11-1005	4-224	SCREWDRIVER SET	For general use.
11-1032	4-229	PRESSING TOOL	To install small distributor gear and outside race of drive end bearings.
11-1036	4-232	PRESSING TOOL	To install inside race breaker end bearing.
11-1037	4-233	PULLER	To remove small distributor gear.
11-1049	4-235	PULLER	To remove inside race of breaker end ball bearing.
11-1060	4-241	PULLER	To remove breaker cam.
11-1065	4-243	PULLER	To remove inside race of drive end ball bearing.
11-1072	4-1337	SOCKET WRENCH	To remove lock nuts on front end plate studs.
11-1100	4-2512	TIMING DISC	To check contact point opening at proper time.
11-1124	4-4676Z	AMMETER	To check magnet strength by measuring primary current.
11-1133	4-7264	GAUGE	To check height of distributor cylinder electrodes.
11-1138	4-7823	END PLAY GAUGE	To check magnet end play.
11-1157	4-8092	MILLING FIXTURE	To mill distributor block electrodes.
11-1217	4-9713	SPRING TENSION GAUGE	To check breaker main spring tension.
11-1248	4-12176	CONTACT POINT BLOCK	Holds contact points for dressing.
11-1274	4-12933Y	OHMMETER	To check coil secondary resistance.
11-1275	4-12967	ASSEMBLY TOOL	For assembling component parts of the contact assembly.
*11-1301	4-14215	MAGNET CHARGER	To magnetize rotating magnet.
*11-1302	4-14215	MAGNET CHARGER	To magnetize rotating magnet.
11-1400	4-17049	MEGGER	To check primary condenser.

*The 11-1301 charger operates on 110 Volts D.C.

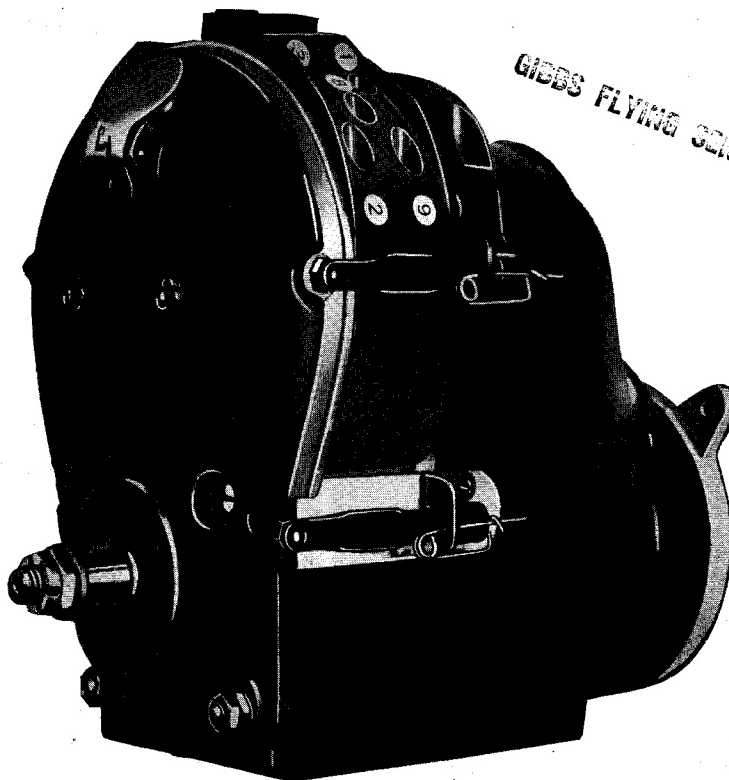
*The 11-1302 charger operates on 36 Volts D.C.



SERVICE PARTS LIST

BENDIX-SCINTILLA AIRCRAFT MAGNETOS

Types SB9RN, SF9RN, SF9LN



GIBBS FLYING SERVICE LIBRARY

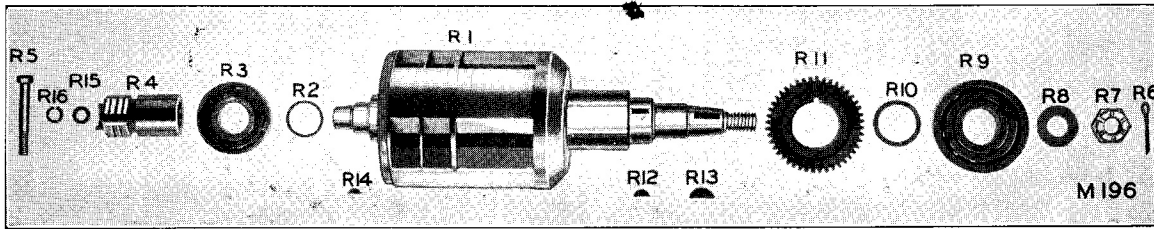
Typical SB9RN Type Magneto



SCINTILLA MAGNETO DIVISION

BENDIX AVIATION CORPORATION

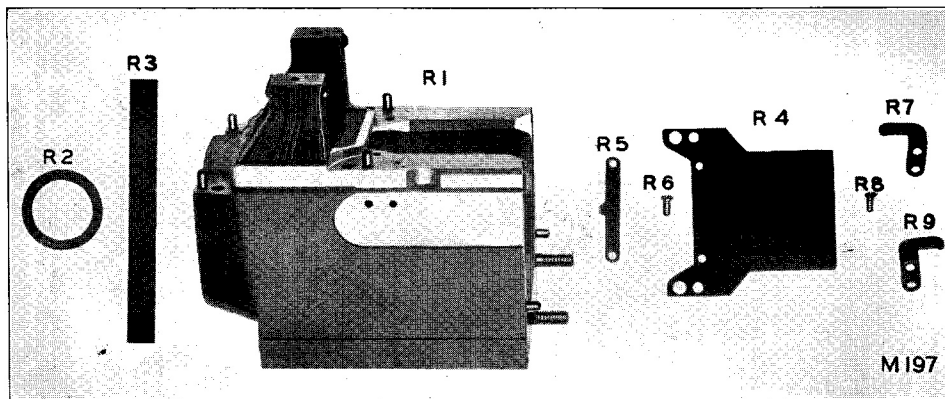
SIDNEY, NEW YORK, U. S. A.



ROTATING MAGNET

Ref. No.	Part No.	No. Req.	Description	Ref. No.	Part No.	No. Req.	Description
R-1	2-792Y	1	MAGNET—Rotating	R-9	2-463	1	BEARING—Ball (Drive End)
R-2	2-161-1	1	WASHER—Shim—.0025" thick	R-10	2-189-1	1	WASHER—Shim—.0025" thick
	2-161-2	1	WASHER—Shim—.004" thick		2-189-2	1	WASHER—Shim—.004" thick
	2-161-3	1	WASHER—Shim—.005" thick		2-189-3	1	WASHER—Shim—.005" thick
	2-161-4	1	WASHER—Shim—.008" thick		2-189-4	1	WASHER—Shim—.008" thick
	2-161-5	1	WASHER—Shim—.010" thick		2-189-5	1	WASHER—Shim—.010" thick
	2-161-6	1	WASHER—Shim—.012" thick		2-189-6	1	WASHER—Shim—.012" thick
			(Magnet End Play Adjusting, Breaker End)				(Magnet End Play Adjusting, Drive End)
R-3	2-462	1	BEARING—Ball (Breaker End)	R-11	2-292Z	1	GEAR—Distributor—Small
R-4	2-621	1	CAM—Breaker—Clw.	R-12	2-181	1	KEY—Woodruff (Small Gear)
	*2-633	1	CAM—Breaker—Anti-Clw.	R-13	2-295Z	1	KEY—Woodruff (Drive Shaft, Base Mounted)
R-5	10-2560	1	SCREW—Cam Fastening	*2-828Z	1	KEY—Woodruff (Drive Shaft, Flange Mounted)	
R-6	2-393	1	PIN—Cotter (Drive Shaft Nut) (Magnetos up to and including Serial No. 049667)	R-14	2-182	1	KEY—Woodruff (Cam)
	*10-18918	1	PIN—Cotter (Drive Shaft Nut) (Magnetos on and after Serial No. 049668)	R-15	2-160	1	WASHER—Plain (Cam Screw)
R-7	10-4092	1	NUT—Drive Shaft	R-16	10-3132	1	WASHER—Lock (Cam Screw)
R-8	2-965	1	WASHER—Plain (Drive Shaft Nut)				

*Not illustrated.

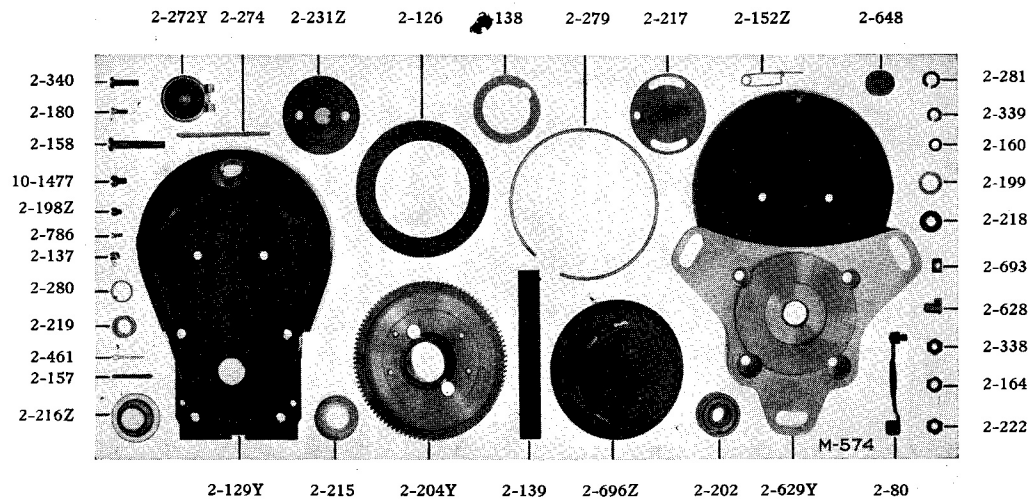


MAGNETO HOUSING

Ref. No.	Part No.	No. Req.	Description	Ref. No.	Part No.	No. Req.	Description
R-1	2-834W	1	HOUSING—Magneto (Base Mounted)	R-7	10-1464	1	HOOK—Radio Shield Clamp—R. H. Side (Except Boeing Shields)
	*2-1134Y	1	HOUSING—Magneto (Flange Mounted)	R-8	10-1465	4	SCREW—Radio Shield Clamp Hook Fastening (Except Boeing Shields)
R-2	2-140	1	GASKET (Magnet Bearing Outer Race)	R-9	10-1476	1	HOOK—Radio Shield Clamp—L. H. Side (Except Boeing Shields)
R-3	2-141-1	1	STRIP—.007" thick		*2-274	1	STRIP—Felt (Specify length)
	2-141-2	1	STRIP—.008" thick		*2-782Z	1	PLATE—Magneto Identification
	2-141-3	1	STRIP—.009" thick		*10-1339	4	SCREW (For Plugging Clamp Hook Screw Holes when Boeing Shields are installed)
	2-141-4	1	STRIP—.010" thick		10-22067	2	DRIVE SCREW (Identification Plate)
	2-141-5	1	STRIP—.011" thick				
	2-141-6	1	STRIP—.012" thick				
			(Magnet Bearing Outer Race)				
R-4	2-148	1	PLATE—Insulating				
R-5	2-453	1	BRIDGE—Coil Safety Gap				
R-6	2-187	2	SCREW—Safety Gap Bridge Fastening				

*Not illustrated.

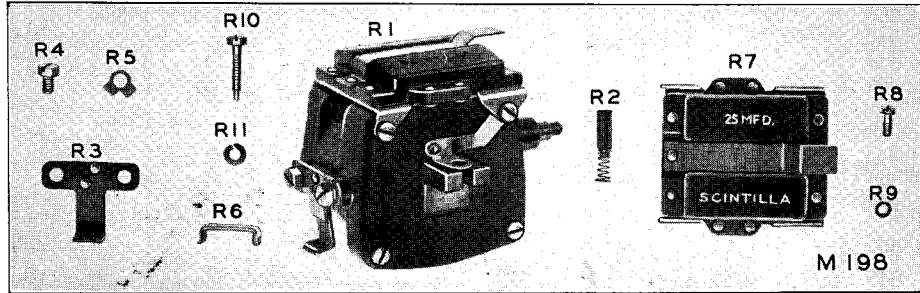
BENDIX-SCINTILLA MAGNETOS



FRONT END PLATE

Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-80	✓	CLAMP—Distributor Block and Radio Shield (4, Non-shielded installations) (2, Standard shielded installations)	✓2-202	2	BEARING—Ball (Large Gear)
2-126	1	GASKET—Cylinder	✓2-204Y	1	GEAR—Distributor—Large
†2-129Y	1	PLATE—Front End	2-215	1	RETAINER (Large Gear Bearing)
†*2-515Y	1	PLATE—Front End (1-7/8" Pilot)	✓2-216Z	1	CAP—Oil Retaining (Large Gear Bearing)
†2-629Y	1	PLATE—Front End (3" Pilot)	2-217	1	AXLE—Large Gear
†2-137	1	SPRING (End Plate Oil Cap)	2-218	1	WASHER—Plain (Large Gear Axle)
2-138	1	GASKET (Magnet Bearing Outer Race)	2-219	1	SPACER (Large Gear Bearing)
2-139-1		STRIP—.007" thick	2-222	2	NUT (Large Gear Axle)
2-139-2		STRIP—.008" thick	2-231Z	1	RING—Booster Collector
2-139-3		STRIP—.009" thick	†2-272Y	1	CAP—End Plate Oil
2-139-4		STRIP—.010" thick	✓2-274		STRIP—Felt (Specify length)
2-139-5		STRIP—.011" thick	2-279	1	RING—Lock (Cylinder)
2-139-6		STRIP—.012" thick	†2-280	1	WINDOW—Timing
		(Magnet Bearing Outer Race)	2-281	2	WASHER—Lock (End Plate Mounting Stud)
2-152Z		SAFETY PIN—Distributor Block and Radio Shield Clamp (4, Non-shielded installations) (2, Standard shielded installations)	2-338	2	NUT (Large Gear Axle Screw)
†2-157	1	PIN (End Plate Oil Cap)	2-339		WASHER—Lock (Used with screw 10-1477) (2, Standard Shields) (4, Boeing Shields)
2-158	2	SCREW—End Plate Fastening	†2-340	2	SCREW—Large Gear Axle Fastening
2-160		WASHER—Plain (Large Gear Axle Screw) (4, Base Mounted) (2, Flange Mounted)	†2-626	2	SCREW—Large Gear Axle Fastening
2-164	4	NUT (End Plate Mounting Stud)	2-461	2	PIN—Cotter (Large Gear Axle Screw)
2-180	2	SCREW—Booster Collector Ring	†2-628	1	OIL CUP—End Plate
2-198Z	2	SCREW—Cylinder to Gear Locating	†2-648	2	PLUG—Leather (End Plate Mounting Stud Hole)
2-199-1		WASHER—Plain—.0025" thick	†*2-649	2	PLUG—Leather (End Plate Screw Hole)
2-199-2		WASHER—Plain—.004" thick	2-693	4	ELECTRODE—Cylinder
2-199-3		WASHER—Plain—.005" thick	✓2-696Z	1	CYLINDER—Distributor
2-199-4		WASHER—Plain—.008" thick	2-786	4	SCREW—Cylinder Electrode Fastening
2-199-5		WASHER—Plain—.010" thick	10-1477		SCREW (For Plugging Radio Shield Clamp Hole) (2, Standard Shields) (4, Boeing Shields)
2-199-6		WASHER—Plain—.012" thick (Large Gear Bearing End Play Adjusting)			

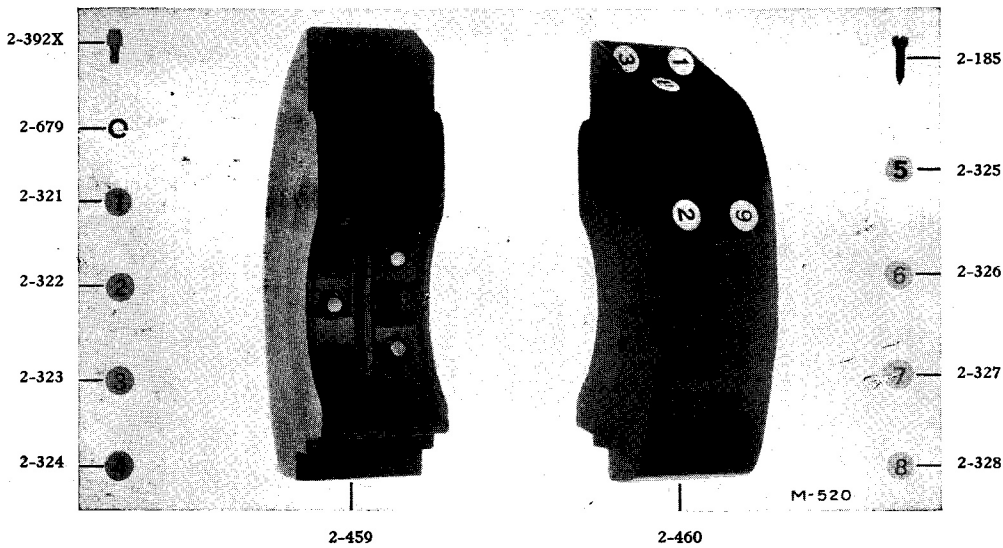
*Not illustrated.
†Base Mounted End Plate.
‡Flange Mounted End Plate.



MAGNETO COIL

Ref. No.	Part No.	No. Req.	Description	Ref. No.	Part No.	No. Req.	Description
R-1	2-751	1	COIL—Complete	R-6	2-819	2	CLAMP—Coil
	*2-752	1	COIL—Stripped (Does not include Condenser)	R-7	2-755Z	1	CONDENSER
R-2	2-311	1	CARBON BRUSH	R-8	10-528Z	4	SCREW—Condenser Fastening
R-3	2-764	1	BRUSH—Primary Contact	R-9	2-194	4	WASHER—Lock (Condenser Fastening Screw)
R-4	10-4874	2	SCREW—Primary Contact Brush Fastening	R-10	2-177	2	SCREW—Coil Fastening
R-5	10-7308	2	WASHER—2 Ear Lock (Primary Contact Brush Screw)	R-11	2-220	2	WASHER—Lock (Coil Fastening Screw)
					*2-1053	1	CUSHION ASSEMBLY—Coil (Not used for Navy requirements)

*Not illustrated.

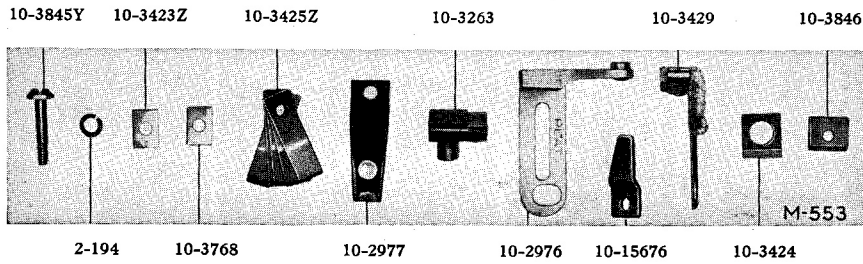


DISTRIBUTOR BLOCK

Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-185	9	SCREW—Cable Piercing	*2-334	1	BLOCK—Distributor—Complete— Anti-clw.—L. H. Side
2-321	1	DISC—No. 1	2-459	1	BLOCK—Distributor—Complete— Clw.—L. H. Side
2-322	1	DISC—No. 2	2-460	1	BLOCK—Distributor—Complete— Clw.—R. H. Side
2-323	1	DISC—No. 3	2-392X	9	ELECTRODE—Distributor Block
2-324	1	DISC—No. 4	2-679	9	WASHER—Lock (Distributor Block Electrode)
2-325	1	DISC—No. 5			
2-326	2	DISC—No. 6 and No. 9			
2-327	1	DISC—No. 7			
2-328	1	DISC—No. 8			
*2-333	1	BLOCK—Distributor—Complete— Anti-clw.—R. H. Side			

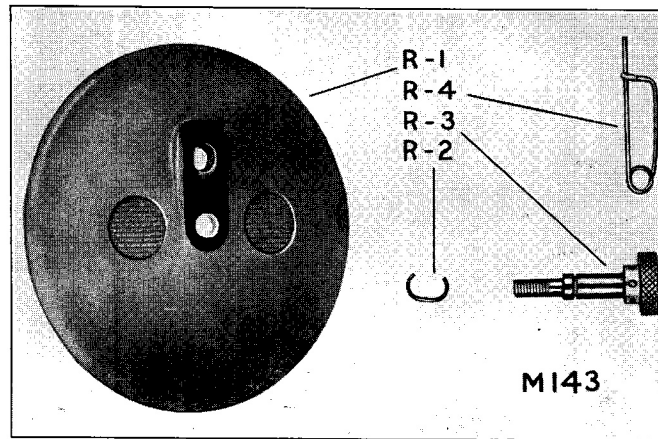
*Not illustrated.

BENDIX-SCINTILLA MAGNETOS



DETAIL PARTS OF CONTACT ASSEMBLY NO. 10-546V

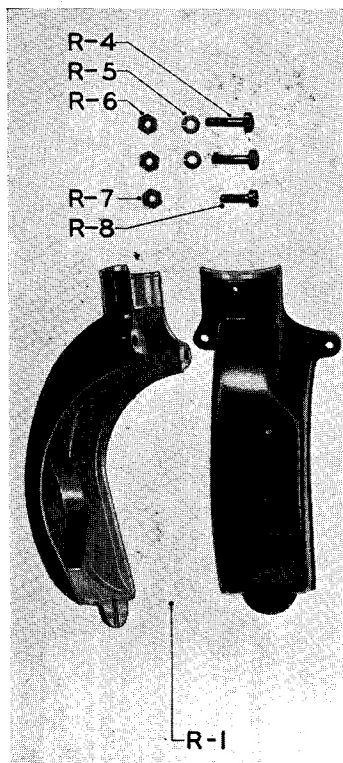
Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-194	1	WASHER—Lock (Assembly Screw)	10-3425Z	1	BRUSH ASSEMBLY—Primary
10-2976	1	SUPPORT—Contact Assembly (Includes Platinum Contact)	10-3429	1	FOLLOWER—Cam
10-2977	1	SPRING—Main (Includes Platinum Contact)	10-3768-1	1	WASHER—Shim—.008" thick
10-3263	1	BUSHING—Insulating (Contact Assembly Support)	10-3768-2	1	WASHER—Shim—.004" thick (Main Spring Adjusting)
10-3423Z	1	PLATE—Main Spring	10-3845Y	1	SCREW—Assembly Fastening
10-3424	1	PLATE—Insulating (Assembly Screw Nut)	10-3846	1	NUT (Assembly Screw)
			10-15676	1	STOP—Main Spring



BREAKER COVER

Ref. No.	Part No.	No. Req.	Description	Ref. No.	Part No.	No. Req.	Description
R-1	2-1000Z	1	COVER—Breaker—Non-ventilated— Variable Spark	R-3	10-3040	1	SCREW—Cover Fastening
	*2-1001Z	1	COVER—Breaker—Non-ventilated— Fixed Spark	R-4	2-152Z	1	PIN—Safety (Cover Screw)
R-2	10-2633	1	RING—Lock (Cover Screw)		*10-3039	1	SPRING—Cover Screw
					*10-5071	1	RIVET—Cover Screw Spring Fas- tening

*Not illustrated.



RADIO SHIELDS

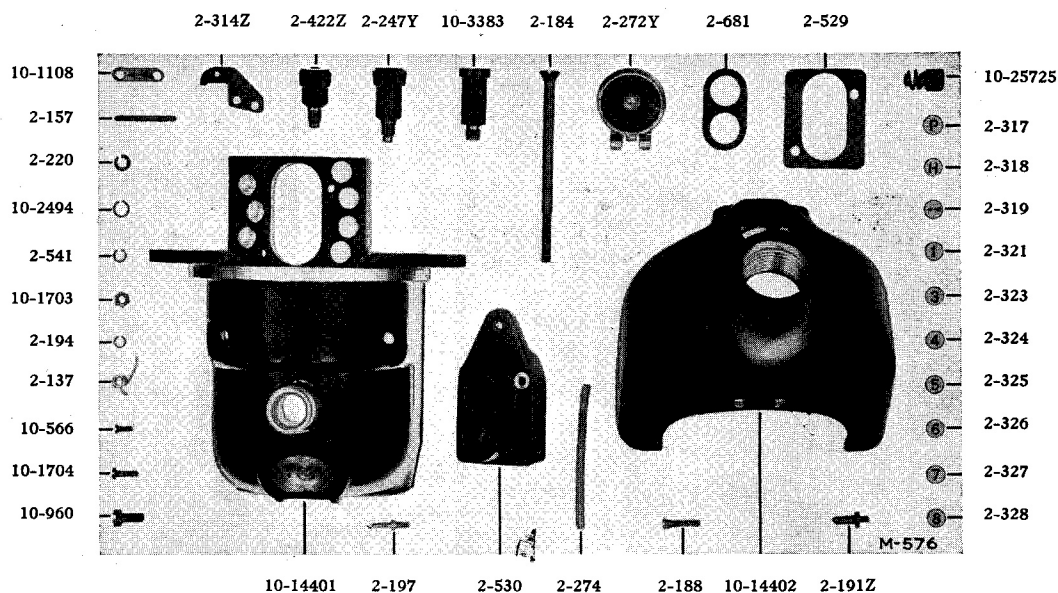
Ref. No. Part No. No. Req.

Description

TYPE RS-C. SINGLE TOP OUTLET

R-1	10-1536	1	RADIO SHIELD ASSEMBLY—Complete
R-4	10-1466	2	SCREW—No. 10-32P x 13/16"—Hex. Hd. (Shield Clamping)
R-5	2-339	2	WASHER—13/64" I. D. x 3/8" O. D. x 1/32"—Lock. (Shield Clamping Screw) ..
R-6	10-1467	2	NUT—No. 10-32P x 3/16"—Hex. (Shield Clamping Screw)
R-7	10-3132	1	WASHER—.200" I. D. x .325" O. D. x 3/64"—Lock. (Outlet Adaptor Locking Screw)
R-8	10-3164	1	SCREW—No. 10-24P x .373"—Fill. Hd. (Outlet Adaptor Locking)

BENDIX-SCINTILLA MAGNETOS

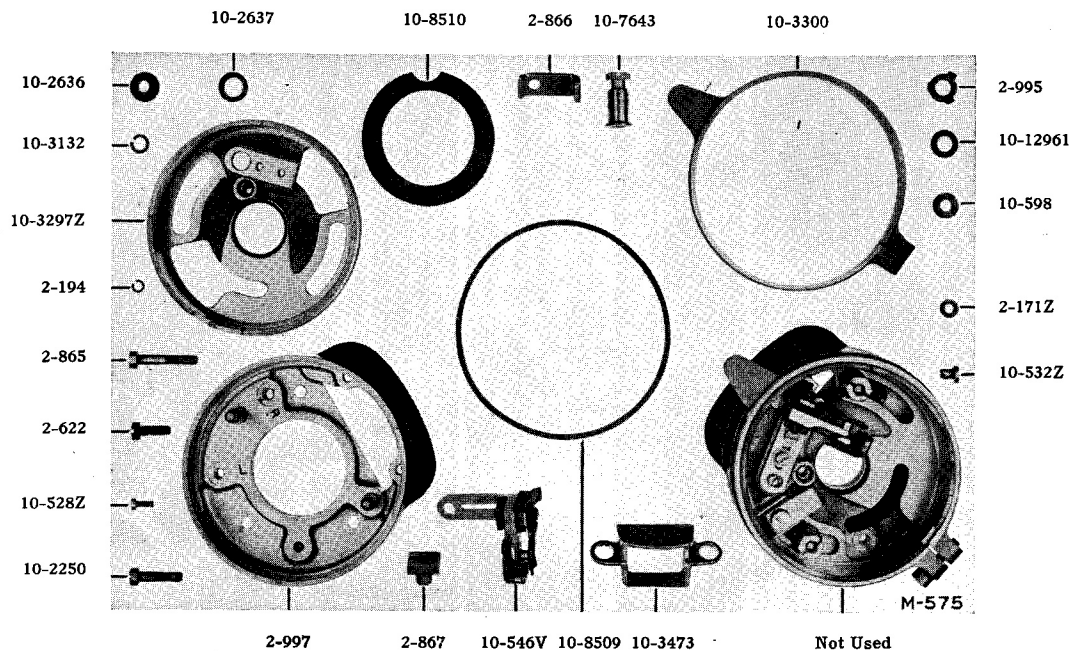


MAGNETO COIL COVER

Part No.	No. Req.	Description	Part No.	No. Req.	Description
†2-137	1	SPRING (Coil Cover Oil Cap)	*2-536V	1	COVER—Coil (Not incorporating Auxiliary Ground Terminal or Air Blast Requirements)
†2-157	1	PIN (Coil Cover Oil Cap)	*2-750Y	1	COVER—Coil (Incorporating Auxiliary Ground Terminal but not Air Blast Requirements)
2-184	2	SCREW—Coil Cover Fastening	10-14401Y	1	COVER—Coil (Incorporating Auxiliary Ground Terminal and Air Blast Requirements)
2-188	2	SCREW—Terminal Block Fastening	10-14402	1	HOOD—Air Blast—Threaded Inlet (Coil Cover 10-14401Y)
2-191Z	1	STUD—Primary Current (Terminal Block)	2-541	1	WASHER—Lock (Booster Electrode)
2-194	4	WASHER—Lock (Distributor Block Clamp Hook Screw) (Except shielded installations)	2-681	1	LOCK—Rubber (Booster and Ground Terminal Screws)
2-197	1	ELECTRODE—Booster (Terminal Block)	†10-566	2	SCREW—Rotation Plate Fastening
2-220	1	WASHER—Lock (Primary Current Stud)	10-960	4	SCREW—Air Blast Hood Fastening
2-247Y	1	TERMINAL SCREW—Booster	†10-1108	1	PLATE—Rotation
†2-272Y	1	CAP—Coil Cover Oil	10-1703	4	NUT (Distributor Block Clamp Hook Screw) (Except shielded installations)
2-274	1	STRIP—Felt (Specify length)	10-1704	4	SCREW (Distributor Block Clamp Hook) (Except shielded installations)
2-314Z	2	HOOK—Distributor Block Clamp (Except shielded installations)	10-2494	4	WASHER—Lock (Air Blast Hood Screw)
2-317	1	DISC—P	10-3383	1	TERMINAL—Auxiliary Ground (Coil Covers 2-750Y, 10-14401Y)
2-318	1	DISC—H	10-25725	1	CONTACT BUTTON (Auxiliary Ground Terminal) (Coil Covers 2-750Y, 10-14401Y)
2-319	1	DISC—Rotation	*10-26198	1	WASHER—Plain (Auxiliary Ground Terminal)
2-321	1	DISC—No. 1	*10-26199	1	SLEEVE—Insulating (Auxiliary Ground Terminal)
2-323	1	DISC—No. 3 (Clw. only)			
2-324	1	DISC—No. 4 (Clw. only)			
2-325	1	DISC—No. 5 (Anti-clw. only)			
2-326	1	DISC—No. 6 (Clw. only)			
2-327	1	DISC—No. 7 (Anti-clw. only)			
2-328	1	DISC—No. 8 (Anti-clw. only)			
2-422Z	1	TERMINAL SCREW—Ground			
2-529	1	GASKET—Terminal Block			
2-530	1	TERMINAL BLOCK—Booster and Ground			

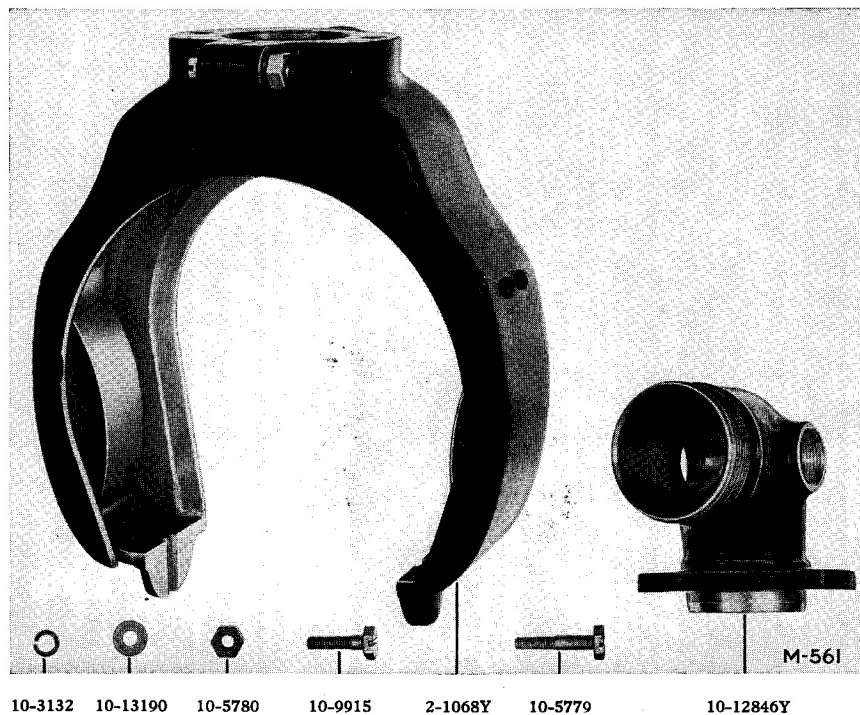
*Not illustrated.
†Not required with Air Blast Requirements.

BENDIX-SCINTILLA MAGNETOS



BREAKER ASSEMBLY

Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-171Z	2	WASHER—Plain (Contact Assembly Fastening Screw)	10-2250	1	SCREW—Advance Lever Clamping
2-194	2	WASHER—Lock (Contact Assembly Fastening Screw)	10-2636	2	BUSHING—Insulating (Primary Contact Segment Screw)
2-622	5	SCREW—Fastening (3, Adaptor) (2, Primary Contact Segment)	10-2637	2	WASHER—Insulating (Primary Contact Segment Screw)
2-865	1	SCREW—Breaker Housing Clamp Fastening (Fixed Spark)	10-3132		WASHER—Lock (3, Adaptor Screw) (2, Primary Contact Segment Screw) (1, Advance Lever Screw)
2-866	1	CLAMP—Breaker Housing (Fixed Spark)			(1, Breaker Housing Clamp Fastening Screw, Fixed Spark)
2-867	1	BLOCK—Breaker Housing Clamp (Fixed Spark)	10-3297Z	1	HOUSING—Breaker
2-995	2	WASHER—3 Ear (Breaker Hold Down Spring) (For 10-7643, Fixed Spark)	10-3300	1	LEVER—Breaker Advance
2-997	1	ADAPTOR—Breaker Housing	10-3473	1	SEGMENT—Primary Contact
10-528Z	2	SCREW—Contact Assembly Fastening	10-7643	2	SPRING—Breaker Hold Down
10-532Z	1	SCREW—Eccentric (Contact Assembly Adjusting)	10-8509	1	GASKET—Breaker Cover
10-546V	1	CONTACT ASSEMBLY—Platinum	10-8510	1	GASKET—Breaker Housing
10-598	2	WASHER—Plain (Primary Contact Segment Screw)	10-12961	2	WASHER—Plain (Breaker Hold Down Spring) (For 10-7643, Fixed Spark)

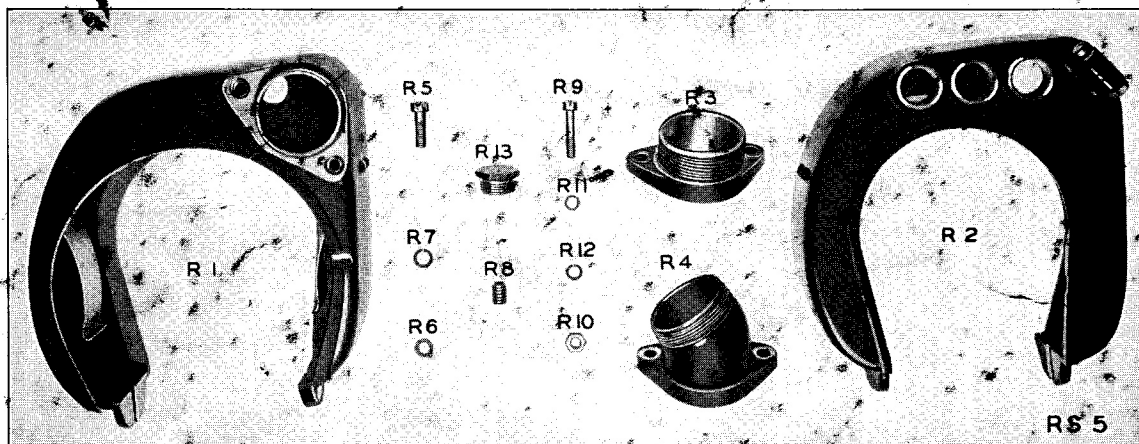


RADIO SHIELDS

<i>Part No.</i>	<i>No. Req.</i>	<i>Description</i>
2-1068Y	1	SHIELD ASSEMBLY—Radio (<i>Less Cable Outlet Adaptor</i>)
*2-1069Y	1	SHIELD ASSEMBLY—Radio—Complete (<i>Includes Cable Outlet Adaptor</i>)
10-3132	4	WASHER—Lock (2, <i>Shield Clamping Screw</i>)
		(2, <i>Adaptor Fastening Screw</i>)
10-5779	2	SCREW—Shield Clamping
10-5780	2	NUT (<i>Shield Clamping Screw</i>)
10-9915	2	SCREW—Adaptor Fastening
10-12846Y	1	ADAPTOR—Cable Outlet
10-13190	2	WASHER—Plain (<i>Adaptor Fastening Screw</i>)

*Not illustrated.

W 21340



RADIO SHIELDS

Ref. No. Part No. No. Req.

Description

TYPE RS-No. SINGLE HORIZONTAL OUTLET-OFFSET

R-1	10-7595Y	1	RADIO SHIELD ASSEMBLY—Left Hand Magneto
R-2	10-7594Y	1	RADIO SHIELD ASSEMBLY—Right Hand Magneto
R-3	10-7665	1	ADAPTOR—Cable Outlet—Straight
	10-7666	1	ADAPTOR—Cable Outlet—Elbow—Right Hand
R-4	10-9409	1	ADAPTOR—Cable Outlet—Elbow—Left Hand
R-5	10-7662	2	SCREW—No. 12-24P x .750"—Hex. Hd. (Cable Outlet Adaptor Fastening)
R-6	10-7664	2	WASHER—7/32" x 3/8" x .031"—Plain. (Cable Outlet Adaptor Fastening Screw)
R-7	10-7663	2	WASHER—7/32" x 11/32" x 3/64"—Lock. (Cable Outlet Adaptor Fastening Screw)
R-8	10-7667	2	BUSHING—5/16"-24P outside thread, No. 12-24P inside thread, 3/8" long—Brass. (Cable Outlet Adaptor Fastening Screw)
R-9	10-7658Z	1	SCREW—No. 10-32P x 1.000"—Flat Hd. (Radio Shield Clamping)
R-10	10-7661	1	NUT—No. 10-32P x 1/8"—Hex. (Radio Shield Clamping Screw)
R-11	10-7659	1	WASHER—13/64" x 5/16" x .031"—Plain. (Radio Shield Clamping Screw)
R-12	10-7660	1	WASHER—.203" x .328" x .047"—Lock. (Radio Shield Clamping Screw)
R-13	10-8162		PLUG—Auxiliary Cable Outlet. (Used as required)