

Monarch Magneto Telephones



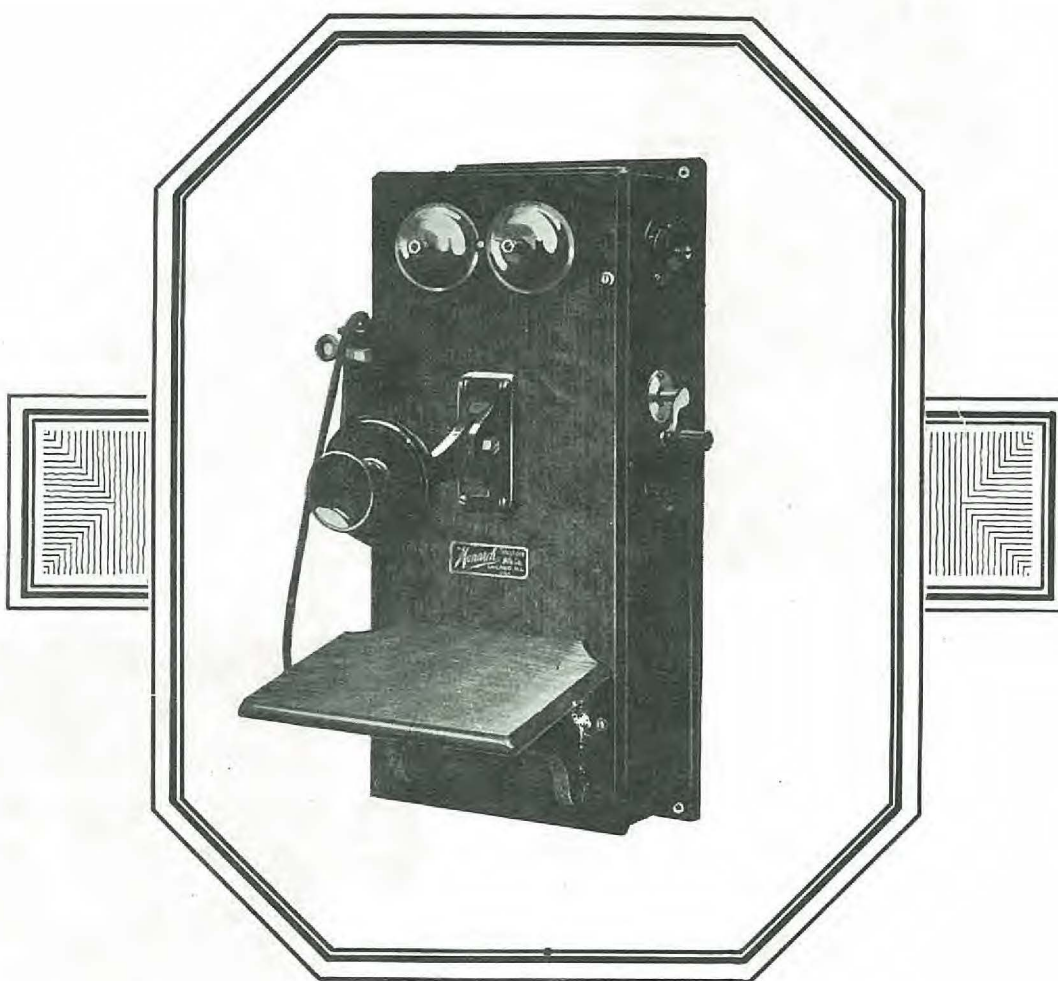
Monarch Telephone Mfg. Co.

951 West Van Buren Street
CHICAGO, ILL.

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Bulletin No. 34

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Bulletin No. 54

Monarch Local Battery Telephones

Compact Type Telephones

AFTER quarter of a century in the manufacture, study and development of magneto telephone equipment, we are convinced the telephones and parts illustrated and described in this bulletin will give the best service, over the longest period of time, at the lowest cost of upkeep.



Fig. 1—Compact Type Farm Line Telephone

Figures 1 and 2 are from photographs of our standard farm line bridging telephone, known as the compact type. The cabinet is built of quarter-sawed oak given a golden oak finish and in strict accordance with modern ideas, without paneling of any sort. Its dimensions are $7\frac{3}{4} \times 17\frac{1}{4}$ ". All wiring is in cable form, color-coded and shellaced, so that it is entirely moisture-proof.

From Figure 2 it will be seen that all parts are so arranged they are easily accessible. The ringer is entirely self contained and its resistance is shown by a label on the end of the magnet. The receiver terminal block is arranged to take a cord having either tips, spades or loops. The lightning arrester connections are positive and permanent. Line and ground wires are placed between two washers and are held firmly by a machine screw.

It is a very simple matter to remove the induction coil by removing a wood screw from each end of the coil. Primary terminals are on one end and secondary terminals are on the opposite end. Machine screws and washers make soldering unnecessary and assure a positive and permanent connection. The generator may be easily removed from its shelf. These telephones are all wired for a condenser, but if ordered without one installed, a loop is provided in the battery compartment so that one may be installed later, if desired. Every cabinet is drilled so that either a three, four or five bar generator may be installed.

Code numbers of the most commonly used telephones of this type are as follows:

Code Numbers

Code No.	Generator	Ringer
MC-8801	3-bar	1000 ohm
MC-8802	5-bar	1600 ohm
MC-8803	5-bar	2500 ohm
MC-8804	5-bar	1600 ohm with condenser
MC-8805	5-bar	2500 ohm with condenser

NOTE: If a push button is desired, the code numbers found on page 12 should be used. Thus, "MC-8804-D" refers to a *compact type* bridging telephone having a 5-bar generator, 1600 ohm ringer, a condenser, and a push button to ring central over one side of the line and ground.

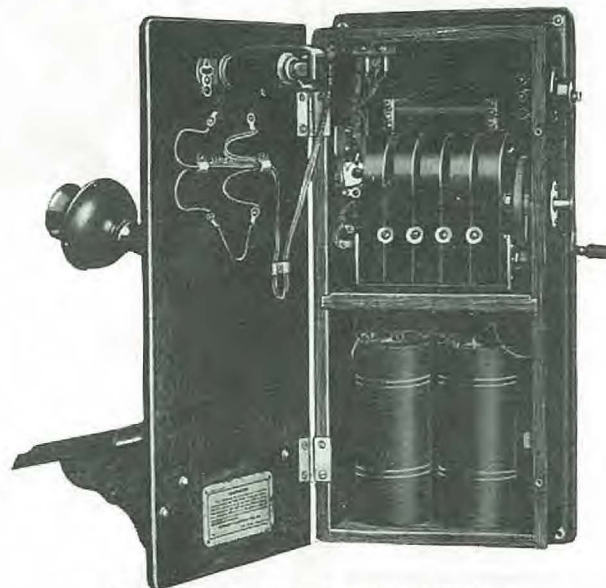


Fig. 2—Interior View Farm Line Telephone

Residence Type

This is a very neat little telephone and has proven a great favorite for both residence and business houses. It is a complete telephone in every respect, containing all the standard equipment found in the compact type, the difference being no compartment has been provided within the cabinet for containing the batteries. This necessitates locating the batteries in a battery box, closet, or other convenient dry place with a pair of wires run to the battery binding posts within the cabinet.

All of the parts, binding posts and wiring within the cabinet are of easy access. In fact, an important feature of this telephone is that the cabinet is hinged both front and rear, so that it opens away from the backboard. The saving of wall space is probably the principal reason for the popularity of this type of telephone. Code numbers of the most



Fig. 3—Residence Type Magneto Telephone

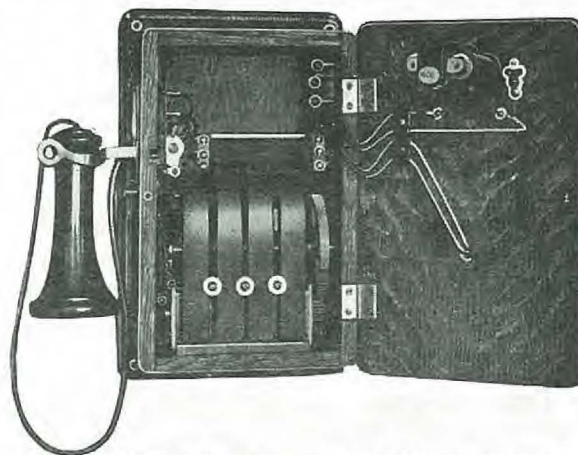


Fig. 4—Interior View Residence Type Magneto Telephone

commonly used residence type telephone are as follows:

Code Numbers

Code No.	Generator	Ringer
MC-8806	3-bar	1000 ohm
MC-8807	5-bar	1600 ohm
MC-8808	5-bar	2500 ohm
MC-8809	5-bar	1600 ohm with condenser
MC-8810	5-bar	2500 ohm with condenser

NOTE: If a push button is needed, the code numbers found on page 12, under attachments should be used. Thus, "MC-8806-G," refers to a residence type bridging telephone having a 3-bar generator, 1000 ohm ringer and a push button to close the transmitter circuit.

Booth Telephones

For installation in a central office for use by the public, where instructions for calls are given personally to an operator, our MC-8806 set will be found ideal for the purpose. It consists of a standard transmitter, receiver, hookswitch and induction coil mounted in a compact oak cabinet. Its principal feature probably, is the fact that its cost is much less than a magneto telephone and that it requires so little space. Transmitter dry cells must be mounted in a nearby convenient place.

Our MC-8807 set is the same as the MC-8806 set, but with the addition of a ringer. Some companies have found the ringer advantageous, as it is unnecessary for the operator to turn and tell the

waiting party she is ready for his call. She merely rings the bell. Space is provided within the cabinet for 2 No. 6 dry cells.

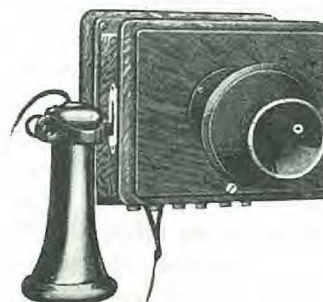


Fig. 5—MC-8806 Local Battery Talking Set

Monarch Local Battery Telephones

The Desk Telephone

The newly designed Monarch magneto desk telephone illustrated and described in this bulletin is the result of many months of research and experimental work by our staff of development engineers. It embodies all of the approved features of existing types plus many others that are distinctive and entirely new.

Every desk type telephone has a beautiful soft, velvet-like, black finish which is entirely permanent. It will fit in equally well with the surroundings of the most exclusive home, or the most up-to-date business office.

The Transmitter

The transmitter furnished with the desk telephone is of the standard Monarch type, having the



Fig. 7—Standard Local Battery Desk Set

same finish as the balance of the telephone. The side view of the desk stand shows the new and pleasing method of mounting the transmitter assembly. The transmitter is fastened to the back by bayonet slots and set screws. The back itself is fastened to the phosphor bronze mounting neck by a concealed hinge, having the appearance of a ball and socket joint, but permitting vertical motion only.

The hinge referred to is concealed in the transmitter back, but is accessible by removing the transmitter itself. While the transmitter can be easily moved, the adjustment is such that it cannot fall of its own weight, but is held firmly in any position desired. The design of the hinge is such that what little wear there is, is automatically taken up, making the adjustment entirely permanent.

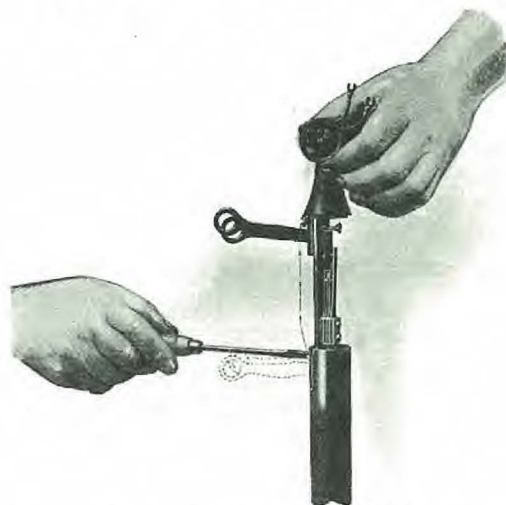


Fig. 8—Method of Withdrawing Hook and Spring Assembly

The Hookswitch

The receiver hook and the spring assembly (of the desk stand) are mounted on a plate which extends from the mounting neck to the desk stand base. By loosening the single "non-losable" screw holding the base plate and backing up the screw above the hook, the transmitter assembly may be lifted about four inches, withdrawing the spring and hook assembly for inspection. The springs are of high grade phosphor bronze.

The Base Assembly

The tube and base are constructed of heavy steel rigidly fastened together, the entire assembly being parkerized and japanned. The base contains a heavy Micarta terminal block plainly marked for the various connections. Terminals are of brass and designed so that a positive and permanent connection



Fig. 9—Base Assembly of Standard Magneto Desk Set

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is assured. The wiring is in cable form, color-coded and with a "loop," so the terminal block may be removed from the base. The base plate is covered with heavy dark brown felt. The desk stand having the induction coil in the base, is known by code MC-8913. Without the induction coil in the base, it is coded MC-8907.

The Ringer Box

For the local battery desk set, the ringer box is of quartered oak with a golden oak finish. All wiring is in cable form and color-coded. Each ringer box is drilled for a three, four or five bar generator, and is arranged so the generator may be easily removed. The terminal block on the left side of the ringer box (see Figure No. 11) is for the four conductor desk stand cord. The four bottom terminals are marked solid, red, blue and yellow, referring to the four conductor desk stand cord having one conductor of a solid color, the other three having a tracer of red, blue and yellow. The two top connections of this terminal block are marked "Bat." and are for connecting the pair of wires from the transmitter battery.

On the right side of the ringer box (see Figure No. 11) is the terminal block for the line and ground wire connections. The top and bottom terminals are marked "LINE" and are used when the line is metallic. When used on a grounded circuit, the physical line is connected to the top terminal and the ground wire to the center terminal. However, desk set ringer boxes are now considered standard when equipped with our MC-6858 Arrester, and

the connections are then made as shown in Figure No. 27 and explained under "The Arrester" on page 11.

The backboard is grooved and drilled to permit a neat installation of both battery and line wires. The generator and ringer are described in detail elsewhere in this bulletin.

Ringer Box Codes

Desk Set Ringer Boxes are furnished complete with our MC-6858 Arrester, unless otherwise specified. In ordering a desk telephone complete, it is

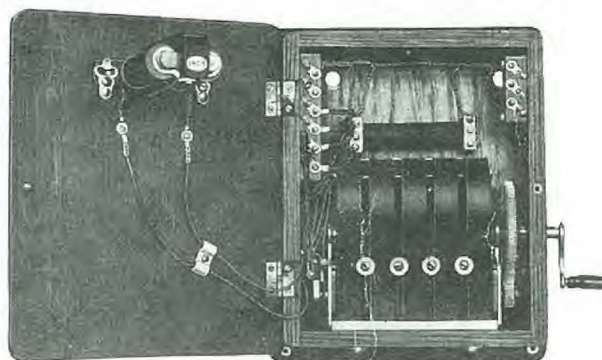


Fig. 11—Interior View of Desk Set Ringer Box

necessary to give both the code number of the desk set and the ringer box. For example, an MC-8907 Desk Set with Ringer Box MC-8946, specifies a desk type bridging telephone having a 5-bar generator and 1600 ohm ringer with the induction coil mounted in the ringer box. Codes are as follows:

Desk Set Ringer Boxes

With induction coil in Ringer Box. Used only with Desk Set MC-8907.	Used with desk set MC-8913 which has an induction coil in its base.
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Code	Generator	Ringer	Code
MC-8954	3-bar	1000 ohm	MC-8958
MC-8946	5-bar	1600 ohm	MC-8959
MC-8955	5-bar	2500 ohm	
MC-8956	5-bar	1600 ohm & cond.	MC-8960
MC-8957	5-bar	2500 ohm & cond.	MC-8961

Extension Ringers

It is often desirable to install an extension bell and for that reason the small oak cabinet as shown in Figure No. 12 was designed. The ringer is

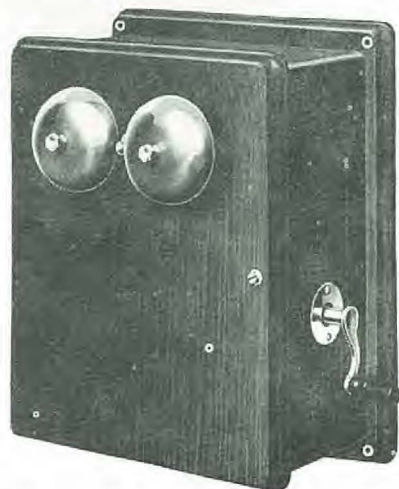


Fig. 10—Ringer Box Furnished With Magneto Desk Set

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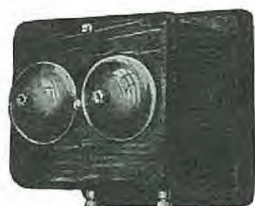


Fig. 12—Extension Ringers Are Mounted as Shown Herewith

Monarch Features

No study of Monarch telephones is complete without an investigation of the little features which help to make these instruments so economical to maintain.

Telephone Cabinets

A *Metal Bushing* mounted in each corner of the back board is provided in all Monarch telephones so that the screws used in mounting the telephone on the wall cannot mar the woodwork. Without



Fig. 13—A Metal Bushing Prevents Marring of the Cabinet

these metal bushings a telephone is badly damaged after one or two removals.

The *Special Door Lock* is another little feature which helps to make an instrument keep its new appearance. It consists of a machine screw fitted through a metal bushing in the door, and arranged to lock into a metal socket mounted in the cabinet. The screw is so constructed that it cannot be removed from the metal bushing.

The *Receiver Cord Terminal Block* is a complete unit in itself, Code MP-595. It is mounted in the top of the cabinet. It consists of a fibre block in which are sunk two brass receptacles for the receiver cord terminals, with connectors, to which are soldered the wires of the receiver circuit. Binding screws extend through the side of the block and into the receptacles, making it possible to use a receiver cord having tips, spade clips or loops equally as well. A screw eye is provided in which to fasten the strain cord.

Wiring and Circuits

All Monarch telephones are wired throughout with flexible stranded wire consisting of six strands

mounted on the door, which locks with a machine screw fitted through a bushing in the door, and arranged to lock into a metal socket mounted in the case. The ringer connections are brought to terminals at the bottom of the cabinet, and line wires are connected there. In ordering extension ringers, be sure and state the resistance desired.

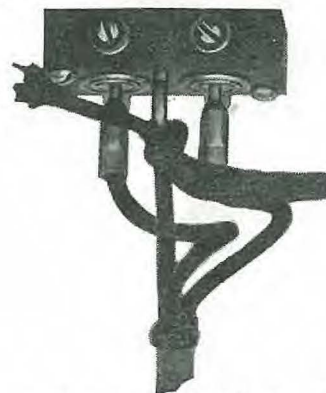


Fig. 14—The Receiver Cord Terminal Block

of tinned copper wire. Each conductor is insulated with one wrapping of cotton over which is a heavy cotton braiding, and the whole is thoroughly waxed. The wiring is entirely contained within the cabinet, being held in place by fibre cleats, and is placed in such a manner as to be accessible. Each circuit is color-coded, making it very easy to trace any particular circuit. All circuit connections are made on tinned connectors and thoroughly soldered.

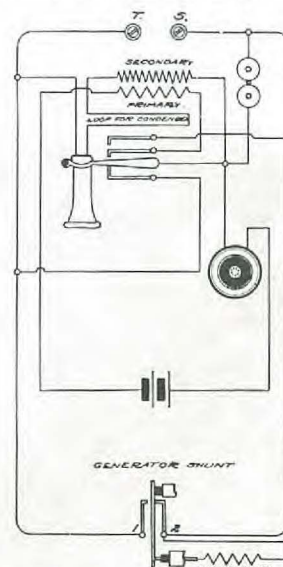


Fig. 15—Standard Bridging Circuit of Monarch Magneto Telephone

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The circuits of a telephone are very important, and for that reason those used in a Monarch telephone are somewhat different from the circuits of other telephones. In the majority of circuits used, the receiver, transmitter and induction coil windings are "switched," that is, they are closed and opened, and when lightning strikes the line and traverses the path of least resistance, it follows the circuit through the normally open contacts of the hookswitch, which intensifies the current, and it discharges back

through the receiver and induction coil windings, with the ultimate result of rupturing them.

In a Monarch telephone these conditions do not exist. The circuits are *not* "open" at any time. When the receiver is on the hook all parts are *shunted*, which results in a direct "short circuit" across the receiver and induction coil windings.

This explains why a burned out transmitter, receiver or induction coil is an unusual occurrence in a Monarch telephone.

Telephone Parts

The Transmitter

There is a very good reason for the particular design of each part of our transmitter, and a description of the parts and how they are made should prove of interest to any person desiring a thorough knowledge of transmitter principles and construction. The principles of acoustics and electricity have been scientifically applied in the manufacture and assembly of all parts. This results in a transmitter perfect in operation and so highly efficient as to be extremely economical in battery consumption.



Fig. 16—Monarch Standard Local Battery Transmitter

The Front of a transmitter is really the foundation on which the other parts depend for their rigid support. In the Monarch transmitter the front is made of a heavy casting turned down in a lathe to its required form. The special tools used in this operation leave the front perfectly smooth and ready for finishing.

The Bridge is the part of the main structure upon which the operating parts are mounted, and consequently must be as heavy and substantial as

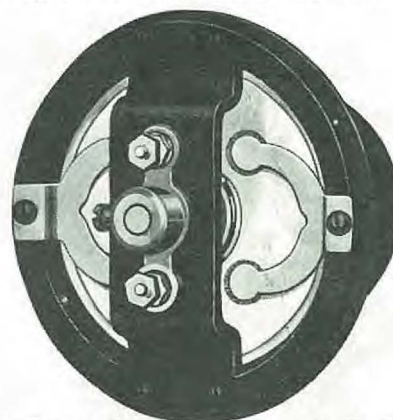


Fig. 17—Showing Arrangement of Parts on Local Battery Transmitter

the front. Reference to the illustrations will show that the bridge in our transmitter is made of heavy sheet metal formed for mounting the working parts, and then fastened with four machine screws in a channel in the front. This construction absolutely insures accuracy, and provides a most solid mounting for the sensitive operating units.

The Diaphragm being the first vibrating part in the transmitter, is made of material peculiarly sensitive to even the slightest vibrations. Specially rolled sheet aluminum is used in the manufacture of diaphragms for Monarch transmitters. The greatest care is used in blanking out and forming these pieces. Straining the metal unequally while being formed will give it unnatural tension and spoil its efficiency, but when formed accurately with a flange around the rim, the sensitiveness of the diaphragm is increased. This flange also forms a support which, while part of the diaphragm, does not interfere with its vibrations.

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The Damping Springs. Without some provision for the elimination of side tones and excessive vibrations a transmitter would not properly fulfill all requirements. To keep the transmitter from being so extremely sensitive, two damping springs with four points of contact on the diaphragm are supplied. Pads of felt are fastened to the four feet of the damping springs so as to eliminate any metallic tone which might be caused. These "feet" are an equal distance from each other, thus insuring equal pressure at points where it is most effective.

An Insulating Ring of specially treated linen, "MP-219" is placed between the transmitter front and diaphragm. On top of the linen gasket, and between it and the diaphragm, is placed a Micarta

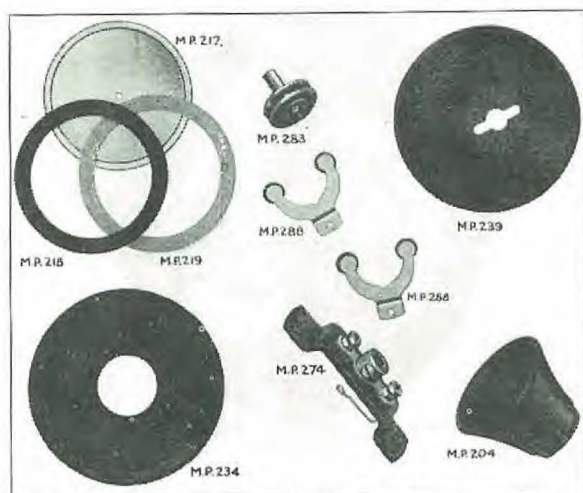


Fig. 18—Transmitter Disassembled Giving Code Number of Parts

ring, "MP-218" to prevent heat and moisture from causing the linen to adhere to the diaphragm.

The Carbon Chamber. A detailed description of the construction of the carbon chamber is of interest, as this is the part in which the voice vibrations are transformed into electrical waves. A brass ring forms the cylinder walls of the chamber. This ring is accurately cut with special tools, and is then finished in a special lathe, making its dimensions absolutely correct.

The Electrodes are of the finest carbon obtainable, and are soldered to brass supporting discs. After being thus mounted the carbons are ground and polished until their surfaces are as smooth and clear as a mirror.

Mica diaphragms are placed behind the brass supporting discs and are locked in place with threaded brass nuts. The carbon electrode and mica dia-

phragm for the front of the carbon chamber are fastened to a brass disc having a threaded stud, which passes through the aluminum diaphragm of



Fig. 19—Transmitter Mounted on MC-1601 Arm

the transmitter and is there locked in place with a nut, so that the vibrations of the diaphragm act directly upon the front electrode. The rear electrode is fastened to a brass disc having a solid hub which extends into the transmitter, and is there locked in place by a set screw. The two electrodes mounted as described are clamped to the brass ring, thus forming a moisture-proof chamber within which is placed the hard pure carbon granules.

The Finish. The beautiful soft, velvet-like black finish on the Monarch transmitter is obtained after it has passed through several processes which assure its permanency. The first process is that of "sand blasting" which gives the parts a rough finish, or "body." They are then parkerized, cleaned, and sprayed with rubber japan and baked for thirty minutes in an oven, at an average temperature of 400° fahrenheit. After cooling, this process is repeated, making doubly sure that the lustre and finish are permanent.

Transmitter Mountings. Two standard mountings are provided for the Monarch transmitter. The MC-1601 Arm as illustrated in Figure 19 is used on our residence type telephones, and by many telephone men when rebuilding old types of telephones. The transmitter has the standard black finish, while the Arm itself is nickel plated.



Fig. 20—Transmitter Mounted on MC-1608 Arm

The MC-1608 Arm as shown in Figure 20 is used on our compact type magneto telephones. It is made of pressed steel and is adjustable.



Fig. 21—The MC-5123 Receiver

The Receiver

An efficient receiver must meet certain requirements. It must accurately reproduce the voice vibrations transmitted to it. It must be substantial enough to withstand the hard usage to which it is often subjected and it must be so made that changes in temperature will not affect its operating parts. Recently, several distinct improvements have been made in this receiver, improving its service and enabling it to withstand the most severe usage. Assembly MP-753 as illustrated in Figure No. 22 consists of two pieces of 14 gauge brass, which after being blanked and formed, are riveted together in four places. This renders this part of the receiver unbreakable.

The *Electro-Magnets* are wound with the best grade of insulated magnet wire on spools having



Fig. 21A—The MC-5123 Receiver

extended cores. The spools (MP-758 in Figure 21A) are reversible; that is, a pole piece now used on the right side, may readily be used on the

left side of another receiver. Our method of winding these coils makes it unnecessary to twist together the ends of the wires of the two windings, which eliminates a possible source of trouble.

The Adjustment. After extensive experiments the air gap between the electro-magnets and the diaphragm was determined, and the adjustment cannot be changed. After the electro-magnets have been rigidly assembled the pole pieces are ground by a special machine so that the air gap between the pole pieces and diaphragm is uniform at all points.

The Permanent Magnet is much heavier than in most receivers. The steel used is of a special grade and when hardened and magnetized by our process they have exceptional life and efficiency. The magnet

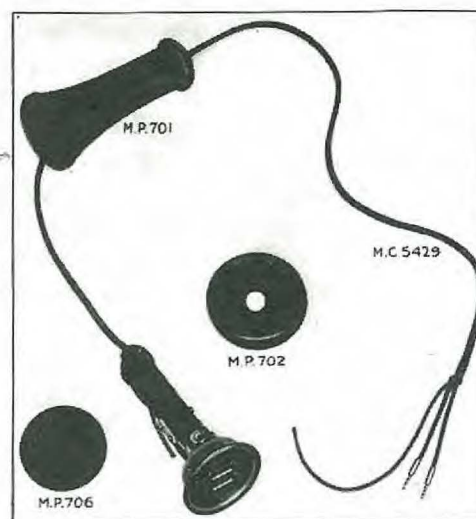


Fig. 22—Receiver Disassembled Giving Code Number of Parts

is full thickness its entire length which gives a full measure of strength.

The *Diaphragm* (MP-706) is made of ferrotype metal and has a finish which withstands rust. It rests upon the brass cup as shown in Figure 21A.

The *Receiver Cord* furnished as standard is known as our MC-5429 cord and is full 36" in length, with "tips" on both ends. It is made up of two tinsel conductors, each thoroughly insulated and protected with a heavy mercerized outer braiding. Each conductor has a tracer its entire length, one being red and the other green. A cord with "tips" for the receiver end is standard, but a cord having "spade clips" or "loops" may be used equally as well.

The Induction Coil

The Induction Coil is the transformer of the telephone, and must be properly designed and con-

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structed in order to insure the best results. Many years of experience have convinced us that for gen-

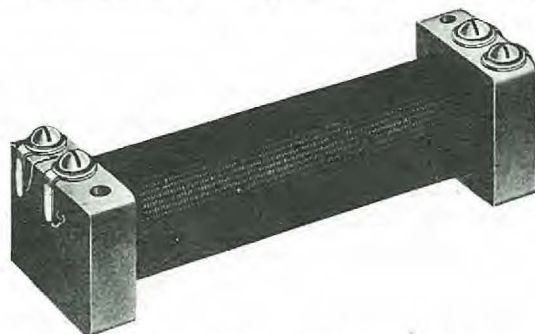


Fig. 23—Standard Local Battery Induction Coil
Code MC-2881-A

eral local battery work, including long distance as well as local talking, a primary winding of 1.4 ohms and a secondary winding of 175 ohms will give the best service. All Monarch local battery induction coils, unless made for some particular service, are wound to these resistances.

The primary winding is placed over a large core composed of a paper tube filled with soft Norway iron wires. This core is fastened between two heavy fibre heads, and the whole forms a most substantial spool for the windings. The windings are brought out to terminals plainly marked to distinguish between the primary and secondary. No two layers of wire come in direct contact with each other, each being insulated by paper to protect it from lightning.

The Hookswitch

Our MC-6241 Hookswitch is unquestionably the most reliable hookswitch on the market and is used in all Monarch local battery wall type telephones. The hook is firmly held in place by the same phosphor bronze spiral spring that lifts it when the receiver is removed, and can easily be detached

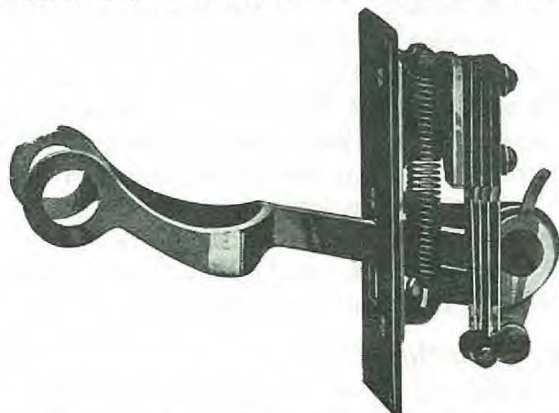


Fig. 24—The MC-6241 Hookswitch as Used in Wall Type Telephones

by pressing the hook locking lever, shown in the illustration, just back of the contact springs. This locking lever device makes it absolutely impossible to remove the hook, or in any way disarrange its adjustment, from the outside of the cabinet. The frame on which the parts are mounted is attached directly to the escutcheon plate by three machine screws, making the entire hookswitch self contained and exceptionally compact. This hookswitch is mounted in the side of the cabinet and the contact springs and locking lever are the only parts that protrude into the interior space.

The contact springs are mounted in a perpendicular position with the free ends hanging downward. This arrangement, in connection with the wiping contact, makes this hookswitch positively self cleaning and eliminates all possibility of trouble caused by the accumulation of dust and other particles.

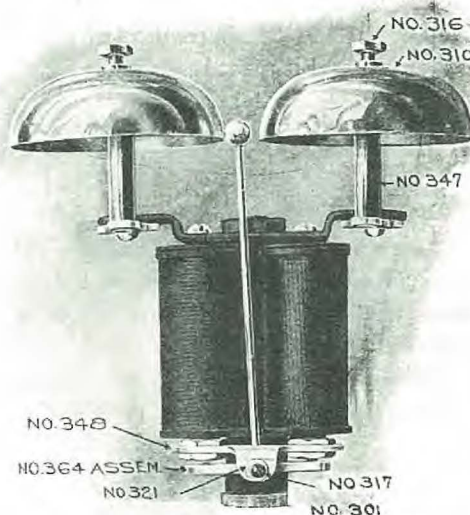


Fig. 25—Standard Ringer Showing Code Number of Piece Parts

The Ringer

Monarch ringers are adjustable, so that when put into service they can be adjusted to meet conditions at the particular place where installed. Every telephone man, especially those operating long farm lines, knows the advantage of ringers that can be adjusted. The simple, substantial construction of the ringer makes it efficient and free from trouble.

The coils are wound on spools having Norway iron cores which are thoroughly annealed. The heads of the coils are fibre, and the winding is carefully done with the best grade magnet wire. Each

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coil, before it is assembled, is tested and its resistance carefully measured.

Adjustment is seldom necessary, but means of changing the position of the armature have been provided. The illustration shows the yoke which supports the armature held between lock nuts on the extended cores of the coils. Changing the position of these lock nuts changes the position of the yoke, and consequently the position of the armature. On one side of the yoke is a pivot point, while on the other side is a pointed set screw. The armature is suspended between these two points, thus giving it great freedom of movement.

The Monarch ringer is self contained. The base supports the gong stands, which may be swung backward or forward to secure the proper adjustment of gongs.

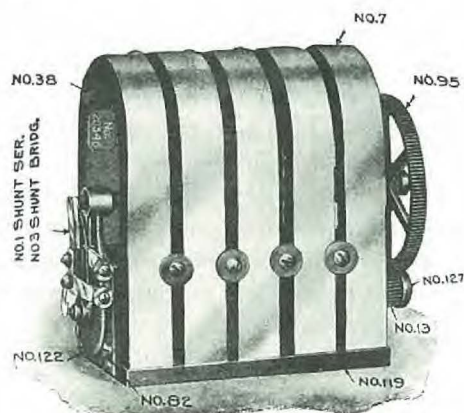


Fig. 26—Bridging Generator Furnished in 3 and 5 Bar Size

The Generator

Probably more machine work is required in making a telephone generator than in producing any other part of a telephone. This fact should be remembered by a purchaser, and the parts should be carefully inspected to make sure they are accurately made and heavy enough to stand the strain of hard usage.

The Armature. Our generators have laminated armatures which prevent "eddy currents" from being set up while the armature is being revolved and thus cutting down its output of current.

The Magnets. The steel used in the magnets is watched very closely, as the efficiency of Monarch generators is undoubtedly due to the uniformly high quality of the magnet steel.

The Field Pieces. Soft iron castings are used as field pieces. Milling machines finish these castings so accurately that when placed between the

generator heads there is just a few thousandths of an inch air space between the armature and field piece.

The Generator Heads are made of heavy brass sheet formed to fit the field pieces, and with long bushings for the bearings of the crank and armature shafts.

Gear and Pinion. Dissimilar metals wear better together than two of the same character. For that reason, in a Monarch generator the Pinion wheel (MP-22) is made of steel and the gear wheel (MP-95) of brass. This construction insures smooth running and more than doubles the life of the parts. A protector cap with cushion springs inside, is placed over the pinion. The springs absorb the shock of sudden starting and reduces the strain on the gears.

The Shunt Springs are of 24 gauge silver and when in normal position the winding of the armature is shunted out of the circuit. Turning the crank forces the shaft out against the long shunt spring, thus breaking the short circuit.

The Arrester

Monarch magneto telephones are equipped with one of the best and most efficient arresters on the market. The illustration shows its general construction, but an explanation of its line connections will no doubt be of value. The wires of the circuits, necessarily connected to the arrester are, of course, soldered to the terminals shown in the illustration. The line wires (and ground wire) are brought in through a hole drilled in the backboard of the cabinet and a positive connection is assured by placing the line and ground wire between two washers and tightening the machine screw.



Fig. 27—Our MC-6858 Arrester Is Furnished With Both the Desk and Wall Type Telephone

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In connecting a metallic line, the line wires are connected to the top and bottom terminals, and the copper wire to ground for protection, is connected to the center terminal. For a grounded line, the top terminal should be used for the line wire and the bottom terminal for the ground wire and we recommend that the center and bottom terminals be strapped together permitting a shorter and easier path to ground for lightning. For the ground wire we recommend a heavy copper wire well soldered to a $\frac{1}{2}$ " ground rod sunk deeply into moist earth.

Attachments

Monarch telephones are built for all classes of service and the attachments here described are designated by letters added to the regular code number of the instruments. Always specify the letter when an attachment is desired, for example "MC-8801-A," "MC-8802-G," "MC-8804-H." These attachments

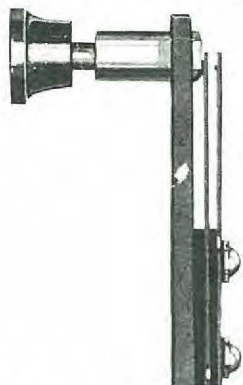


Fig. 28—The MC-5902 Push Button

are Push Buttons, as illustrated, and are mounted in the left side of the cabinet.

Attachment "A"—Signifies that a *Direct Current Generator* instead of the regular alternating current generator, be furnished. The direct current will throw the drop at the switchboard, but will not ring the other telephones on the line.

Attachment "B"—Is a *Push Button with Direct and Alternating Current Generator*. When the generator crank is turned *without* depressing the push button, alternating current is supplied which rings the other telephones on the line and throws the drop at central. When ringing *with* the button depressed, direct current is supplied, which throws the drop at central but does not ring the other telephones on the line.

Attachment "C"—Signifies a *Condenser in the Receiver Circuit*. Every farm line telephone should have a condenser installed in the receiver circuit

which will enable the operator to ring a certain telephone even though several subscribers may have their receivers off the hook.

Attachment "D"—Is a *Push Button to Ring Central Over One Side of the Line and Ground*. For use on a metallic line only. The Push Button is



Fig. 29—The MC-6861 Condenser— $\frac{1}{2}$ M.F. Capacity

arranged so the generator is across the line when the button is in normal position. When depressed, it enables a subscriber to ring central over one side of the metallic line and ground, without ringing other telephones on the line.

Attachment "E"—*Divided Circuit*. In such telephones the ringers are connected from either side of the line to ground so the operator rings over but one side of the line, and therefore signals but one-half the subscribers.

Attachment "F"—*Push Button for Code Ringing*. A push button is wired in the generator circuit. The generator crank is turned continuously, and the rings are controlled by pressing the button.

Attachment "G"—*Transmitter Cut-in*. This is a push button wired so the transmitter circuit is open until the button is pressed.

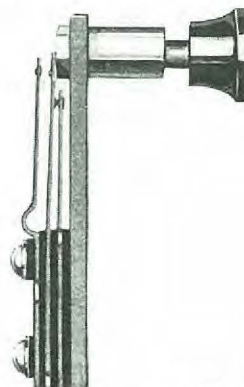


Fig. 30—The MC-5905 Push Button

Attachment "H"—*Transmitter Cut-out*. This is a push button wired so the transmitter circuit is opened when the button is pressed.