KELLOGG SWITCHBOARD AND SUPPLY COMPANY.

1903

BULLETIN NUMBER EIGHT
MAGNETO TELEPHONES
1903

Contains detailed information about Kellogg's magneto telephones and accessories with details on wall sets, desk sets, vanities, transmitters, receivers and ringers. A very detailed article on the Kellogg produced magneto generator answering many questions about when and where Kellogg produced their own generators.

The scans shown in this PDF have been changed to grey scale to reduce the loading time and storage disk space.

It was discovered that an earlier version of this bulletin exists. Kellogg for some reason just reprinted the booklet with the changes without noting this in the copyright page. The full scan book presented here is the later version, this was determined by the desk stand which is the so called "1904" model which is apparently the "1903" model. Twelve pages are different from the earlier version and they have been inserted after the second edition page and are marked "FIRST EDITION PAGE".

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Magneto Telephones

KELLOGG SWITCHBOARD AND SUPPLY CO.
CHICAGO — U.S.A.


PAN-AMERICAN EXPOSITION
BUFFALO·NEW YORK·A·D·1901
The Directors, on the recommendation of the Superior Jury confer their award of
A GOLD MEDAL
on Kellogg Switchboard & Supply Company
for Telephone Systems and Apparatus.
John G. Milburn President
Director General
Secretary
Superintendent of Awards

Bulletin Number Eight

Magneto Telephones

Kellogg Switchboard & Supply Company

Chicago, Illinois, U. S. A

Branch Offices: Keystone Telephone Bldg., Philadelphia, Pa
Electric Bldg., Cleveland, Ohio

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FIRST EDITION PAGE

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The Lakeside Press
R. R. DONNELLEY & SONS COMPANY
CHICAGO

FIRST EDITION PAGE

Introductory

WITHIN the last few years the public, if it has not become properly instructed in the technique of telephony, has at least had the opportunity of becoming so, and this little book aims to be one more aid in that library of instruction. It founds its hope of a favorable reception on the fact that it is a book of to-day in a literature where, above all others, a book so soon becomes a thing of yesterday.

Passing over for the present other apparatus, this bulletin is devoted to a survey of the constituent parts of the Kellogg magneto telephone. It shows that careful design, the finest obtainable material and skillful workmanship are the secrets of the Kellogg reputation for highest efficiency and lowest cost of maintenance. This last fact as to the high efficiency and general excellence of our telephones we should hesitate to advance on our own authority, but the criticisms of the best American and European telephone experts concur in this regard, so that we can truthfully say that the Kellogg telephones are the "standard of excellence" throughout the world.

That the art of telephony is essentially American is a foregone conclusion; that the best of it is essentially Kellogg is attested to by the fact that at the Pan-American Exposition in Buffalo the company received the highest award in open competition with all competitors—the only Gold Medal awarded for Telephone "Systems and Apparatus." Also, at the great St. Louis Exposition in 1904, the "Grand Prize" was awarded to Kellogg for Telephone Switchboards, Telephone Appliances, Appurtenances, and Supplies.

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FIRST EDITION PAGE

MAIN FACTORY AND GENERAL OFFICE

The Kellogg Company

THE Kellogg Switchboard and Supply Company was organized in 1897 for the manufacture of telephone switchboards and all other telephone apparatus, its first work being the manufacture of a divided exchange multiple switchboard for the Kinloch Company of St. Louis. This was the largest switchboard in the world, and the entirely successful completion of the huge task paved the way for the manufacture by the Kellogg Company of the majority of modern exchanges in the great cities of the United States. Work of a more exacting nature than this it would be impossible to find.

The means by which the company has been able to meet the great requirements involved in such undertakings are expressed in these three watchwords of Kellogg success: The best engineering; the best material; the most skillful workmanship.

Our engineering force is unparalleled by that of any other independent manufacturer of telephone apparatus. These experts are known world-wide as pioneers in the development of modern telephony and all apparatus turned out under their supervision must of necessity bear the stamp of the "master hand."

What results have been obtained by this employment of best engineering, finest material and the most skilled workmanship during the six years of Kellogg history? Not the cheapest selling apparatus, naturally, but a product of strong individuality with a firmly established reputation for high efficiency combined with lowest cost of maintenance—the price paid for repairs and inspection, a most important item. The question why the majority of large

telephone companies, requiring the best for competitive purposes, prefer Kellogg apparatus is thus clearly answered.

Our aim is so to design and construct apparatus that repair parts are seldom or never needed and that the purchaser may not have to depend continually upon the manufacturer for repair parts. They are, however, made perfectly interchangeable and any such repairs or substitutions of parts may easily be made.

More than two thousand telephone exchanges in the United States have been equipped wholly or in part by the Kellogg Switchboard and Supply Company. Our company has equipped more great city exchanges than all the other independent manufacturers combined. The actual output of our enormous new factory is over one complete high-grade telephone per minute, but we have greatly exceeded this rate and it does not show our capacity.

An erroneous opinion among telephone men has been that we cater only to the large customers. On the contrary we accord the same care, the same engineering skill and manufacturing supervision to our magneto apparatus and the telephone end of our business as we do to the apparatus of our larger systems. We guarantee our apparatus in every particular. No expense or pains are spared to make it the most perfect that can possibly be produced.

Kellogg Transmitters

THE Kellogg reverse type, solid back transmitter needs no introduction to the telephonic world. Since its advent about two and one-half years ago, it has held the distinction of being the standard of excellence for highest grade transmission. This is evidenced by the fact that there are now a quarter of a million of these instruments in use, giving the best of satisfaction on all classes of service.

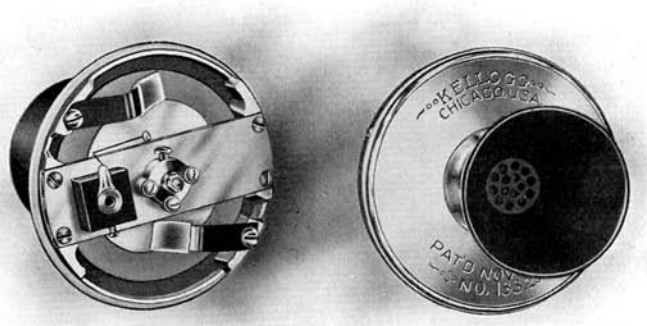


FIG. 1. REAR AND FRONT VIEW.

OPERATION—When compared with the regular "Bell" type solid back transmitter, which is representative of nearly all modern designs of other makes, the real reasons for the great success of the Kellogg instrument can easily be appreciated. In Fig. 2 are shown theoretical diagrams of these transmitters, like designation letters referring to parts performing the same functions in each.

The solid back transmitter has a cell, c, for holding the granular carbon, rigidly fastened to the solid back or bridge, b. This cup contains the rear electrode, r, and is closed by the front electrode, f, arranged in the opening of the same with a flexible auxiliary diaphragm of mica, a, to retain the carbon granules and make a moisture-proof seal for the cell. The front electrode is fastened to the main diaphragm so as to vibrate with it; thus, when a sound-wave strikes the latter, it causes the front electrode to move with a piston-like action in the stationary cell, thus varying through the granular car-

Transmitters—continued

bon the electrical resistance of the transmitter. It will readily be seen that the only movement imparted to the granular carbon comes from the front electrode, f, and the mica diaphragm, a. In contrast to this, we have in the Kellogg transmitter a cup, C, for holding the carbon granules made in and forming a part of the diaphragm. The front electrode, F, carbon retaining cup, C, and mica auxiliary diaphragm, A, are the movable parts, while the rear electrode, R, is the only stationary part of the cell, being fastened rigidly to the solid back or bridge, B. The same resistance variation is obtained between the carbon electrodes, R and F, as in the case of the first instrument, and in addition an extra movement is imparted through the cup itself, livening up the carbon granules and greatly augmenting this resistance variation, thereby producing a more powerful and accurate transmission. Any tendency of the carbon granules to settle or wedge between the electrodes, R and F, a common occurrence in the regular solid back transmitter, is entirely overcome by the movement of the diaphragm cell combination, which keeps the instrument perfectly alive at all times. In fact, the word packing has no significance when applied to the Kellogg transmitter.

Referring again to Fig. 2, an additional advantage is shown in the Kellogg construction. The carbon retaining cup, projecting as it does from the front of the main diaphragm, brings the most sensitive part of the transmitter nearer the speaker's lips, and effects a more powerful action, and consequently further reaching transmission.

CONSTRUCTION—The efficient design of the Kellogg transmitter is the result of years of patient experimenting, persistent effort, and careful perfecting by telephone engineers of vast resources. In the Kellogg scientific method of manufacture these same engineers superintend the work of construction, so that the commercial product is absolutely uniform with the perfected model.

ELECTRODES—Made from a special grade of dense carbon, copper-plated on one face and through this metal carefully soldered to backing discs. The exposed surface of the carbon is accurately finished to size, and highly polished without any filling, thus making the surface permanent and lasting, even if the transmitter should become heated.

GRANULAR CARBON—Exceedingly hard and uniform in size and free from dust, retaining these qualities indefinitely. Great care is exercised in preparing this carbon

Transmitters—continued

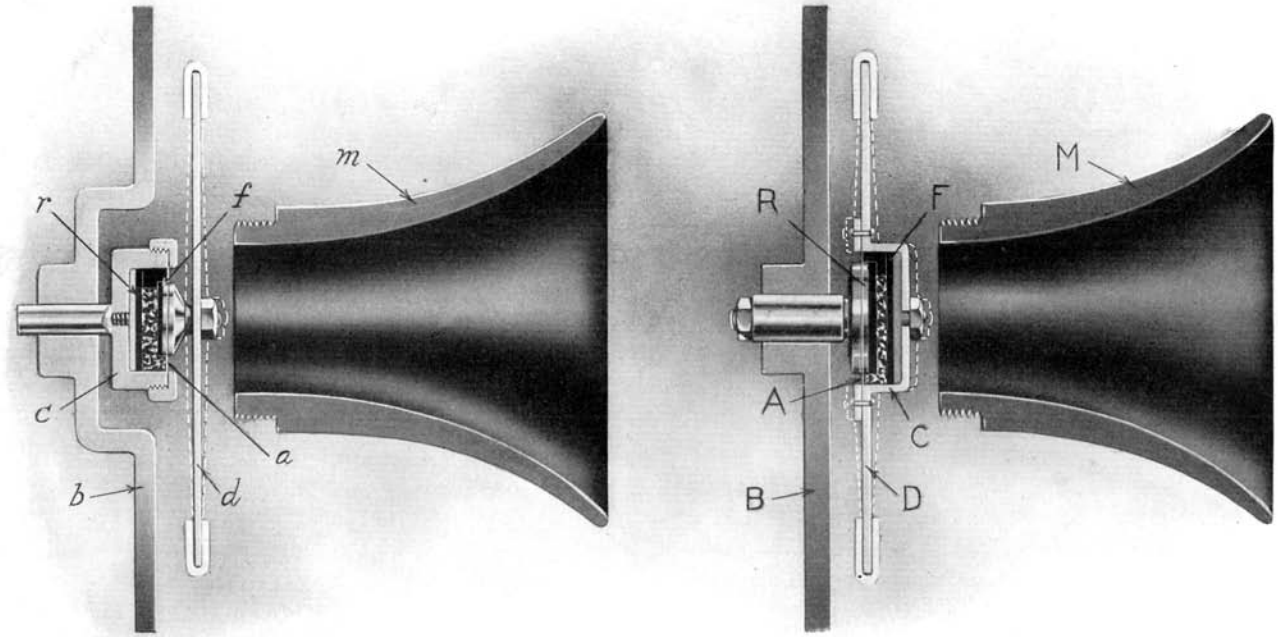


FIG. 2. SECTIONAL DIAGRAMS OF "BELL TYPE" SOLID BACK AND KELLOGG REVERSE TYPE.

Transmitters—continued

and each granule has a highly polished, irregular surface and a density not unlike black diamond. In fact, this carbon is hard enough to scratch glass. The recarbonating process used in its manufacture renders the granular carbon impervious to any heat which might be generated in the transmitter cell, and its resistance is such as to give the best results with the minimum amount of battery current.

MAIN DIAPHRAGM—Made from hard-drawn aluminum, with a carbon retaining cup, formed in the center of its face. Each diaphragm is subjected to five hundred tons pressure in accurate shaped dies to give it the required resilience to respond accurately and without lag to any form of audible sound waves.

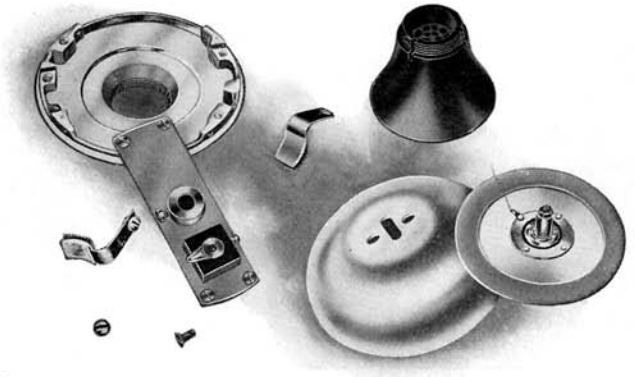


FIG. 3. TRANSMITTER PARTS.

AUXILIARY DIAPHRAGM—Made from toughest mica, carefully gauged as to thickness, providing a durable granular carbon retaining cover of highest insulation resistance, which cannot be affected by heat or moisture.

DIAPHRAGM SEAL—As the electrodes and granular carbon form the vitals of the transmitter they are sealed by riveting a heavy, hard aluminum retaining ring over the mica auxiliary diaphragm. This construction prevents these parts from being tampered with and at the same time renders the cell moisture-proof.

GASKET—The ease with which parts of a transmit-

Transmitters—continued

ter vibrate, giving rise to a series of overtones or discords, makes it necessary to separate completely the metal of the diaphragm from the remainder of the instrument. For this use a soft gasket or cushion is provided, made from a special quality of rubber guaranteed to remain soft and pliable. This gasket also forms an insulator, preventing the diaphragm from coming into metallic contact with the frame of the instrument.

FRONT OF CASE—Made from special metal, cast in accurate steel dies under enormous pressure, which gives a finished product, assuring interchangeability and ease in assembling. As the front of the transmitter forms the base to which all the remaining parts are assembled, the necessity of the above construction is evident

DAMPENING SPRINGS—Made from best oil-tempered spring steel, shaped to give the proper amount of pressure on the main diaphragm, so as to prevent the same from being flabby, and thus picking up foreign noises. These springs also keep the diaphragm in condition at all times to respond actively to the voice. The free end of the springs are provided with combination soft rubber and felt cushions designed to eliminate any chances of metallic sound in transmission.

BRIDGE—Made from a straight piece of heavy sheet brass, without any bends or angles. It is fastened by four machine screws into recesses provided in the case of the transmitter, thus insuring rigidity and permanency. As the bridge forms the "Solid Back" of the transmitter to which the stationary rear electrode is clamped, it is evident that the best construction should be used to prevent this part of the instrument from taking up any unnecessary vibration which impairs the efficiency of transmission.

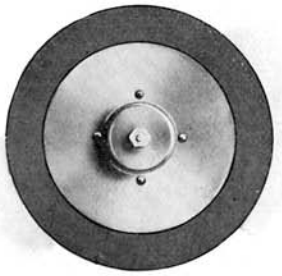


FIG. 4. DIAPHRAGM.

MOUTHPIECE—Made from the best grade of hard rubber, with a perforated diaphragm arranged to prevent objects from coming in contact with the main diaphragm. It is specially shaped, and designed to give the best results by allowing the cup located on the front of the main diaphragm (which latter is the most sensitive part

Transmitters—continued

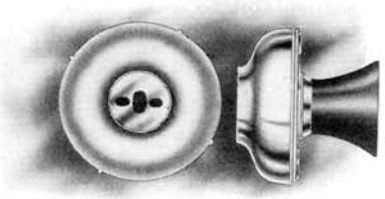


FIG. 5. NO. 9-L TRANSMITTER.

of the transmitter) to project into its inner opening and thus nearer to the speaker's lips.

ADJUSTMENT—The transmitter being self-adjusting, it only remains necessary to talk directly against the main diaphragm of the assembled instrument, before setting the clamp screw in the bridge, this operation fastening the rear electrode rigidly to the "Solid Back." Any further adjustment is unnecessary, as the instrument works at its highest efficiency when set by the above method.

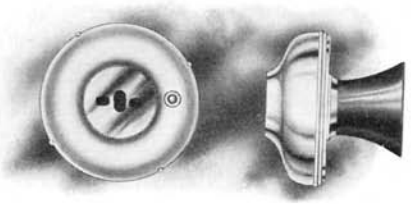


FIG. 6. NO. 12-L TRANSMITTER.

BACK OF CASE—This is formed from heavy sheet brass, and serves primarily as a protection for the working parts of the transmitter, and as a means for attaching the same to its mounting.

NUMBERING—Each transmitter bears a serial number and designation letter. The latter indicates the service for which the instrument is designed, e. g., "L" indicating for local battery use. Fig. 8 shows a view of the special pneumatic typewriter, made in our experimental shops for stamping these serial numbers directly into the metal of the transmitter front, insuring neatness and accuracy.

TESTING—The transmitter is given the "minimum current consumption" test, with accurate electrical measuring instruments, and is further subjected to a comparative test for articulation and volume of transmission by comparing with a standard transmitter. These tests are repeated in the Inspection Department by different observers, and by this method uniform and accurate results are positively secured.

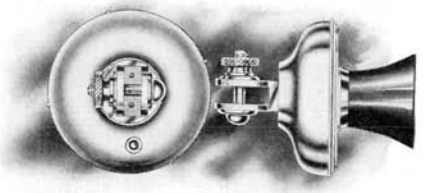


FIG. 7. NO. 13-L TRANSMITTER.

Transmitters—continued

RESULTS OBTAINED—Furthermore, every detail of the working parts of the Kellogg transmitter is designed to reduce loss of imparted energy, and secure responsiveness, accuracy, and delicacy of movement. The result combines volume and purity of tone, with an articulation which is as natural as the voice itself.

FIG. 8.

Summing up the results secured, which make the Kellogg transmitter what it is, we have:

1. The most far-reaching transmission possible, suited for long distance and local connections.

2. An instrument not affected by foreign sounds or noises in the room.

3. An instrument which will transmit perfectly when talking into its mouthpiece in the lowest tones.

4. An instrument which will not blur or break when forcing transmission (talking loud).

5. A transmitter which is proof against "packing" or becoming dead from regular use.

6. An instrument not affected by internal heat, its construction being such as to radiate heat rapidly.

7. Minimum battery consumption.

8. A self-adjustable transmitter which is always set right for highest efficiency.

9. An instrument which will stand the most severe abuse without materially affecting its talking qualities.

10. Small number of parts, accurately made from the best material obtainable, reducing possible chances for trouble to a minimum.

11. Durability and long life, obtained from careful selection of material used in its construction.

12. A "perfect transmitter."

GUARANTEE—The Kellogg transmitter is guaranteed indefinitely, and any part showing an inherent defect will be repaired or replaced free of charge on being returned to the company.

CODE NUMBERS—No. 9-L Transmitter, for concealed cord type transmitter arm. (Standard transmitter case and mounting.) See Fig. 5. No. 12-L Transmitter, same as No. 9-L, but for use on a solid type transmitter arm employing an exposed connecting cord. See Fig. 6. No. 13-L Transmitter, with a hinge mounting lug. See Fig 7. No. 14-L Transmitter, same as No. 13-L, but with a hard rubber bushed hole in back of case for a double conductor connecting cord. See Fig. 7.

Kellogg Receivers

FIG. 1. SECTION OF NO. 6-A RECEIVER.

THE next in importance to the transmitter, in the talking circuit, is the receiver. Kellogg receivers are the result of careful design, tested out in actual operation for all conditions of service. The first object in their design is to obtain the highest electrical and acoustic efficiency; secondly, the best mechanical design, eliminating all possible chances for trouble; lastly, to produce a durable instrument which will always retain the above features, and furthermore, keep indefinitely its beautiful exterior appearance.

Experience has demonstrated that a properly designed and carefully constructed telephone receiver, which is not subject to quick deterioration, needs no adjustment after leaving the factory. Also, that all provisions for adjustment serve as a source of trouble, and are a detriment rather than an advantage. Our receivers are made up of carefully gauged, interchangeable parts, and best of material, giving a permanent and lasting instrument, therefore not needing any provisions for adjustment. The system of tests gone through in the manufacture of these receivers, render them absolutely uniform in results obtained, and are guaranteed to work perfectly under the most exacting conditions.

The cord terminals are inclosed within the receiver retaining case and all strain on the cord conductors arranged to be taken by the braiding of the cord, thus preventing the connections from working loose and giving trouble. It is found in practice that aside from the

Receivers—continued

aforesaid advantage of concealing the terminals, a cord will last fully three times as long as with the old form where the connections were made outside.

The Kellogg receivers have, besides the cord connections, all metal parts entirely concealed within their insulating or retaining case. This prevents the possibility of receiving an electrical shock from the receiver while using the telephone in case of the outside line becoming crossed with a dangerous lightning or trolley circuit, or in case of lightning discharges.

CONSTRUCTION—The Kellogg receiver is now furnished in three styles, the main difference being in the construction of the retaining cases. The No. 6-A receiver has a three-piece shell made of the best grade of hard rubber procurable. The No. 12-A receiver is similar to the No. 6-A, but has a two-piece shell. The No. 8-A receiver is made exactly like the No. 12-A, but has a special composition case closely resembling hard rubber, but more durable. The electrical parts are the same in each of the three styles of receivers, guaranteeing the same operating efficiency.

MAGNETS—The making of an efficient and lasting telephone receiver is primarily in its magnetic system, and with this in view we have taken the utmost care to produce an instrument which is commercially as well as theoretically perfect. The magnet proper is made up of two pieces or bars of special magnet steel, bolted together with a magnetic metal filling block between their rear ends, thus forming a bi-polar magnet of great strength and retaining power. This construction will be fully appreciated by those who have experienced the weakening of the magnetism (efficiency) of the one-piece horseshoe-shape magnets, due in most part to invisible temper cracks, or the "burning" of the steel through the heating

FIG. 2. NO. 6-A RECEIVER PARTS.

Receivers—continued

FIG. 3. NO. 12-A RECEIVER.

necessary to make a short bend. In the Kellogg construction the steel is cut from the bar, and accurately faced and drilled without heating or bending, thereby preventing any possibility of structural change in the material. This double bar construction is necessarily more expensive than the one-piece formed magnet, but the efficient and lasting results secured more than offset the additional cost.

POLE PIECES—Made from carefully annealed Norway iron, and secured to the magnet by the same bolt that fastens the supporting bridge in place.

MAGNET COILS—Metal spool heads are fastened mechanically, and soldered to the pole pieces, while the pole is held in a special tool, assuring accurate spacing of the parts. The spools thus formed are carefully insulated and wound with the best grade of silk-covered magnet wire. These assembled windings, including their pole pieces or cores, are carefully tested in comparison with a like part from a standard receiver by means of special measuring instruments, hence guaranteeing absolute uniformity in the electrical parts within a small allowable percentage deviation.

MOUNTING BRIDGE—The mounting bridge is made in disc shape from a special non-magnetic metal, cast in accurate steel dies under enormous pressure, insuring absolute interchangeability. It is fastened in place with its bridge portion between the magnet bars and pole pieces, by the same bolt used for holding the magnet system together. The disc portion of the mounting bridge serves as a base for the whole magnet system of the receiver, and is designed to fit a shoulder formed in the retaining

Receivers—continued

case, to which it is securely clamped by four machine screws. This fastening is made near the diaphragm end of the shell, so as effectually to prevent temperature or atmospheric conditions from changing the distance between the pole pieces and diaphragm, by this means insuring permanency in adjustment.

DIAPHRAGM—Made from perfectly flat ferrotype metal, tightly clamped in its normal condition between the hard rubber of the receiver body and ear cap. This leaves it in a condition to respond freely and accurately to the voice currents, therefore producing perfect articulation without any metallic or foreign sounds.

RECEIVER TERMINALS—In the No. 6-A receiver the terminals are mounted on an insulating base, which is in turn fastened to the magnetic filling-block at the rear end of the magnet. This position of the terminals allows them to be got at by removing the tail cap, which closes the small end of the shell, thus leaving the diaphragm end of the receiver intact. The No. 8-A and No. 12-A receivers have terminals supported on a hard rubber block, which is clamped between the magnets. The working parts of the receiver are in this case readily removed from the diaphragm end of the shell when it becomes necessary to get at these terminals.

WEIGHT—A lead block, shaped to fill the space between the two bars of the magnet, is provided to increase the weight of the receiver so as to be heavy enough to hold any standard hook switch-lever in its proper position.

FIG. 4. NO. 12-A RECEIVER PARTS.

Receivers—continued

CASE—The No. 6-A receiver-shell is made in three parts, of the finest grade of polished hard rubber, reinforced at all places subject to strain or rough usage. It consists of a case body, ear cap, and tail cap, the caps being threaded to screw in place over either end of the body.

The No. 12-A receiver-shell is made in two parts, a case body and ear cap, of the same grade of hard rubber as is used in the No. 6-A receiver; the body being made in one piece well reinforced, gives a more durable shell than the No. 6-A receiver, and for that reason it has been adopted as our standard.

The demand for a somewhat cheaper receiver-shell than either of the former types, has lead us to make a case from a special composition, in the same shape as the No. 12-A receiver. We do not offer this composition shell as an experiment, as it has been tried out in actual service, and has met with so much favor that it has been adopted as a standard by some of the largest operating companies. The composition material used is not unlike hard rubber in its insulating qualities and glossy blackness, and as far as we have been able to find out, retains these properties almost indefinitely. It will stand rougher usage than hard rubber, and unlike all other compositions, has proved a successful substitute. These composition shells are backed by the Kellogg guarantee, which is all that need be said.

CORDS—Each receiver is provided with a flexible receiver cord attached to the receiver terminals at one end, and provided with solid cord tips at the other end. A continuation of the outer braiding, called the strain cord, is provided to take the strain from the cord connections and receiver-shell, and comes already attached to the magnet system at the receiver end.

CODE NUMBERS—No. 6-A Receiver—Provided with a pure, hard rubber, three-piece case, entirely covering all metal parts. Wound to a resistance of 70 ohms.

No. 8-A Receiver—Provided with a composition two-piece case, entirely covering all metal parts. Wound to a resistance of 70 ohms.

No. 12-A Receiver—Provided with a pure, hard rubber, two-piece case, entirely covering all metal parts. Otherwise same as No. 8-A receiver. Standard.

NOTE.—In ordering, state whether worsted or silk-covered receiver cords are desired.

Kellogg Induction Coil

AN induction coil forms a necessary part of the local battery telephone, its most important use being to step up the low pressure primary currents furnished by the two cells of battery to such a magnitude as to penetrate easily the resistance and retardation of the line circuit. The available transmission thus obtained, must at the start be clear cut in order to penetrate the normal long distance line, it being understood that the best constructed lines tend to distort the voice currents and render them unrecognizable. Furthermore, for good receiving, it is of vital importance that the resultant transmission obtained at the other end of the line be subject to the minimum amount of retardation of the induction coil, the secondary of which must from necessity remain in the circuit.

The most efficient induction coil is one fulfilling these requirements; one that is quick-acting and responsive to the original current changes set up in the primary, and with a secondary capable of receiving with low retardation effect. A coil built on small dimensions fulfills these requirements when working with one of like kind, but fails to give the best results when used in connection with a larger type coil; in fact, the latter combination shows the small type coil to apparent disadvantage in both sending and receiving.

The above facts were taken into consideration in designing our No. 1-A induction coil, which is the result of an exhaustive series of tests made in actual service and under all conditions. This coil is of the small type, and gives the highest efficiency, even when used in conjunction with any standard make of induction coil. With the transmitter and receiver described on the foregoing pages, it completes the most effective talking circuit ever produced.

The length of the No. 1-A induction coil over all, including the projecting terminals, is four and one-quarter inches, and the size of the spool heads is one inch square. The resistance of the primary winding is 0.35 of an ohm, and that of the secondary is 32 ohms. A special secondary circuit giving high resistance to ringing circuits, and low resistance to voice currents, is described on page 68.

Kellogg Ringers

IN this ringer we offer a decided novelty to the telephone public, and will say that it is only after a study of the subject, extending over a long period of years, that it has been perfected. The methods heretofore used of obtaining the proper adjustment of the armature of the ringer have, to say the least, been crude. The armatures have by various means been actuated to approach or recede from the pole pieces in order to make the ringer more or less sensitive. Our new ringer embodies the decidedly novel feature of letting the armature remain in its usual place, and causing the pole pieces to move toward or from it, when the adjustment is made, thereby rendering it unnecessary to bend the tapper rod or change the adjustment of the gongs in order to regulate the tapper stroke. Screw extensions are placed in the end of each core, which may be readily moved toward or from the armature by an ordinary wrench, and afterwards locked in place by a lock nut. It is the simplest form of adjustment ever produced, and is not only substantial, but affords extremely delicate changes, and remains permanent after once being set.

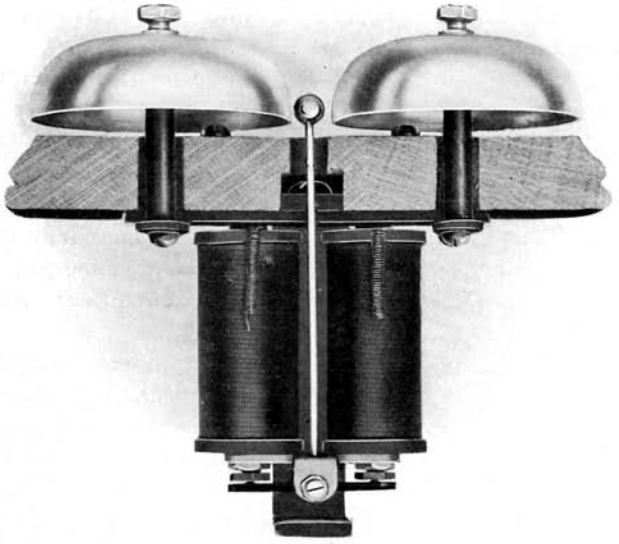


FIG. NO. 1.

A further advantage is obtained in this pole-piece type of adjustment in that it allows the ringer to be so designed that the tapper will strike the gongs in their most responsive part and keep this best point of contact permanently, regardless of the adjustment of the armature.

The gongs are mounted on rigid metal posts, which in turn are adjustably attached by machine screws to the

Ringers—continued

same frame as the ringer magnets. Thus no dependence need be placed on the woodwork of the telephone cabinet for the proper operating of the ringer.

All of the coils used in our ringers, whether for series or bridging work, are made of the long type, and are interchangeable. This allows the use of a larger size wire for the lower resistance windings, and consequently more turns of wire per ringer. The winding is made more durable by the use of the larger wire, and is not so liable to burn out from lightning discharges or other causes, while the tapper stroke is made more powerful by the increased number of turns.

The armature and cores of this ringer are made from the best grade annealed Norway iron. The spools are carefully insulated, and wound with the highest grade silk-covered copper wire. The gongs are of the best grade obtainable, of a very rich tone, and will not develop cracks or become dead through regular service. All of the exposed iron and steel parts are carefully copper-plated and oxidized, which affords much better protection from corrosion than the ordinary method of nickel-plating. The gongs and other parts of the ringer, which show on the outside of the telephone cabinet, are heavily nickel-plated and polished.

Figures 1 and 2, shown herewith, give a good idea of the construction of our standard ringer, and all that can be said in addition is that it is made with the same care as the rest of the Kellogg apparatus, thus insuring the best results.

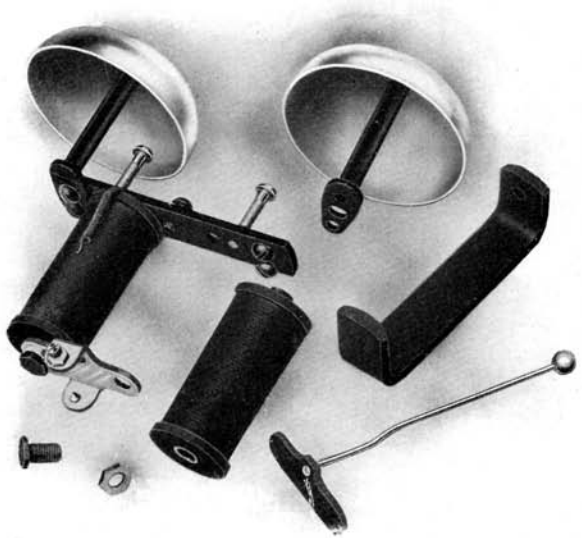


FIG. 2. RINGER PARTS.

Ringers—continued

Figure 3 shows our standard ringer fitted with an adjustable spiral biasing spring for selective signaling purposes. This spring holds the armature against one of the pole pieces, and renders the ringer insensitive to pulsating ringing currents of one polarity and operative to currents of the opposite polarity. A selective system using this type of ringer is described on page 64.

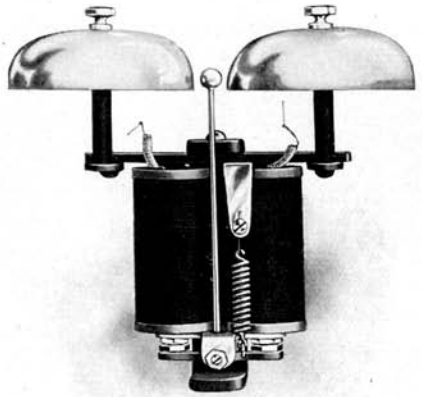


FIG. 3. BIASED RINGER.

Figure 4 shows a leaf biasing spring, designed to slip over the free end of the permanent magnet of our No. 1 type ringer, and hold the armature against one of the pole pieces. It is designed for special uses, one being to keep the ringer from tapping through current not intended for ringing.

CODE NUMBERS—No. 1-A Ringer—Wound to 1,000 ohms resistance. Standard bridging ringer for regular service.

No. 1-B Ringer—Wound to 80 ohms resistance. Same as No. 1-A, but wound with larger wire. Standard series ringer for regular service.

No. 1-C Ringer—Wound to 500 ohms resistance. Same as No. 1-A, but wound with larger wire. Made for special service.

No. 1-D Ringer—Wound to 1,600 ohms resistance. Same as No. 1-A, but wound with smaller wire. Bridging ringer for extra heavily loaded lines.

No. 2-A Ringer.—Wound to 2,500 ohms resistance, and provided with adjustable biasing spring. Made for use on four-party selective ringing system, employing positive and negative pulsating current.

No. 2-B Ringer—Wound to 1,000 ohms resistance. Same construction as No. 2-A, but wound with larger size wire. Made for special service.

P-No. 3600. Biasing spring for No. 1 type ringers. See Figure 4.

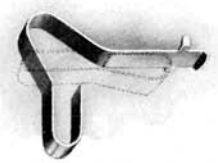


FIG. 4.

Kellogg Generators

THERE has been so much difficulty in producing a generator of sufficient output with lasting qualities and stability, which is fitted for the exacting requirements of the various classes of magneto-call service, that it has been necessary for us to concentrate our engineering and manufacturing talent in perfecting this important part of the telephone.

We have no hesitation in saying that our new generator is as nearly perfect electrically and mechanically as it is possible to be made. To substantiate this statement it is only necessary to add that the design was worked out and the manufacturing done under the supervision of pioneers and experts in generator construction.

ARMATURE—The design of our generator armature is a new departure from the accepted standard of construction. It has a shuttle type-core, made from a special dense silicon iron, which is very soft and permeable. The usual continuous, one-piece shaft has been supplanted by steel shaft projections attached to either end of the armature core by means of heavy brass discs, as shown in Fig 3. These shaft projections are made self-centering by turning-shoulders in these discs, which accurately fit recesses turned in the ends of the armature core, thereby insuring interchangeability and accurate running of the completed armature.

The principal advantages gained in this design are a greater cross section of iron in the core proper, and a larger winding space, free from irregularities, such as the continuous type-shaft.

The winding is of the best grade of silk-covered copper

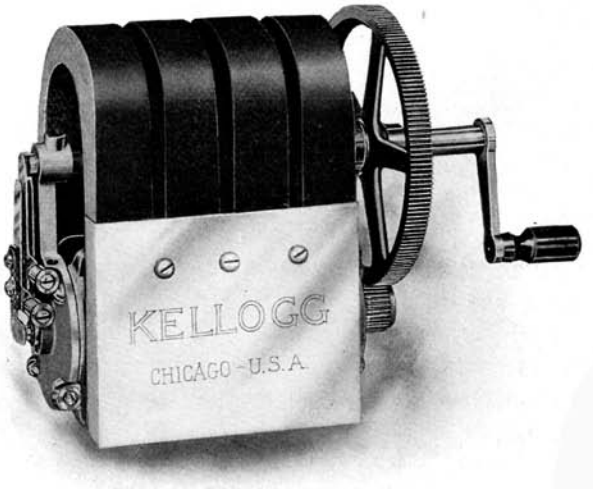


FIG. 1.

Generators—continued

wire, wound smooth, and without piling up at the ends. In Fig. 2, "A" shows the section of this armature, while "B" represents that of the ordinary type. More iron is used in the core of "A" and a larger regular shaped winding space is furnished, which permits of more turns of a larger size wire, while keeping the resistance the same as in "B." Our generator armature is thus permissible of more output, and a better insulation of the winding, together with great durability.

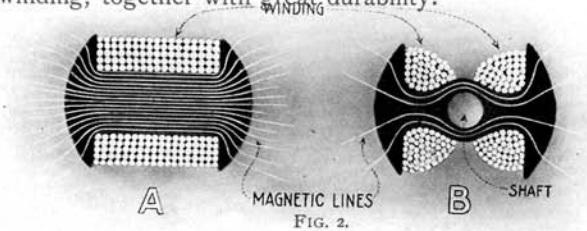


FIG. 2.

POLE PIECES—The two iron pole pieces forming the frame and field of our generator are separated and securely fastened by four heavy brass posts, as shown in Fig. 3. This gives a rigid construction regardless of the end plates, and allows the poles to be bored out to gauge, and to retain their relative positions regardless of any clamping effect of the magnets, or rough usage to which the complete generator may be subjected.

END PLATES—Unlike the regular method of construction, the end plates of this generator serve primarily as bearings for the running gear. They are made with large contact surfaces where the crank and armature shafts revolve, so as to give longer life and smooth running. The end plates are faced off at the same time the armature shaft bearings are drilled, and with this hole as a center, a shoulder or circular ridge is cut to gauge so as to fit accurately the bore of the poles; thus the armature is made self-centering in assembling, and will run accurately with a small clearance or "air-gap" between it and the pole pieces. The self-centering feature of the armature shaft-support and end plates, together with the rigid construction of the field, makes it impossible for the armature ever to become off-center and stick, even with the smallest clearance.

GEAR WHEELS—These are made from hard, tough brass, which has exceptional wearing qualities. The faces of the gears are made extra wide, and are cut with special shaped teeth, the running of which is perfectly smooth and noiseless, even after becoming badly worn. The assembled frame and running gear of the generator without the magnets are clearly shown in Fig. 4.

AUTOMATIC SHUNT—The shunt used to switch the

Generators—continued

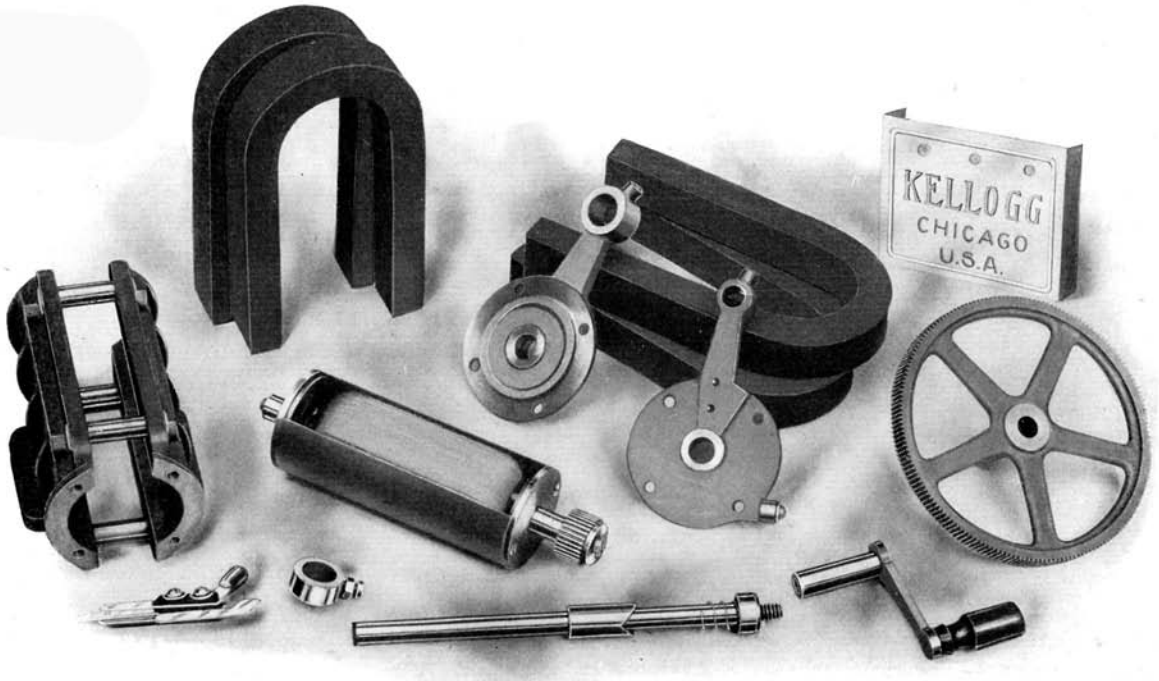


FIG. 3. GENERATOR PARTS.

Generators—continued

generator current to the line, and normally to keep the generator out of circuit, is automatically operated by the crank-shaft. Its contact springs are of German silver, tipped with platinum points, while the insulation used to

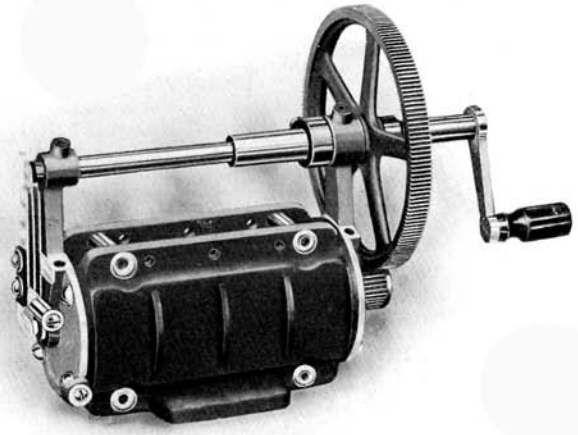


FIG. 4. GENERATOR FRAME.

separate the parts is of the best grade of hard rubber.

FIELD MAGNETS—The magnets are made from the best grade of one-half by three-quarter-inch special magnet steel. They are machine-bent, and tempered by experts, with the aid of automatic handling devices, which insure uniform results. Each magnet is copper-plated, and oxidized so as to prevent corrosion. We have adopted this finish in preference to nickel, as the latter will not effectually prevent rusting of the steel. After being finished, they are charged to saturation by means of powerful magnetizing apparatus, and have the property of retaining this full charge for an indefinite period.

OUTPUT—The output of magneto generators has in the past been variously measured and rated, but in each case the unit of measurement has been misleading, and not in compliance with the actual results obtained in service.

In practice the electrical pressure must be great enough to penetrate the resistance of a line, and the current forced through by this pressure must be of sufficient quantity to ring all of the bridged bells connected across the line. The effective pressure and current are thus the two factors desired, the product of which may be designated as watts output.

With other factors of the generator remaining the same, the maximum watts output depends on: First, larger cross section of the armature core; second, greater number of turns in the armature winding; third, smaller

Generators—continued

"air-gap" or clearance between the poles and armature surface. Each of these changes increases the pressure or voltage of the completed generator, and therefore increases the output factor. It will be noticed from the previous description of the construction of our generator that we have taken advantage of these items, and as a result, obtain the maximum effective watts output.

A great factor tending to cut down the output of the generator, and one often overlooked, is the armature reaction. This factor depends upon the amount of iron in the armature and the size of the winding. In the design of our generator we have so proportioned the armature core to the turns in the winding, that this factor has been reduced to a minimum.

Kellogg Hook Switch

THE importance of a properly designed and reliable hook switch can be fully appreciated when it is considered that, outside of the generator shunt, the only movable or switch contacts in the telephone are located in this piece of mechanism; all other circuit connections being permanently fastened together by soldering. We have, from the first, taken great pains in the design and construction of this seemingly unimportant piece of apparatus, and in our No. 33 hook switch present what is without doubt the most simple and reliable telephone switch ever manufactured.

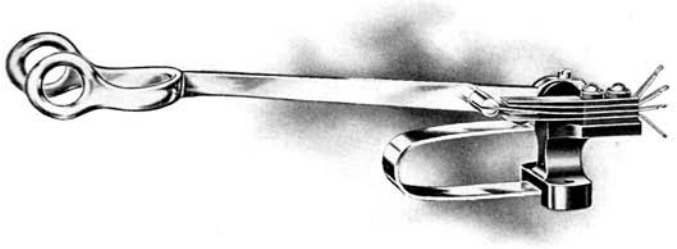


FIG. 1.

BASE—The mounting lug or base, on which all of the parts are assembled, is shown in Fig. 3; it is made from a special tough and dense metal, cast in an accurate steel die under heavy pressure, thus insuring absolute interchangeability. The lever pivot is made from Bessemer steel rod, and forms a part of the base, eliminating in this way one of the chief sources of trouble in this part of the telephone. The lower surface of the base is faced off, and provided with tapped holes for the machine screws used in mounting the hook switch in the cabinet. This forms the only fastening necessary, as the hook switch is self-contained.

HOOK LEVER—The switch lever is made from a tough quality of brass, heavily nickel-plated and polished. It will not crack from any accidental bending, and is carefully proportioned to give strength. The ends of the hook are ring-shaped, and are made of sufficient diameter to prevent their accidentally entering the aperture of the receiver ear-cap, and thus denting the diaphragm. The lever is held in place over the pivot-rod by a lock screw inserted from the top, as shown in Fig. 2. This illustration shows the mounting lug transparent so that the slot in the end of the lever can plainly be seen. This

Hook Switch—continued

novel method of fastening allows the lever to be readily removed and replaced, and effectually prevents it from becoming loose and giving trouble. The lower end of the lever has a projection under the pivot-rod, which forms a stop for the action of the main spring, and prevents the hook from being forced above its working position.

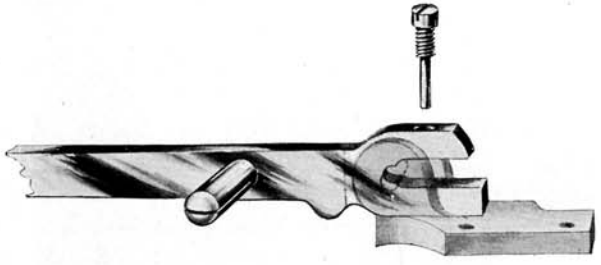


FIG. 2. LEVER FASTENING.

CONTACT SPRINGS—The contact springs are made from heavy German silver, and are well insulated from each other and the frame and hook-lever with pure hard rubber. These springs, after being assembled, are securely fastened to the mounting lug with two machine screws, as shown in Fig. 1. The contact points are made from pure platinum securely riveted through the springs. Pure platinum is the only metal which is proof against oxidization through sparking of contacts, and therefore the reliability of the hook switch depends on this one factor. The actual cost of the platinum used on our No. 33 hook switch is more than the selling price of a complete hook switch in the majority of makes on the market. The contacts are arranged with their conical points turning upward, so as to prevent the accumulation of dust or foreign matter, which would in time tend to make poor electrical connection in the switch. Furthermore, the springs are located so as to leave all working parts fully exposed and open for inspection.

FIG. 3.

MAIN SPRING—Main spring is made from heavy German silver to prevent corrosion, and is fastened in such a position as to act on the lever through a short moving distance, and without any sliding friction, thus making the action of the complete hook switch light and positive.

Kellogg Transmitter Arms

ON the following pages are illustrated a number of our subscribers' station transmitter arms. They are made to fit the various types of telephone cabinet work, and are of sufficient length, when attached, to extend the transmitter to a convenient position where the subscriber will of necessity have to speak directly into the mouthpiece. It is evident from the foregoing that a long type-arm is only desirable where a writing-desk or shelf projects from the telephone cabinet, while the short arm can only be used conveniently on a small cabinet which has no other projection.

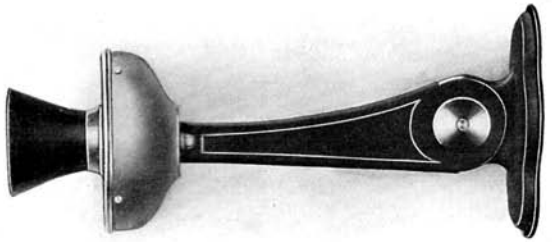


FIG. 1. NO. 20 ARM.

The vertical adjusting feature of these arms is limited by stops, so that the transmitter is always left in an efficient talking position. Furthermore, these arms are made hollow so that two concealed cords can be used to connect the transmitter with the telephone wiring. This allows the metal to be insulated from the telephone circuit so that it is impossible to obtain a shock by coming in contact with the arm or transmitter.

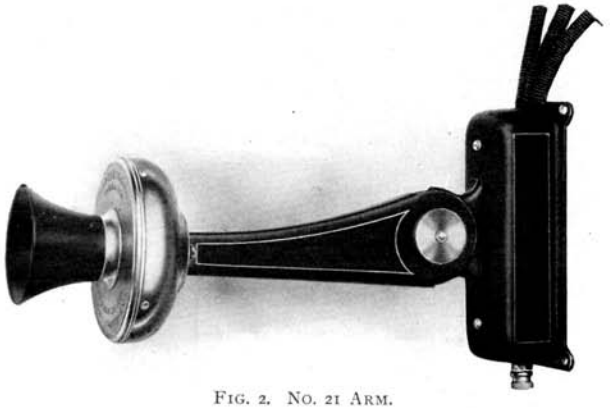


FIG. 2. NO. 21 ARM.

Transmitter Arms—continued

FIG. 3. NO. 26 ARM.

Cord troubles are entirely done away with by this method of concealing the connections to the transmitter, and therefore a big item of telephone maintenance is eliminated.

NO. 20 TRANSMITTER ARM—This arm, shown in Fig. 1, is our standard long type transmitter support for wall telephones. It is made from heavy pressed steel, carefully constructed, and will stand severe abuse without causing trouble. Provisions are made for concealing the transmitter cords and connections. The total length of the arm over all, from mounting to back of transmitter, is $6\frac{3}{3}\frac{3}{2}$ inches. The body and base of the arm are finished with the best grade black japan, ornamented with gold striping, while the trimmings are heavily nickel-plated. Kellogg No. 9-L transmitters are adapted to mount on the No. 20 transmitter arm.

NO. 21 TRANSMITTER ARM—This transmitter support, shown in Fig. 2, is made of the same material and has the same finish as the No. 20 transmitter arm, but is provided with an enlarged base which is arranged for concealing a No. 1-A induction coil. The terminals of the coil and transmitter are brought out for connecting to the telephone wiring through three heavily insulated wires at the top of the transmitter arm base and through a binding post at the bottom. Total length of arm over all, not including transmitter, is 7 inches. This is not a standard mounting. Kellogg No. 9-L transmitters are adapted to mount on the No. 21 arm.

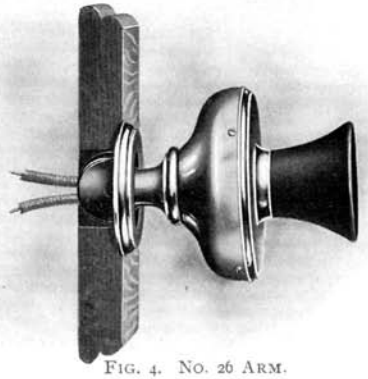


FIG. 4. NO. 26 ARM.

Transmitter Arms—continued

No. 26 TRANSMITTER ARM—Figs. 3 and 4 show our No. 26 or short type transmitter arm, which is designed for use on residence or hotel type telephones. It is made from finished castings with a black oxidized surface, and is arranged for concealing the transmitter cords. The same extent of vertical adjustment is provided on this arm as in the long type by means of the special construction of the hinge support shown in Fig. 4. Total length of arm from wall board or mounting to back of transmitter is only one inch. This is without doubt the neatest and most compact type transmitter arm ever constructed. Kellogg No. 9-L transmitters are arranged to mount on the No. 26 arm.

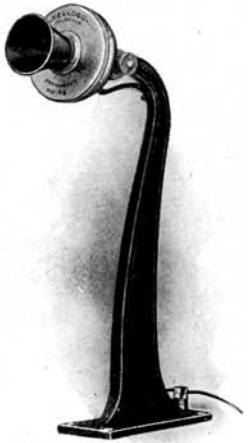


FIG. 5. NO. 11 ARM

No. 11 TRANSMITTER ARM—Designed primarily for use on cabinet desk telephones or for use on writing desks located in sound-proof telephone booths. It is made from a fine grade iron casting, finished in japan and ornamented with gold striping. Eyelets are attached to the side of the arm for the transmitter cords. Total height of arm over all is 12 inches. Kellogg No. 13-L transmitters are adapted to mount on the No. 11 transmitter arm.

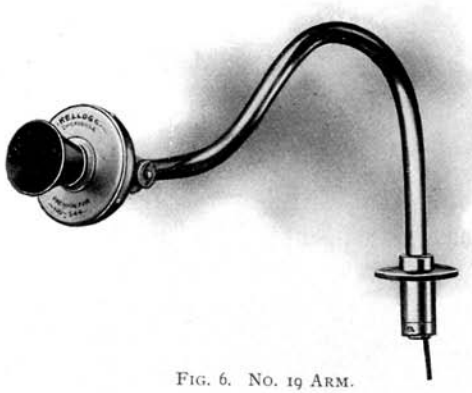


FIG. 6. NO. 19 ARM.

No. 19 TRANSMITTER ARM—Designed for cabinet desk telephones, or for other mounting where a swinging type transmitter is desirable. It is made from brass tubing, heavily nickel-plated, and is arranged for concealing the transmitter cords in the tubular portion of the arm. Total horizontal length over all, not including the transmitter, is 12 inches. Kellogg No. 13-L transmitters are adapted to mount on this arm.

Binding Posts

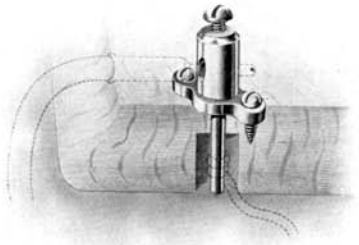


FIG. 1. NO. 2 POST.

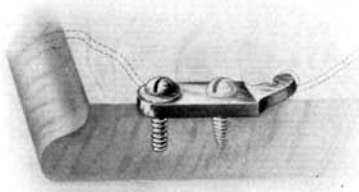


FIG. 2. NO. 11 POST.

THE binding posts, shown in the accompanying illustrations, are made especially for telephone purposes, and their design is such that all chances for trouble are averted. They are made so that the local wiring can be securely soldered to the body or stem of the post without any possibility of loose joints through swelling or shrinking of the woodwork. These posts are made from brass, and are heavily nickel-plated.

No. 2 BINDING POST—For telephone receiver or line wire connections.

No. 11 BINDING POST—For line wire connections when the line terminals are concealed inside of the cabinet.

No. 9 BINDING POST—For line wire connections when terminals are mounted on the outside of the cabinet or on the back board. The end of the threaded portion is spun over to prevent the lock nuts from coming off. All of our standard telephones are now supplied with this binding post for line wire connections.

No. 10 BINDING POST—Same as No. 9, but is also adapted to hold a cord tip.

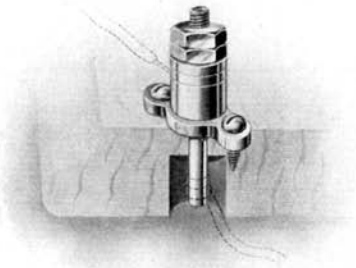


FIG. 3. NO. 9 POST

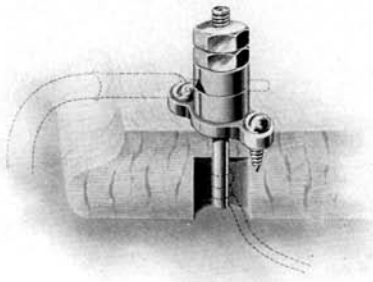


FIG. 4. NO. 10 POST.

Kellogg Lightning Arrester

THE demands for a lightning arrester to be furnished as a part of the telephone have forced us to make a reliable device which will serve as a protection and at the same time not invite trouble into the system. We have no hesitation in saying, however, that the place for the lightning arrester is not on the telephone, but somewhere in the outside circuit, and that for complete protection a fuse block type of arrester should be used in addition to any device furnished on the instruments. (See Protectors, page 77.)

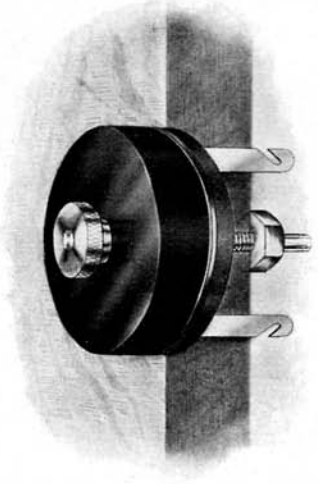


FIG. 1.

Our No. 3 arrester, which is furnished on all makes of telephones listed in this Bulletin, is of the self-contained type with terminals made to project through the woodwork, and to be soldered to the line binding posts as shown in Figs. 1 and 2. It will be seen from Fig. 1, which shows the No. 3 arrester mounted on a cross-section of the cabinet, that it is fastened in place by a hexagonal nut screwed down over the ground terminal, and that no electrical connection is dependent on the woodwork for good contact. Fig. 3

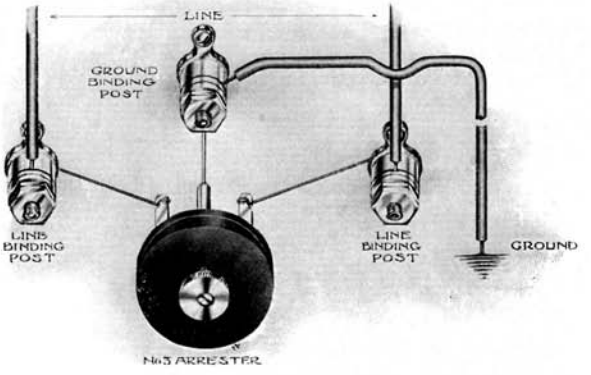


FIG. 2.

shows the carbon block removed and the mica separator exposed. The latter is held in place by a hexagonal nut, which also threads down over the ground terminal, but from the opposite end. The mica is thus securely held

Lightning Arrester—continued

in position, and can never become misplaced, so that there is no chance of replacing the carbon block without the mica. In case this could be done, as is possible with nearly all other makes of arresters, the telephone would be cut out of circuit and the line would be both grounded and short circuited, which would render it useless to all parties connected across it.

All carbon arresters should be inspected from time to time, and especially after an electrical storm, so as to remove any carbon dust which may have become detached through a discharge and lodged between the carbon disc and line plates. This crossing of the carbon disc and line plates will cut the telephone entirely out of the line circuit in the same manner as previously mentioned, and render the line useless until the cause is removed, or if only a small amount of carbon dust is lodged between these parts, the line will be rendered noisy by the slight ground connection thus made.

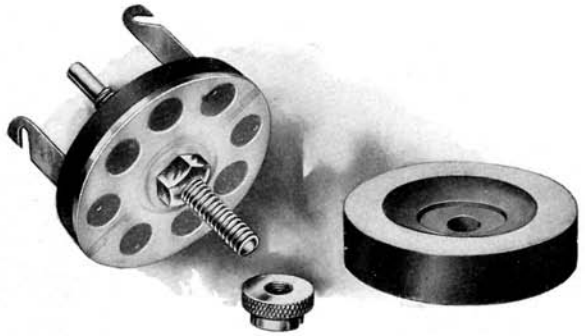


FIG. 3.

In order to make this inspection as simple as possible, and not liable to trouble, the carbon block of our arrester is made in disc shape and supported in the center so that all that need be done to clean the arrester from carbon dust is to loosen the milled thumb nut and revolve the carbon disc several times, after which it can be set back to its normal position. In order to make this gravity method of cleaning effective, the arrester should be mounted in a vertical position, as shown in Fig. 1.

The ease of cleaning this arrester from carbon dust after electrical discharges allows the use of a thin mica separator which will give proper protection. Thick mica invites trouble which might be of a serious nature.

Kellogg Telephones

IT is more than the mere assembling of the apparatus, previously described, into the form of a telephone, which gives the high character to the Kellogg output. It is the careful housing and arranging of these highly efficient parts so as to give ease and simplicity in operation, a prevention of outside trouble from affecting the delicate parts, long life, and last, but not least, beauty of design and finish.

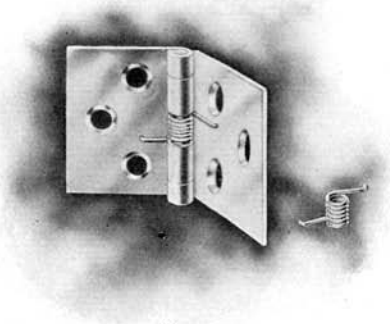


FIG. 1.

In the following pages will be found descriptions of magneto type telephones, fitted for all classes of service and made up in a great variety of styles.

CABINETS—All woodwork is taken from a selected stock, thoroughly well seasoned, and skillfully joined to make strong and attractive telephone cabinets. These are thoroughly and evenly filled with the best finishing material, the outer coat of varnish being hand rubbed and of such a character as not to show ordinary wear, always presenting an exceedingly handsome appearance.

WIRING—The connections between the binding posts and apparatus in the telephone cabinet are made through tinned copper wire securely fastened at all joining points, and with the exception of the generator connections, carefully soldered. The wires are insulated by woven sleeving when exposed, and covered with hot beeswax in the grooves of the backboards or bases. The wax fills up these grooves and covers the exposed or unfinished part of the woodwork, which would otherwise absorb moisture and cause trouble.

When positive continuity of circuit is required, either one of two methods are used in transferring the wiring to the lid or hinge portion of the telephone cabinet: First, by the use of a hinge with a flexible spiral spring, each end of which is securely riveted and soldered to the halves of the hinge, as shown in Fig. 1; second, by the use of an insulated flexible copper cord, mechanically fastened and soldered to the telephone wiring.

In no case does the circuit of our instruments depend

Telephones—continued

on the woodwork for connection, hence one of the most objectionable features of telephone apparatus assembling is done away with.

CORDS—We manufacture our own telephone and desk stand cords, and by using the highest grade material obtainable, and by following modern and original methods of construction, we are able to produce an article which not only represents a fine external appearance, but has exceptional lasting qualities.

One of the patented features of our cords, which will be fully appreciated, is the cord tip fastening, shown in Fig 2. The operations of assembling this tip are shown: First, the binding of the outer braiding of the end of the cord with small bare wire; second, the clamping of a punching over the first operation, securely holding the braiding so as to take the strain from the conductor, which is shown projecting from the end of the cord; third, soldering the one-piece cord tip in place to the conductor punching and binding wire.

TESTING—The finished telephones go directly to the inspectors and testers, who minutely examine every detail of manufacture and see that all is made perfect, and that each instrument is adjusted and tested for practical working conditions. They are then securely packed in strong boxes ready for shipment, and a safe delivery of perfect working telephones is assured.

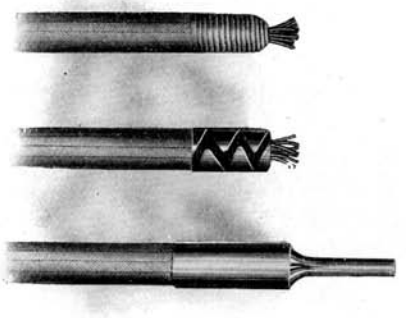
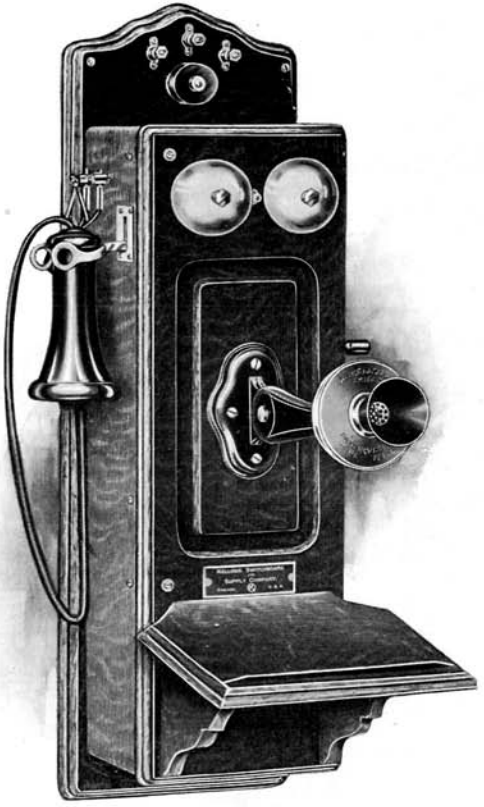


FIG. 2.



Compact Dry Cell Type Telephone

THE instrument shown in the accompanying illustration is our standard type telephone for series or bridging work. It has a very compact and durable cabinet, designed to give easy access to all working parts of the instrument. The woodwork is well made, thoroughly seasoned, and highly finished, and can be furnished in quarter-sawed oak or walnut, as desired.

The standard Kellogg transmitter circuit used in this instrument, requires a comparatively small amount of current for the highest grade transmission, insuring long life to the dry cells, and thus practically reducing the only item of maintenance to a minimum. The dry cells furnished will give a "useful telephone life" of from one to two years, according to the service. The equipment includes both series and bridging combinations of standard Kellogg apparatus, as enumerated under the accompanying code list.

The series sets are without doubt the most efficient made, while the bridging combinations are equally as efficient up to their capacity, the limit of which varies with line conditions and equipment, but roughly stated is fifteen bridging telephones per line. For over this limit the XX Compact Type Telephone should be used.

Compact Dry Cell Type Telephone—continued

CODE NUMBERS.

SERIES, COMPACT TYPE TELEPHONES :

No. 58. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,487.)

No. 59. Same as No. 58, but walnut woodwork.

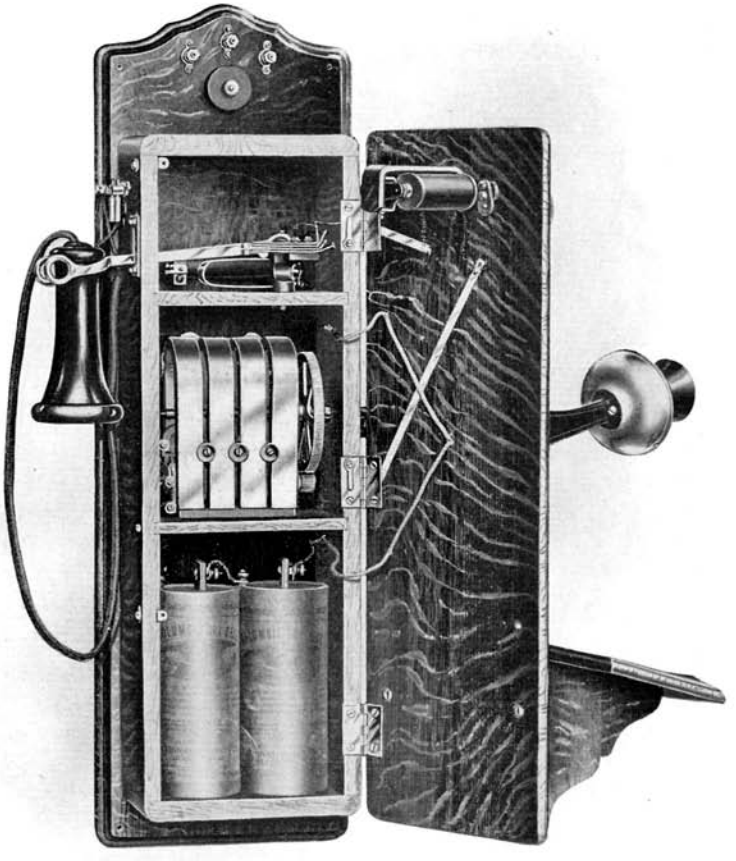
BRIDGING, COMPACT TELEPHONES :

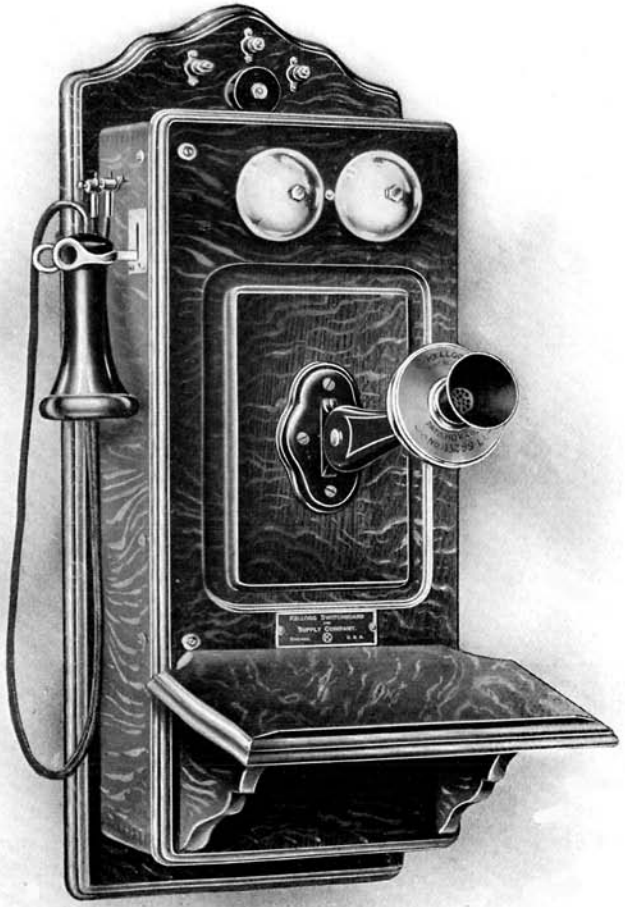
No. 124. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,483.)

No. 125. Same as No. 124, but walnut woodwork.

No. 126. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,483.)

No. 127. Same as No. 126, but walnut woodwork.





XX Compact Dry Cell Type Telephone

THIS instrument is our standard bridging telephone for heavily loaded farmers' or toll lines, and is especially recommended for use on lines where over fifteen instruments are to be installed. It is built on the same general lines as our standard compact type telephone, but the cabinet is made somewhat larger to accommodate a five-bar generator.

The signaling circuit contains an extremely powerful generator, and a very sensitive high wound ringer, these parts being made of the best design and material so as to keep indefinitely their good qualities. Our generators have an extra fastening to the telephone cabinet by means of a clamping plate located near the top and at the back of the magnets. This second fastening is necessary when the five-bar generator is used in order to prevent breakage in shipment.

The talking circuit contains a standard Kellogg transmitter, receiver, and induction coil, the whole being especially adapted to operate with highest efficiency on the longest distance lines with two cells of dry battery.

The lasting qualities of Kellogg apparatus can be appre-

XX Compact Dry Cell Type Telephone — continued

ciated more than ever in this type of telephone, guaranteeing to the user an absolutely reliable instrument which will never fail under the most severe conditions.

CODE NUMBERS.

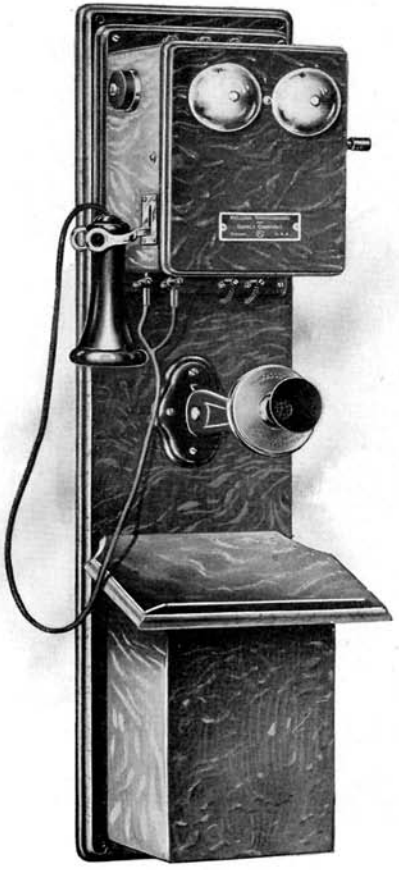
BRIDGING, XX COMPACT TELEPHONES:

No. 128. Oak woodwork, 5-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,483.)

No. 129. Same as No. 128, but walnut woodwork.

No. 130. Oak woodwork, 5-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,483.)

No. 131. Same as No. 130, but walnut woodwork.



Single Battery Box Telephone

THE accompanying illustrations show closed and open views of our Single Battery Box Telephone. This is the most compact type of telephone using a self-contained magneto box with a separate battery cabinet, and before the advent of the compact telephone previously described, was considered the standard instrument for exchange service. It is supplied with the regular Kellogg talking and signaling apparatus, and will operate with the same efficiency as any of our telephones.

The magneto box contains a generator, ringer, induction coil, hookswitch, and attached receiver, the whole being made easily removable from the back board without unsoldering any connections. The battery box is also removable, being detached by forcing it upward so as to unhook its catches.

A metal shelf fastened to the back board is provided for a battery which can be either one cell of wet battery for local work or two cells of dry battery for both local and long distance talking. We furnish with the telephone, however, two cells of dry battery so as to give the best results.

CODE NUMBERS.

SERIES, SINGLE BATTERY BOX TELEPHONES :

No. 42. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,486.)

Single Battery Box Telephone —continued

No. 43. Same as No. 42, but walnut woodwork.

*No. 44. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,557.)

*No. 45. Same as No. 44, but walnut woodwork.

BRIDGING, SINGLE BATTERY BOX TELEPHONES :

No. 60. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,482.)

No. 61. Same as No. 60, but walnut woodwork.

No. 62. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,482.)

No. 63. Same as No. 62, but walnut woodwork.

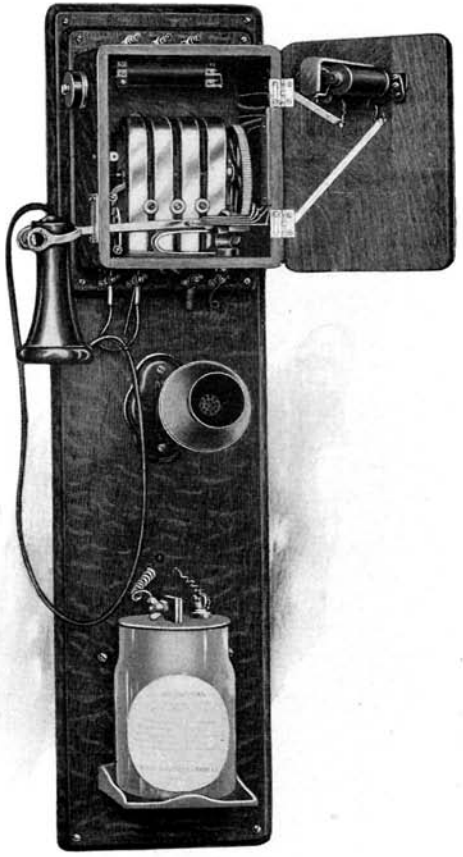
*No. 64. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,556.)

*No. 65. Same as No. 64, but walnut woodwork.

*No. 66. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil. No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,556.)

*No. 67. Same as No. 66, but walnut woodwork.

*Orders for these telephones subject to delay, as they are not carried in stock.



Kellogg Double Battery Box Telephone

OUR Double Battery Box Telephone, shown on this and the following page, and the single battery box instrument are identical in every respect, excepting the lower portion of the back board and the battery box which are made wider to accommodate two cells of wet battery. This telephone is used as a standard by those preferring the wet battery in place of dry cells, but will operate equally as well with the latter.

CODE NUMBERS.

SERIES, DOUBLE BATTERY BOX TELEPHONES:

No. 46. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,486.)

No. 47. Same as No. 46, but walnut woodwork.

*No. 48. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,557.)

*No. 49. Same as No. 48, but walnut woodwork.

BRIDGING, DOUBLE BATTERY BOX TELEPHONES:

No. 76. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

No. 77. Same as No. 76, but walnut woodwork.

No. 78. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

Double Battery Box Telephone—continued

No. 79. Same as No. 78, but walnut woodwork.

*No. 80. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,556.)

*No. 81. Same as No. 80, but walnut woodwork.

*No. 82. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery (Circuit 2,556.)

*No. 83. Same as No. 82, but walnut woodwork.

No. 84. Oak woodwork, 5-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

No. 85. Same as No. 84, but walnut woodwork.

No. 86. Oak woodwork, 5-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

No. 87. Same as No. 86, but walnut woodwork.

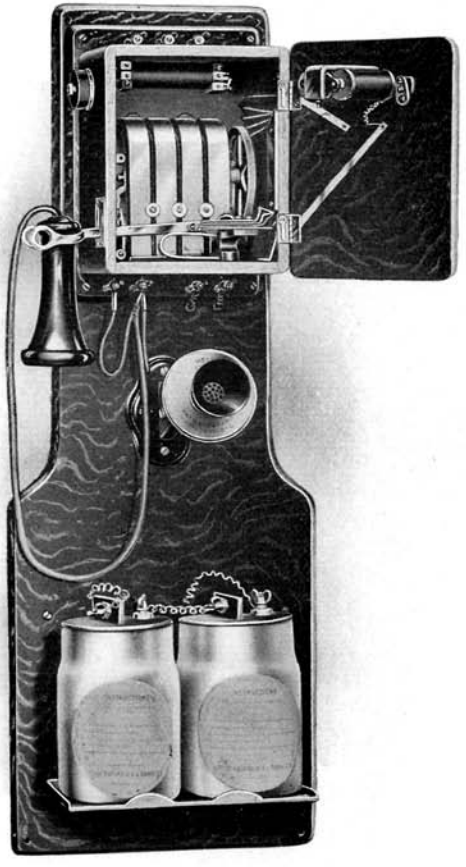
*No. 88. Oak woodwork, 5-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,556.)

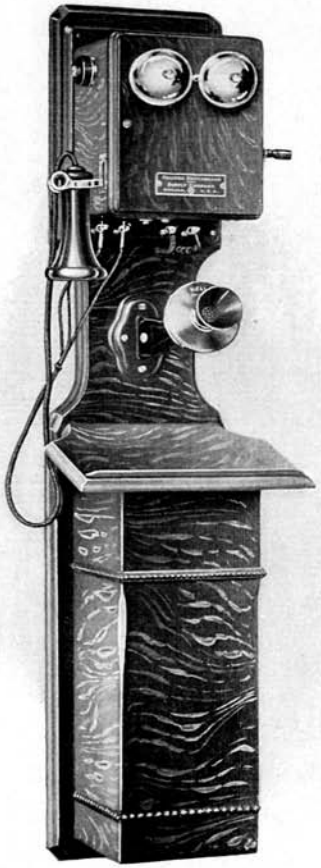
*No. 89. Same as No. 88, but walnut woodwork.

*No. 90. Oak woodwork, 5-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 21 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,556.)

*No. 91. Same as No. 90, but walnut woodwork.

*Orders for these telephones subject to delay, as they are not carried in stock.





Kellogg Tandem Battery Box Telephone

THE two cuts on this page, and on the next, show one of our standard tandem battery box telephones for series or bridging work. The electrical features of the instrument are the same as those already described, the only difference being in the design of the cabinet. A removable magneto box is located at the top of the back board, while an elongated battery cabinet is provided to cover two cells of wet battery, which are supported on iron brackets, one above the other. This instrument is very popular in some sections of the country, being different from the ordinary styles, but having no particular advantages over the other types of telephones already enumerated, we have decided not to list it as a standard product.

CODE NUMBERS.

SERIES, TANDEM BATTERY BOX TELEPHONES:

*No. 54. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,486.)

*No. 55. Same as No. 54, but walnut woodwork.

Kellogg Tandem Battery Box Telephone —continued

BRIDGING, TANDEM BATTERY BOX TELEPHONES:

*No. 108. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

*No. 109. Same as No. 108, but walnut woodwork.

*No. 110. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

*No. 111. Same as No. 110, but walnut woodwork.

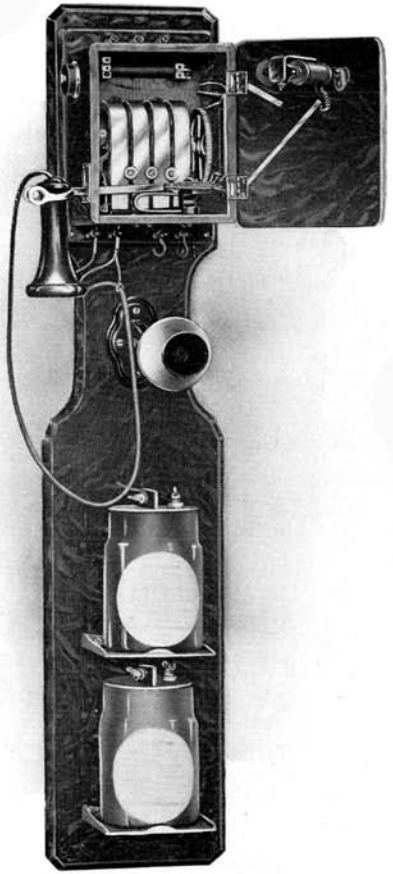
*No. 116. Oak woodwork, 5-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

*No. 117. Same as No. 116, but walnut woodwork.

*No. 118. Oak woodwork, 5-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of battery. (Circuit 2,482.)

*No. 119. Same as No. 118, but walnut woodwork.

*Orders for these telephones subject to delay, as they are not carried in stock.



Residence Type Telephones

THE telephone illustrated on this page is of the residence or hotel type, made up of standard parts, the same as those used in our regular type instrument, thereby guaranteeing the best local or long distance service.

Two binding posts are provided at the bottom of the back board for battery connection; the latter to be located outside of the telephone box, and preferably in the basement or a nearby closet.

CODE NUMBERS.

SERIES, RESIDENCE TYPE TELEPHONES :

No. 32. Oak woodwork, 3-bar generator, 80 ohm ringer, No. 9-L transmitter, No. 26 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,488.)

No. 33. Same as No. 32, but walnut woodwork.

BRIDGING RESIDENCE TYPE TELEPHONES :

No. 34. Oak woodwork, 4-bar generator, 1,000 ohm ringer, No. 9-L transmitter, No. 26 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,484.)

No. 35. Same as number 34, but walnut woodwork.

No. 36. Oak woodwork, 4-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 26 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, No. 3 arrester, two cells of dry battery. (Circuit 2,484.)

No. 37. Same as No. 36, but walnut woodwork.

Kellogg Cabinet Desk Telephone

Series or Bridging

THE accompanying illustration shows a cabinet desk telephone which is especially suited for business offices, hotels, lobbies, sound-proof booths, or halls of fine residences. The cabinet is of fine selected quarter-sawed oak, joined and finished in a thoroughly workmanlike manner, and is of an exceedingly attractive design. Other woodwork can be provided if desired, in any special finish to match the surrounding furnishings. All of the fittings and apparatus are either nickel plated and highly polished, or finished in black; those parts which do not require to be handled, being inclosed in a compartment having a removable bevel plate glass front. The battery box is located directly below the writing-desk, and is provided with a removable panel covering. It has room for two cells of standard Fuller battery, which can be used if desired. The talking circuit apparatus is of the standard long-distance type, suited for the most exacting service. The other equipment necessary to make a complete telephone is listed below, under code numbers, and is of equally high grade. It is sometimes desirable to mount the transmitter on a movable support, thereby giving flexibility to this part of the apparatus. For this purpose the No. 19 transmitter arm is pro-

Kellogg Cabinet Desk Telephone—continued

vided, which is attached to the top portion of the cabinet, leaving the writing-desk unobstructed.

CODE NUMBERS.

SERIES, CABINET DESK TELEPHONES:

No. 257. Quartered oak woodwork, 80 ohm ringer, 3-bar generator, No. 11 transmitter arm, No. 13-L transmitter, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch. (Circuit 3,927.)

No. 258. Same as No. 257, but with No. 19 transmitter arm, and No. 14-L transmitter.

BRIDGING, CABINET DESK TELEPHONES:

No. 259. Quartered oak woodwork, 1,000 ohm ringer, 4-bar generator, No. 11 transmitter arm, No. 13-L transmitter, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch. (Circuit 3,926.)

No. 260. Same as No. 259, but with No. 19 transmitter arm and No. 14-L transmitter.

No. 261. Quartered oak woodwork, 1,600 ohm ringer, 4-bar generator, No. 11 transmitter arm, No. 13-L transmitter, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch. (Circuit 3,926.)

No. 262. Same as No. 261, but with No. 19 transmitter arm and No. 14-L transmitter.

No. 263. Quartered oak woodwork, 1,000 ohm ringer, 5-bar generator, No. 11 transmitter arm, No. 13-L transmitter, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch. (Circuit 3,926.)

No. 264. Same as No. 263, but with No. 19 transmitter arm and No. 14-L transmitter.

No. 265. Quartered oak woodwork, 1,600 ohm ringer, 5-bar generator, No. 11 transmitter arm, No. 13-L transmitter, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch. (Circuit 3,926.)

No. 266. Same as No. 265, but with No. 19 transmitter arm and No. 14-L transmitter.

Kellogg Desk Telephones

IN offering our new type of desk stand to the telephone public we are confident that the novel features presented will cause it to be received with general favor. In external appearance it is all that could be desired, and its beauty is greatly enhanced by the use of a polished hard rubber covering over the handle or tubular standard. This construction, which is original with us, does away entirely with the unsightly wear or tarnish caused by handling the usual nickel-plated standard. The mechanism is dust-proof and cannot be tampered with as it is entirely enclosed.

A tubular standard and hollow base support and contain all parts of the stand. The transmitter is adjustably hinged to the top of the standard, and two cords, concealed their entire length, lead from it to their proper connections in the base. The base is covered by a handsome nickel-plated brass shell, and in it are mounted the hook-switch and a hard rubber terminal block for the reciever and desk stand cords. The hook-switch is what is known as our celebrated toggle-joint type on account of the joint in the lever, which makes possible a long motion of the springs of the hook-switch, thus insuring good wiping contacts, with a very small motion of the receiver hook. The hook-switch lever and the transmitter are insulated so that there is no chance for the subscriber to receive an electric shock while using the instrument.

The No. 28 desk stand used in the desk sets listed on the following pages has a No. 22-L transmitter, No. 12-A receiver with green silk cord. Our standard No. 1-A induction coil, when mounted on a base together with six binding posts for desk set connections, is known as the No. 20-A induction coil.

Kellogg Desk Telephones

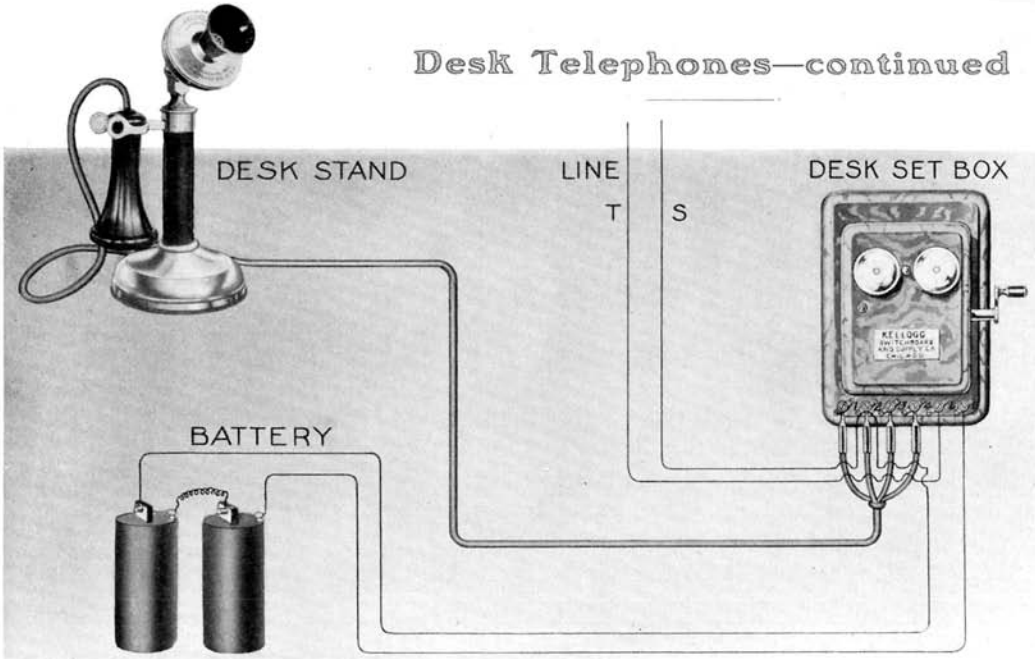
THE test of time has proved our portable desk telephone, shown on this page, to be the most durable and lasting instrument of the kind on the market, and while we have been able to improve details of the internal mechanism, it has not been possible even to suggest a betterment of the external appearance. One of the reasons for this is that we use a covering of best hard rubber over the upright portion or handle, thus entirely doing away with the unsightly wear or tarnish of the nickel plate caused by handling. The base is made of large diameter, thereby preventing the stand from being upset by careless handling, and the parts are securely interlocked so as not to become loose. As will be noticed in the illustration, the mechanism of the desk stand is entirely inclosed, so as not to be tampered with, and is also dust-proof. The hookswitch is as simple and durable as our long lever type, and is made up of bunched German silver springs with pure platinum contact points.

The No. 4 desk stand used in the desk sets listed on the following pages has a No. 13-L transmitter, No. 12-A receiver with green silk cord, and a six-foot four conductor green silk desk cord. The circuits used in these sets are shown on pages 82, 83, and 84.

Our standard No. 1-A induction coil, when mounted on a base together with six binding posts for desk set connections, is known as the No. 20-A induction coil.

FIRST EDITION PAGE

Desk Telephones—continued



Each of the following desk sets consists of No. 28 desk stand, a desk set box with generator, ringer and No. 1-A induction coil mounted therein, and two cells of dry battery.

CODE NUMBERS.

No. 5. SERIES—Oak woodwork, 80 ohm ringer, 3-bar generator. (No. 27 desk set box, circuit 6,081.)

No. 6. Same as No. 5, but walnut woodwork. (No. 28 desk set box.)

No. 1. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 16 desk set box, circuit 5,798.)

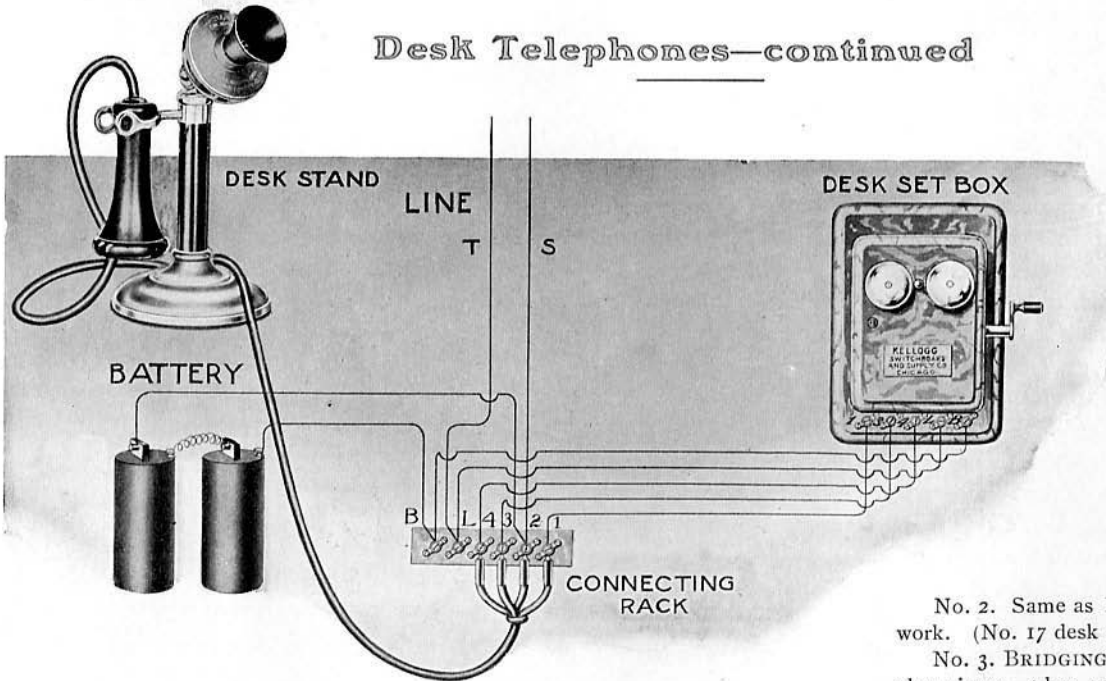
No. 2. Same as No. 1, but walnut woodwork. (No. 17 desk set box.)

No. 3. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 18 desk set box, circuit 5,798.)

No. 4. Same as No. 3, but walnut woodwork. (No. 19 desk set box.)

NOTE—Orders for instruments of the above type are subject to delay, as they are not carried in stock.

Desk Telephones—continued



Each of the following desk sets consists of No. 4 desk stand, a desk set box with generator, ringer and No. 1-A induction coil mounted therein, a 6-point connecting rack, and two cells of dry battery.

CODE NUMBERS.

No. 5. SERIES—Oak woodwork, 80 ohm ringer, 3-bar generator. (No. 27 desk set box, circuit 3,054.)

No. 6. Same as No. 5, but walnut woodwork. (No. 28 desk set box.)

No. 1. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 16 desk set box, circuit 3,053.)

No. 2. Same as No. 1, but walnut woodwork. (No. 17 desk set box.)

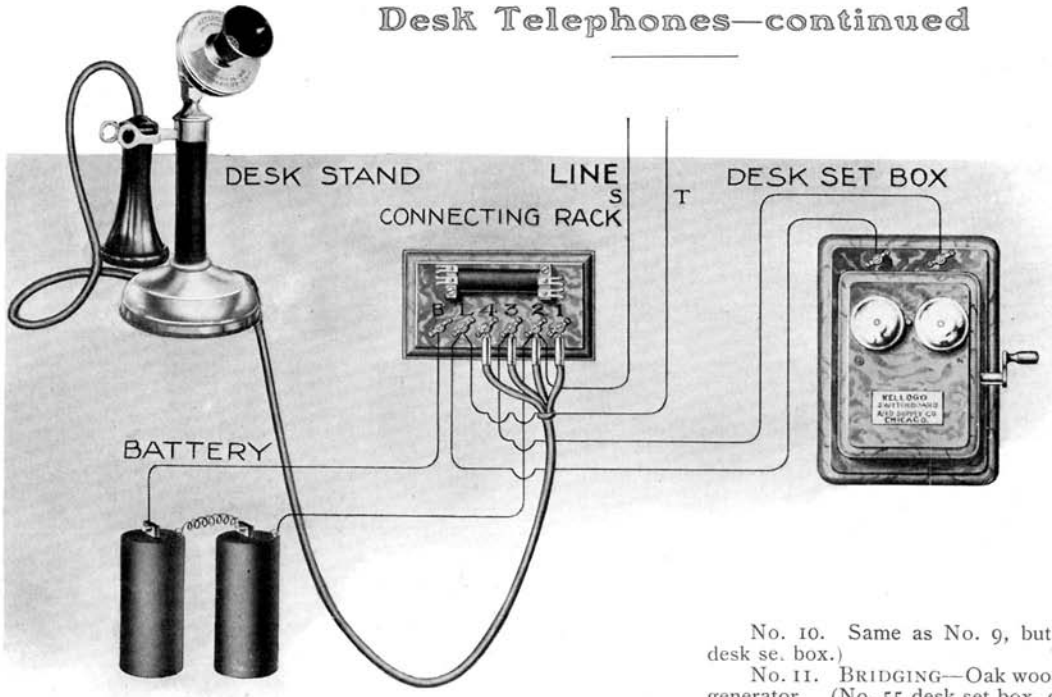
No. 3. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 18 desk set box, circuit 3,053.)

No. 4. Same as No. 3, but walnut woodwork. (No. 19 desk set box.)

NOTE—Orders for instruments of the above type are subject to delay, as they are not carried in stock.

FIRST EDITION PAGE

Desk Telephones—continued



Each of the following desk sets consists of a No. 28 desk stand, a desk set box with generator and ringer mounted therein, a No. 20 induction coil, with binding posts and two cells of dry battery. Standard Type Kellogg Desk Sets.

No. 17. SERIES—Oak woodwork, 80 ohm ringer 3-bar generator. (No. 6 desk set box, circuit 6,083.)

No. 18. Same as No. 17, but walnut woodwork. (No. 26 desk set box.)

No. 7. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 5 desk set box, circuit 5,799.)

No. 8. Same as No. 7, but walnut woodwork. No. 13 desk set box.)

No. 9. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 14 desk set box, circuit 5,799.)

No. 10. Same as No. 9, but walnut woodwork. (No. 15 desk set box.)

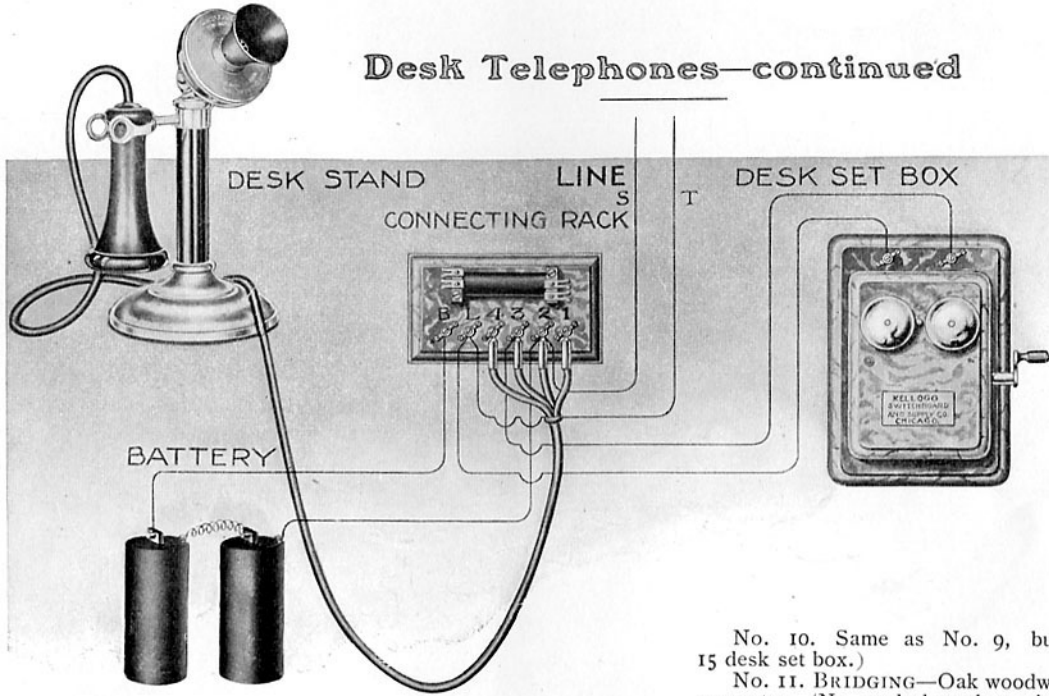
No. 11. BRIDGING—Oak woodwork, 1,000 ohm ringer, 5-bar generator. (No. 55 desk set box, circuit 5,799.)

No. 12. Same as No. 11, but walnut woodwork. (No. 56 desk set box.)

No. 13. BRIDGING—Oak woodwork, 1,600 ohm ringer, 5-bar generator. (No. 53 desk set box, circuit 5,799.)

No. 14. Same as No. 13, but walnut woodwork. (No. 54 desk set box.)

Desk Telephones—continued



Each of the following desk sets consists of a No. 4 desk stand, a desk set box with generator and ringer mounted therein, a No. 20 induction coil, with binding posts and two cells of dry battery. Standard Type Kellogg Desk Sets.

No. 17. SERIES—Oak woodwork, 80 ohm ringer 3-bar generator. (No. 6 desk set box, circuit 3,031.)

No. 18. Same as No. 17, but walnut woodwork. (No. 26 desk set box.)

No. 7. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 5 desk set box, circuit 3,032.)

No. 8. Same as No. 7, but walnut woodwork. (No. 13 desk set box.)

No. 9. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 14 desk set box, circuit 3,032.)

No. 10. Same as No. 9, but walnut woodwork. (No. 15 desk set box.)

No. 11. BRIDGING—Oak woodwork, 1,000 ohm ringer, 5-bar generator. (No. 55 desk set box, circuit 3,032.)

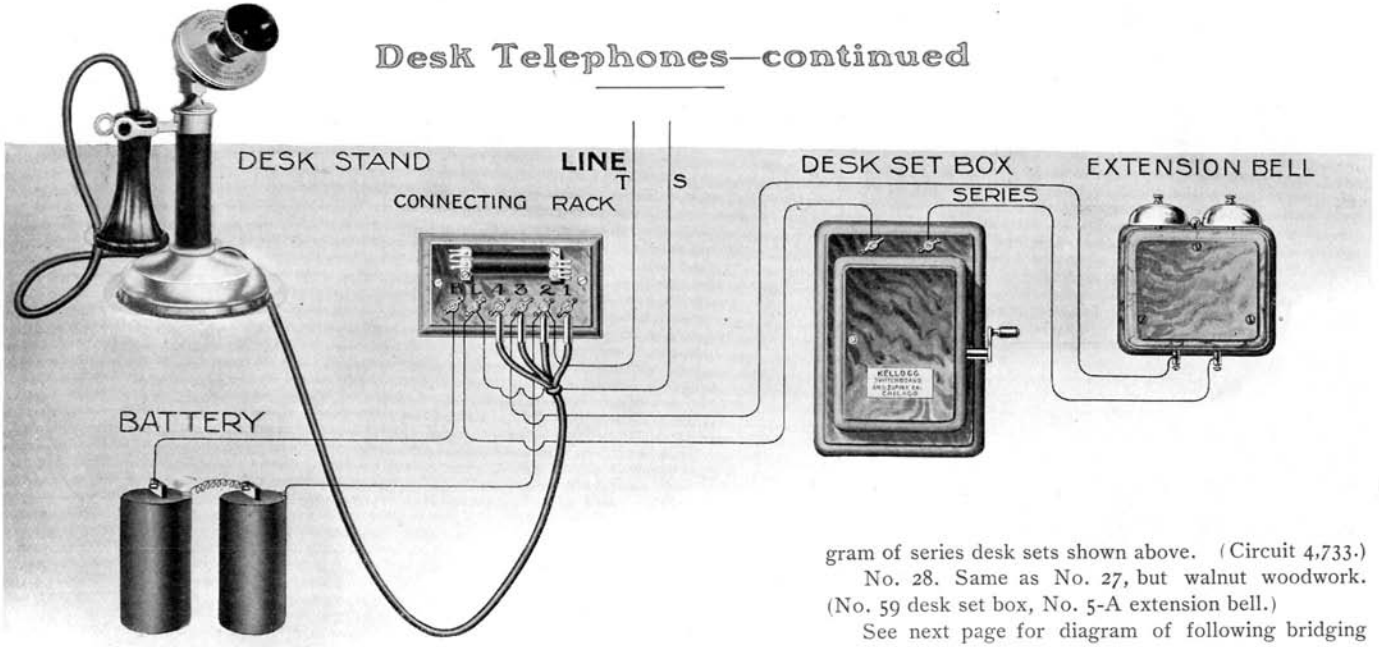
No. 12. Same as No. 11, but walnut woodwork. (No. 56 desk set box.)

No. 13. BRIDGING—Oak woodwork, 1,600 ohm ringer, 5-bar generator. (No. 53 desk set box, circuit 3,032.)

No. 14. Same as No. 13, but walnut woodwork. (No. 54 desk set box.)

FIRST EDITION PAGE

Desk Telephones—continued



Each of the following desk sets consists of a No. 28 desk stand, a desk set box containing a generator, an extension bell, a No. 20 induction coil with binding posts and two cells of dry battery.

No. 27. SERIES—Oak woodwork, 80 ohm ringer, 3-bar generator. (No. 52 desk set box, No. 2-A extension bell.) Diagram of series desk sets shown above. (Circuit 4,733.)

No. 28. Same as No. 27, but walnut woodwork. (No. 59 desk set box, No. 5-A extension bell.)

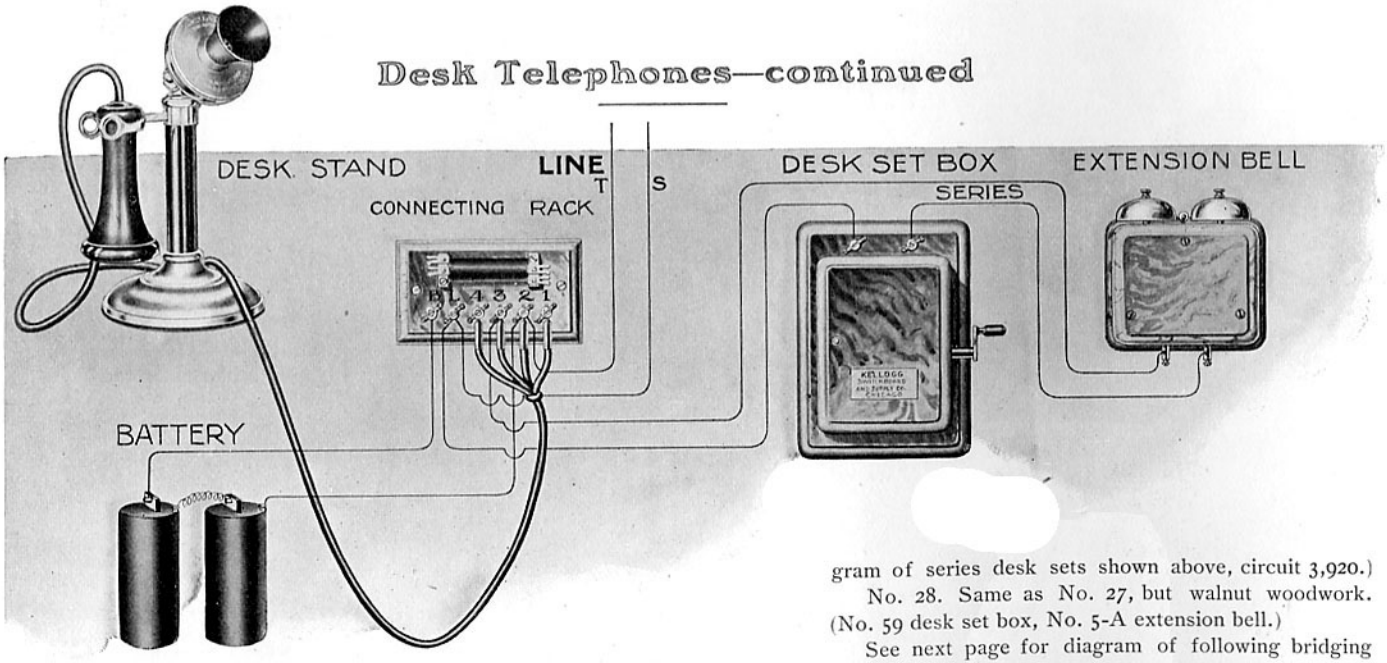
See next page for diagram of following bridging desk sets. (Circuit 4,671.)

No. 19. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 24 desk set box, No. 2-D extension bell.)

No. 20. Same as No. 19, but walnut woodwork. (No. 25 desk set box, No. 5-D extension bell.)

No. 21. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 24 desk set box, No. 2-E extension bell.)

Desk Telephones—continued



Each of the following desk sets consists of a No. 4 desk stand, a desk set box containing a generator, an extension bell, a No. 20 induction coil with binding posts and two cells of dry battery.

No. 27. SERIES—Oak woodwork, 80 ohm ringer, 3-bar generator. (No 52 desk set box, No. 2-A extension bell.) Diagram of series desk sets shown above, circuit 3,920.)

No. 28. Same as No. 27, but walnut woodwork. (No. 59 desk set box, No. 5-A extension bell.)

See next page for diagram of following bridging desk sets, circuit 3,454.

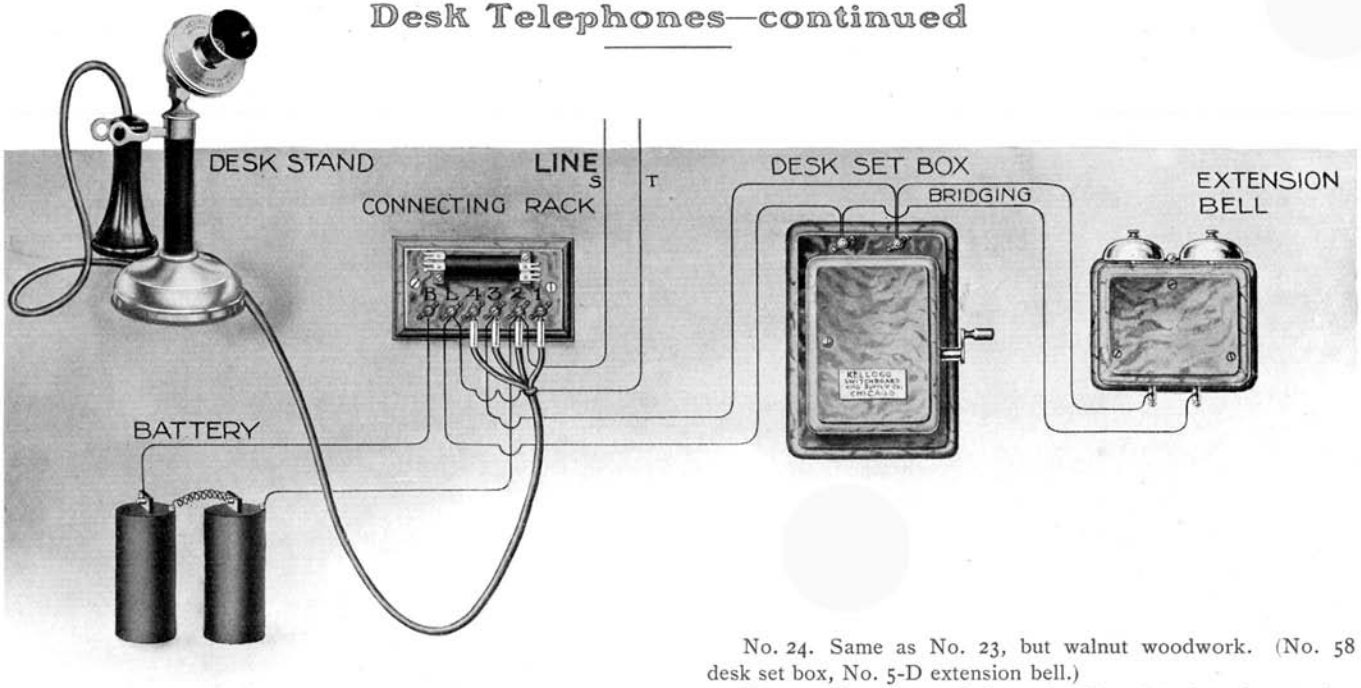
No. 19. BRIDGING—Oak woodwork, 1,000 ohm ringer, 4-bar generator. (No. 24 desk set box, No. 2-D extension bell.)

No. 20. Same as No. 19, but walnut woodwork. (No. 25 desk set box, No. 5-D extension bell.)

No. 21. BRIDGING—Oak woodwork, 1,600 ohm ringer, 4-bar generator. (No. 24 desk set box, No. 2-E extension bell.)

FIRST EDITION PAGE

Desk Telephones—continued



No. 22. Same as No. 21, but walnut woodwork. (No. 25 desk set box, No. 5-E extension bell.)

No. 23. BRIDGING—Oak woodwork, 1,000 ohm ringer, 5-bar generator. (No. 57 desk set box, No. 2-D extension bell.)

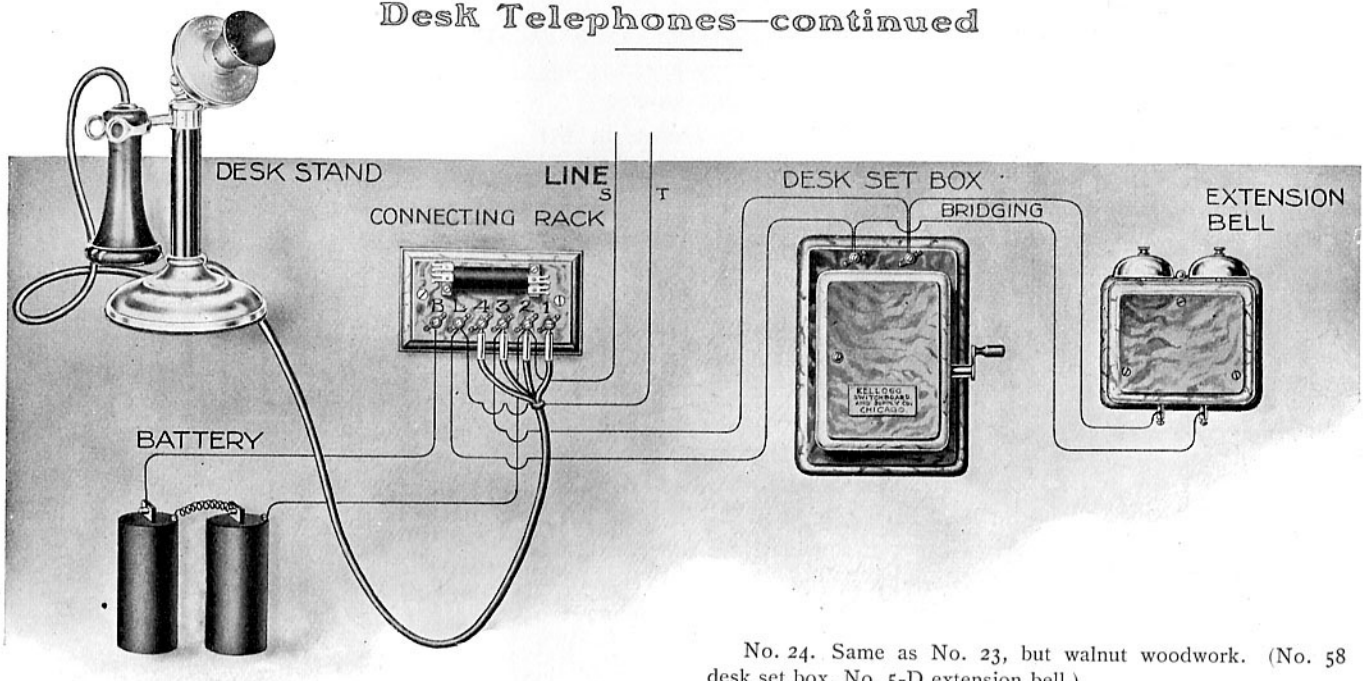
No. 24. Same as No. 23, but walnut woodwork. (No. 58 desk set box, No. 5-D extension bell.)

No. 25. BRIDGING—Oak woodwork, 1,600 ohm ringer, 5-bar generator. (No. 57 desk set box, No. 2-E extension bell.)

No. 26. Same as No. 25, but walnut woodwork. (No. 58 desk set box, No. 5-E extension bell.)

NOTE—Orders for instruments listed on this page and that preceding are subject to delay, as they are not carried in stock.

Desk Telephones—continued



No. 22. Same as No. 21, but walnut woodwork. (No. 25 desk set box, No. 5-E extension bell.)

No. 23. BRIDGING—Oak woodwork, 1,000 ohm ringer, 5-bar generator. (No. 57 desk set box, No. 2-D extension bell.)

No. 24. Same as No. 23, but walnut woodwork. (No. 58 desk set box, No. 5-D extension bell.)

No. 25. BRIDGING—Oak woodwork, 1,600 ohm ringer, 5-bar generator. (No. 57 desk set box, No. 2-E extension bell.)

No. 26. Same as No. 25, but walnut woodwork. (No. 58 desk set box, No. 5-E extension bell.)

NOTE—Orders for instruments listed on this page and that preceding are subject to delay, as they are not carried in stock.

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Desk Telephones—continued

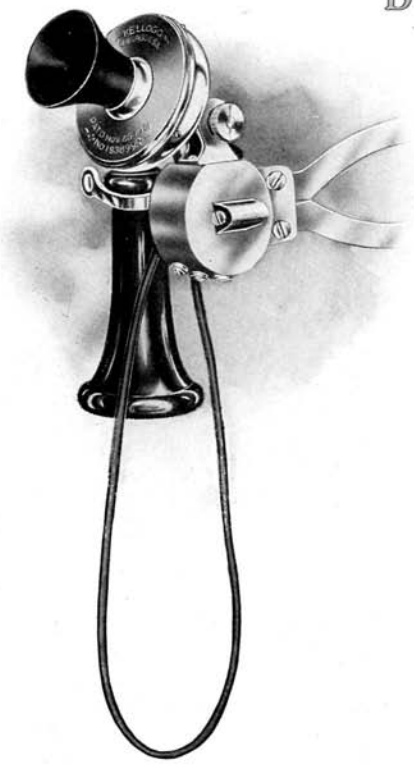

FIG. 1.

ADJUSTABLE TELEPHONE.

The instrument shown in the accompanying illustrations contains a desk stand and an adjustable desk stand holder combined in one, therefore allowing the removal of all objectionable features of the ordinary combination. This instrument is very compact and light, and is of a graceful design, making an extremely attractive adjunct to a desk or table. It can be attached to any vertically or horizontally flat surface, or to any style desk, and its adjustable feature keeps it constantly at hand ready for instant use, yet never in the way or a source of annoyance. Unlike the portable desk stand, the adjustable telephone is securely fastened in place, and it is obviously only subject to the same chances for breakage as in the case of the wall type telephone, thereby making the maintenance cost of a desk set on the same footing with the wall telephone. This saving will appeal to the telephone manager, while the great convenience provided by its use will be fully appreciated by the subscriber.

FIG. 2.

Desk Telephones—continued

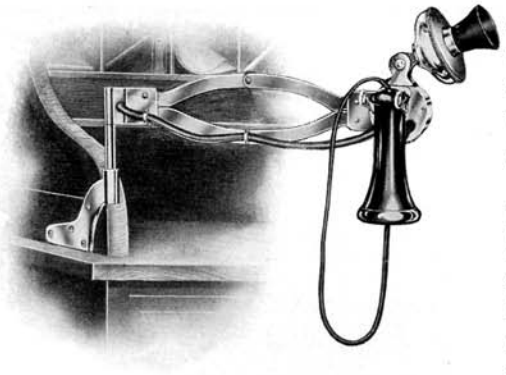

FIG. 3.

Fig. 1 shows the cylindrical box which incloses the hookswitch and cord connections, and to which the transmitter is adjustably attached. The hookswitch springs are German silver with platinum contact points, and are entirely insulated from the metal of the case and receiver hook. The adjustable lever arms and base are made from steel, highly nickel plated, and will stand severe abuse without breakage.

The mounting bases, shown in Fig. 6, are made in three shapes for fitting the adjustable telephone to the various mounting surfaces. Base "A" is designed for attaching to a flat top desk or table; "B" to either end of the roll top desk; and "C" to a flat vertical surface or wall.

CODE NUMBERS.

No. 18. DESK STAND—Adjustable telephone for roll top desks, single length extension of 17½ inches, fitted with a No. 22-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. (See Figs. 2 and 3.)

No. 19. DESK STAND—Same as No. 18, but with a double length extension of 27½ inches.

No. 20. DESK STAND—Adjustable telephone for walls or other vertically flat surfaces, single length extension of 17½ inches, fitted with a No. 22-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. Same telephone as shown in Fig. 2, but with mounting base "C," shown in Fig. 6.

FIG. 4.

Desk Telephones—continued

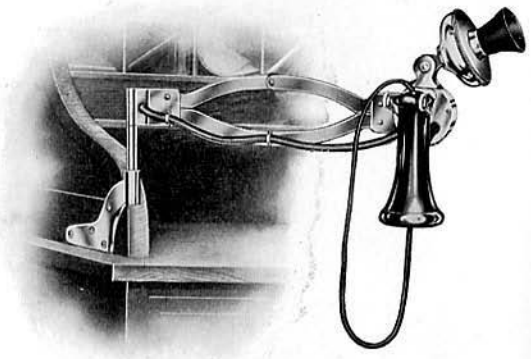

FIG. 3.

Fig. 1 shows the cylindrical box which incloses the hook switch and cord connections, and to which the transmitter is adjustably attached. The hookswitch springs are German silver with platinum contact points, and are entirely insulated from the metal of the case and receiver hook. The adjustable lever arms and base are made from steel, highly nickel plated, and will stand severe abuse without breakage.

The mounting bases, shown in Fig. 6, are made in three shapes for fitting the adjustable telephone to the various mounting surfaces. Base "A" is designed for attaching to a flat top desk or table; "B" to either end of the roll top desk; and "C" to a flat vertical surface or wall.

FIG. 4.

CODE NUMBERS.

No. 18 DESK STAND—Adjustable telephone for roll top desks, single length extension of 17½ inches, fitted with a No. 13-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. (See Figs. 2 and 3.)

No. 19. DESK STAND—Same as No. 18, but with a double length extension of 27½ inches.

No. 20. DESK STAND—Adjustable telephone for walls or other vertically flat surfaces, single length extension of 17½ inches, fitted with a No. 13-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. Same telephone as shown in Fig. 2, but with mounting base "C," shown in Fig. 6.

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Desk Telephones—continued

No. 21. DESK STAND—Same as No. 20, but with a double length extension of 27 inches.

No. 22. DESK STAND—Adjustable telephone for flat top desks or other horizontally flat surfaces, single length extension

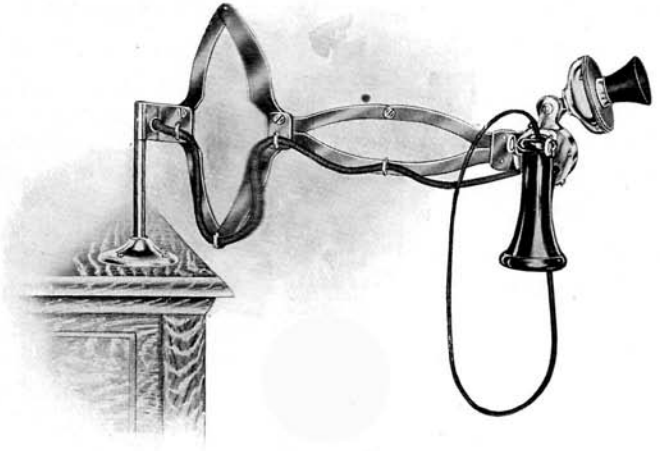


FIG. 5.

of 17½ inches, fitted with a No. 22-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. (See Fig. 4.)

No. 23. DESK STAND—Same as No. 22, but with a double length extension of 27½ inches. (See Fig. 5.)

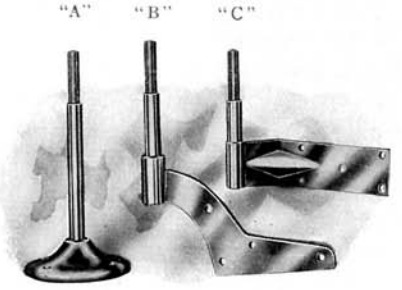


FIG. 6.

NOTE—The above code numbers represent desk stands only, without desk set boxes. When orders for complete telephones are desired these desk stands are to be substituted for the No. 28 desk stand in the previously described Desk Sets, illustrated on page 55.

Desk Telephones—continued

No. 21. DESK STAND—Same as No. 20, but with a double length extension of 27 inches.

No. 22. DESK STAND—Adjustable telephone for flat top desks or other horizontally flat surfaces, single length extension of 17½ inches, fitted with a No. 13-L transmitter, No. 12-A receiver with green silk cord, and a four conductor, six-foot green silk desk cord. (See Fig. 4.)

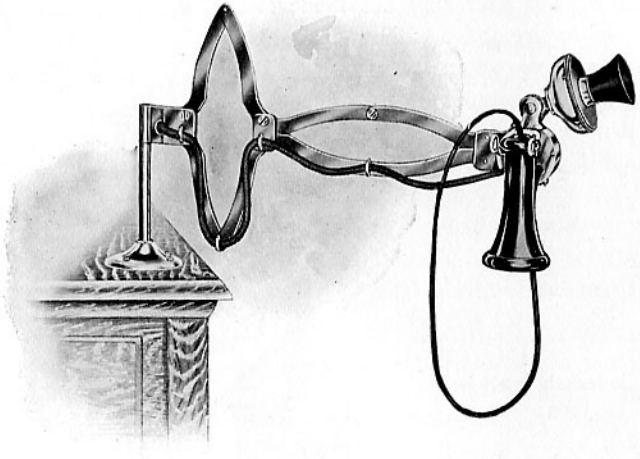


FIG. 5.

No. 23. DESK STAND—Same as No. 22, but with a double length extension of 27½ inches. (See Fig. 5.)

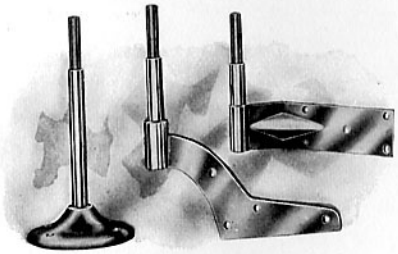


FIG. 6.

NOTE—The above code numbers represent desk stands only, without desk set boxes. When orders for complete telephones are desired these desk stands are to be substituted for the No. 4 desk stand in the previously described Desk Sets, illustrated on page 55.

FIRST EDITION PAGE

Kellogg Bridging Telephone with Grounding Key

WE have modified the circuit of our regular bridging telephone, so that a subscriber can call central without disturbing other parties on the same line, and so that these subscribers can call each other without throwing the drop at central. The circuit of this instrument is shown in Fig. 8, on page 83. It will be noticed that a key has been introduced so that when pushed, the generator will be connected between the sleeve binding post S, and ground binding post G. Otherwise when the key is in its normal position the wiring is the same as for a standard bridging telephone.

It is only necessary to connect the line drop at central between the sleeve side of line to ground, in order to fit a circuit for this special service. Then when the generator is operated at any of the telephones on this line, the drop remains normal, but the other telephones are signaled the same as in any bridging circuit. With the key depressed, the generator will send current from the sleeve side of line through the drop to ground, and thus back to the generator. This will throw the drop but will not ring the bells on the other telephones connected to the same line.

The talking circuit of a completed connection through the switchboard is the same as for the best bridging line, as there are no ground connections, the line drop being cut off in the line jack. Thus the best grade transmission can be had.

CODE NUMBERS.

No. 229. DOUBLE BATTERY BOX TYPE TELEPHONE—Oak woodwork, 5-bar generator, 1,600 ohm ringer, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, grounding key, and two cells of dry battery. (Circuit No. 2,794.)

No. 230. Same as No. 229, but walnut woodwork.

NOTE—Orders for these telephones are subject to delay, as they are not carried in stock.

Kellogg Two-Party Selective Telephones

A SIMPLE two-party line selective system employing the divided circuit ringing connection is shown in the diagram on the opposite page. In this diagram a "master key," common to the other ringing keys of an operator's position, is used for switching the same to either side of the line, thereby sending ringing current through only one of the telephones to ground and back to generator. This rings the desired bell without disturbing the other party.

Any number of these telephones can be bridged across the line, one-half having their ringers connected from the tip side of the line to ground, and the remainder from sleeve side of the line to ground. By this "divided" circuit arrangement only one-half of the subscribers will be disturbed when signaled, which for a heavily loaded line is a great advantage.

By using a low wound or series type drop bridged across the line at the switchboard the subscribers on this circuit can signal central without disturbing the other subscriber connected to the same circuit.

Telephones adapted for two-party line selective ringing or divided circuit work are wired with their ringer between the left hand or sleeve line binding post S, and middle or ground binding post G, shown in circuit Fig. 12, page 84. This circuit also shows the line wire connections to the telephone binding posts T and S, so as to adapt it for Station No. 1 and Station No. 2, also the connection necessary to make a regular bridging telephone if for any reason it should be desired to utilize the instrument for that purpose.

The talking circuit of these telephones is bridged between the line binding post so that this part of the instrument is the same as for a regular bridging telephone, and will give equally good results.

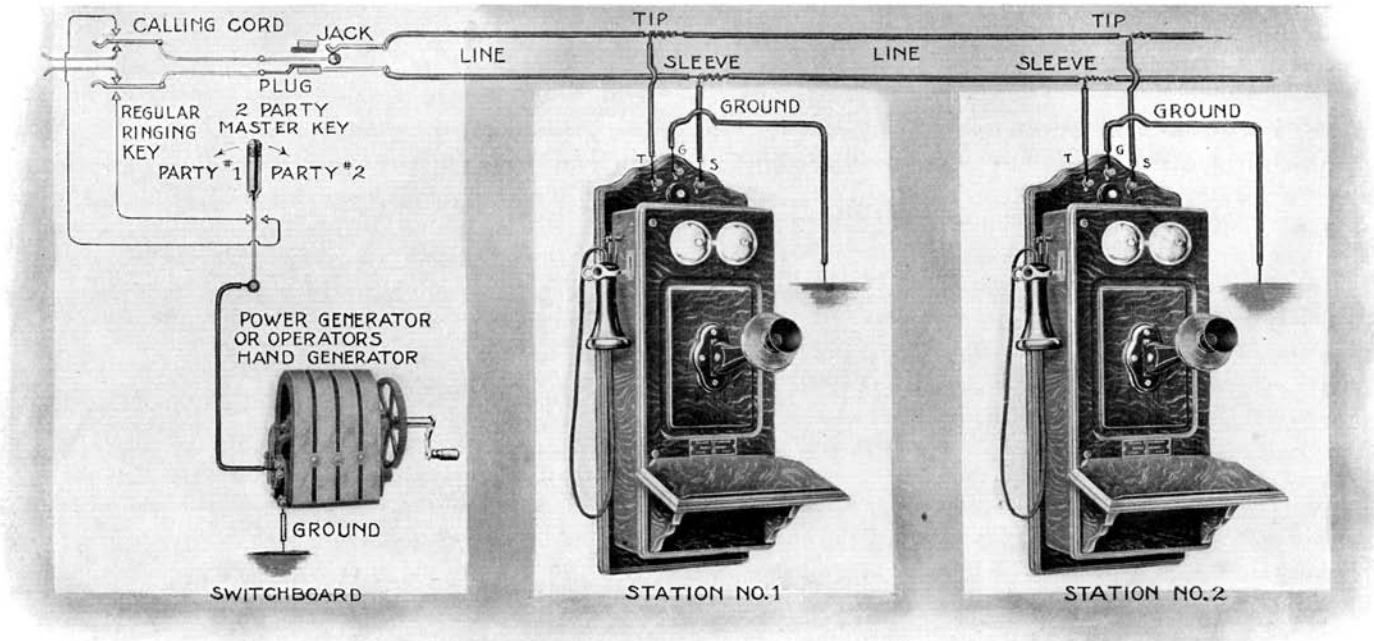
CODE NUMBERS.

No. 211. COMPACT DRY CELL TYPE TELEPHONE—Bridging circuit with ringer wired to middle or ground binding post. Oak woodwork, 1,000 ohm ringer, 4-bar generator, No. 9-L transmitter, No. 20 transmitter arm, No. 12-A receiver, No. 1-A induction coil, No. 33 hookswitch, two cells of dry battery. (Circuit 2,064.)

No 212. Same as No. 211, but walnut woodwork.

NOTE—Orders for these instruments are subject to delay, as they are not carried in stock.

Two-Party Selective Telephones—continued



Four-Party Selective Telephones

OUR selective system for use in connection with magneto switchboards employs positive and negative pulsating current to actuate ringers of similar and opposite polarity, hence, by using each side of a metallic line and a ground return with proper selecting keys at the exchange, four stations can be arranged, each to respond to its proper signal.

Referring to Fig. 1, which shows the complete diagram for our four-party selective magneto system, it can be seen that each subscriber's instrument consists of the regular talking circuit, differing in no way from that of the standard bridging subscriber's set, and a signaling outfit which consists of a bridging generator with an automatic switch to cut it out of circuit when not in use, and a special high wound ringer. This ringer, described and illustrated on page 24, is wound to a resistance of 2,500 ohms, and is provided with an adjustable biasing spring to hold the armature against one of the pole pieces, thereby making it possible to ring only the bell with the right polarity of current, the wrong polarity simply tending to attract the armature of the ringer in the same direction as the tension of the biasing spring. In order to make the telephones interchangeable as regards the station, the ringer is provided with a commutating device. This consists of two cords with clips, Nos. 4 and 5, attached to the ringer terminals and three-line terminals, Nos. 1, 2, and 3, arranged to hold these clips. Thus to adapt a telephone to serve for any of the four stations, these cords are connected as per a predetermined printed code, which is supplied with each instrument, and usually located on the inside of the cabinet lid. (See Fig. 2.)

The selective telephones should always be connected to the line wiring in the same manner, i. e., by connecting the left hand binding post to the tip side of the line circuit, the right hand line binding post to the sleeve side of the line circuit, and the middle binding post to earth or "ground," which latter can be a water pipe or regular ground rod of iron driven into a place where it will be in contact with moist earth during all the year.

The selective party lines should terminate at the exchange switchboard in low wound line drops or signals, arranged to be cut out of circuit when the plug is inserted in the corresponding spring jack. The function of this low wound drop is to consume enough current from the generator of a party calling the exchange so that the other ringers on the same line will not be operated, and as far

Four-Party Selective Telephones—continued

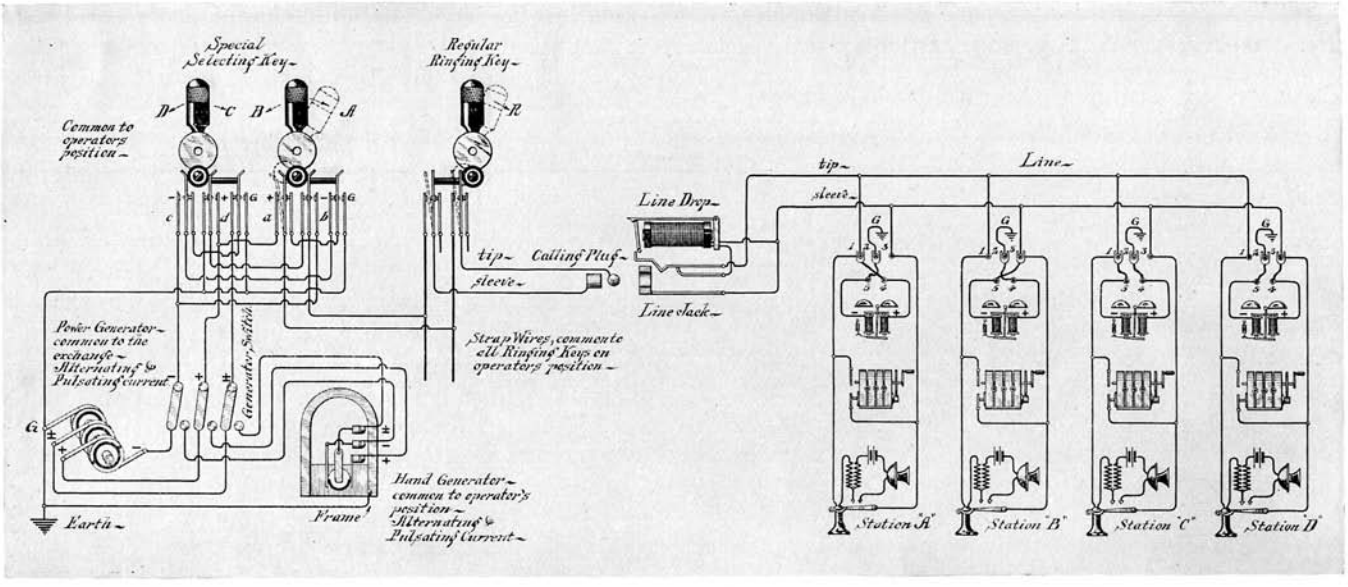


FIG. 1. SWITCHBOARD AND TELEPHONE CIRCUITS.

as disturbance from signaling is concerned, each of the four parties will have the same advantages as on an individual line.

Besides the low wound drop for each party line, it will be necessary to supply the switchboard with generators capable of giving positive (+) and negative (—)

Four-Party Selective Telephones—continued

pulsating current for selecting purposes in addition to the alternating current used for regular ringing, and special selecting keys common to each operator's position to switch the different generator currents to the regular ringing keys. Fig. 1 shows the complete wiring of this exchange apparatus.

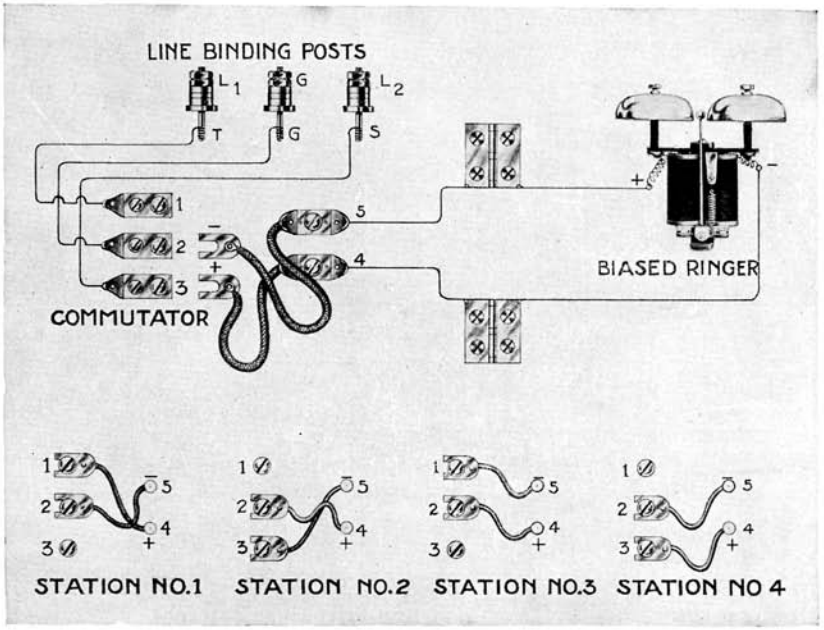


FIG. 2. RINGER DIAGRAMS.

To call a subscriber on any one of these party lines the operator first sets the special selecting key to correspond to the party desired, and with the plug inserted in the line jack of that circuit, the operator rings with the regular ringing key in the usual manner. The movement of the special selecting key simply switches the generator current required to operate the desired station to the strap wires, which are common to all of the keys in an operator's position, so that any cord circuit can be used in calling. When the two levers of the special selecting key are in an upright or normal position, alternating generator current is on these strap wires, so that the switchboard can be operated for regular service.

In connection with this description, we wish to call attention to our harmonic selective system, which is now in successful operation

Four-Party Selective Telephones—continued

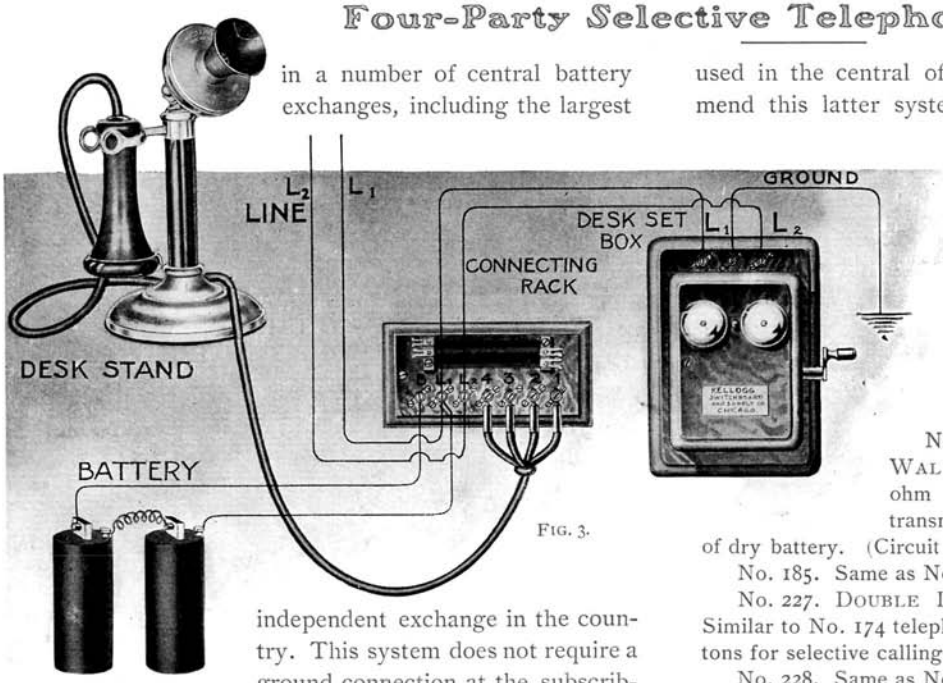


FIG. 3.

in a number of central battery exchanges, including the largest independent exchange in the country. This system does not require a ground connection at the subscriber s station, but "rings metallic," and is non-interfering and positive in action. It is the only system which will operate with as little attention as the latest individual line equipment. Owing to the present cost of the generators used in the central office equipment, we do not recommend this latter system for exchanges having less than one thousand lines capacity.

CODE NUMBERS.

No. 174. DOUBLE BATTERY BOX WALL TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, 4-bar generator, 22-L transmitter, No. 12-A receiver, and two cells of dry battery. (Circuit 4,647.)

No. 175. Same as No. 174, but walnut woodwork.

No. 184. COMPACT DRY CELL TYPE WALL TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, 4-bar generator, 22-L transmitter, No. 12-A receiver, and two cells of dry battery. (Circuit 4,647.)

No. 185. Same as No. 184, but walnut woodwork.

No. 227. DOUBLE BATTERY BOX WALL TELEPHONE—Similar to No. 174 telephone but with a generator and push buttons for selective calling, wired as per Fig. 11, page 84.

No. 228. Same as No. 227, but walnut woodwork.

No. 15. DESK SET TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, and 4-bar generator. This set contains the apparatus shown in Fig. 3. (No. 10 desk set box, circuit 5,794.)

No. 16. Same as No. 15, but walnut woodwork. (No. 38 desk set box.)

Four-Party Selective Telephones—continued

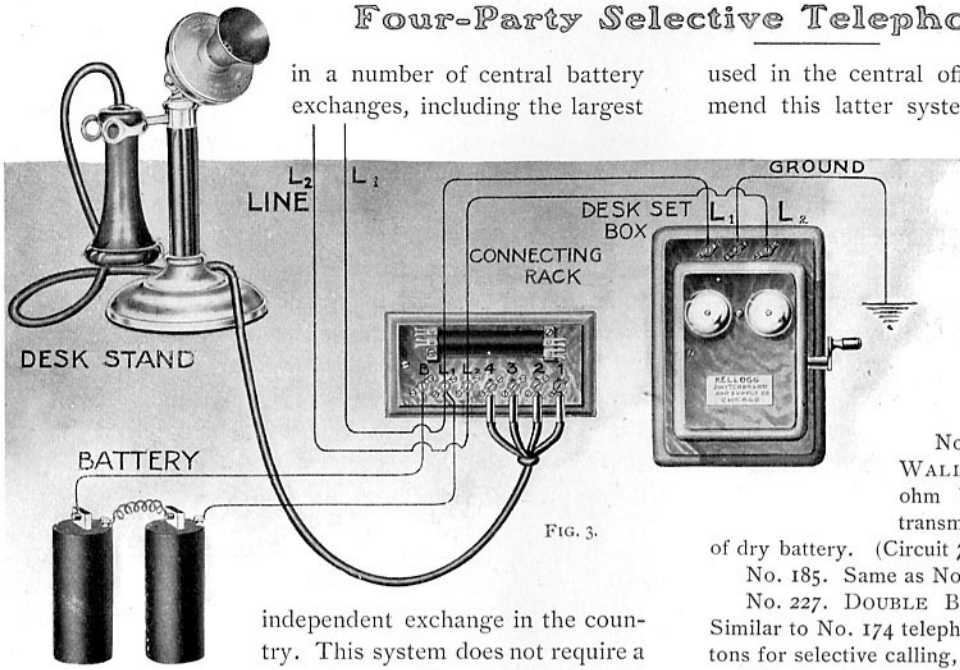


FIG. 3.

in a number of central battery exchanges, including the largest independent exchange in the country. This system does not require a ground connection at the subscribers' station, but "rings metallic," and is non-interfering and positive in action. It is the only system which will operate with as little attention as the latest individual line equipment. Owing to the present cost of the generators used in the central office equipment, we do not recommend this latter system for exchanges having less than one thousand lines capacity.

CODE NUMBERS.

No. 174. DOUBLE BATTERY BOX WALL TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, 4-bar generator, 9-L transmitter, No. 12-A receiver, and two cells of dry battery. (Circuit 751.)

No. 175. Same as No. 174, but walnut woodwork.

No. 184. COMPACT DRY CELL TYPE WALL TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, 4-bar generator, 9-L transmitter, No. 12-A receiver, and two cells of dry battery. (Circuit 751.)

No. 185. Same as No. 184, but walnut woodwork.

No. 227. DOUBLE BATTERY BOX WALL TELEPHONE—Similar to No. 174 telephone but with a generator and push buttons for selective calling, wired as per Fig. 11, page 84.

No. 228. Same as No. 227, but walnut woodwork.

No. 15. DESK SET TELEPHONE—Oak woodwork, 2,500 ohm biased ringer, and 4-bar generator. This set contains the apparatus shown in Fig. 3. (No. 10 desk set box, circuit 3921.)

No. 16. Same as No. 15, but walnut woodwork. (No. 38 desk set box.)

FIRST EDITION PAGE

Telephone Condenser

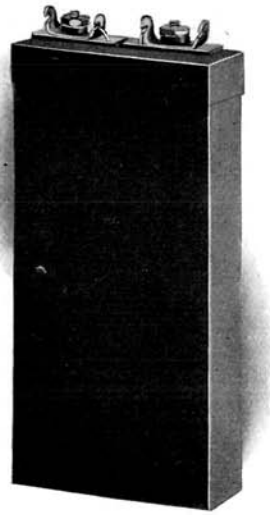


FIG. 1.

THE inability to ring a subscriber when one or more receivers are off the hook, due to people listening in on the same bridging line, limits the usefulness of the service and forms one of the greatest difficulties to be overcome in the operation of heavily loaded or rural lines.

Several remedies have been offered by telephone manufacturers, but in most cases the improvement of the signaling conditions has likewise decreased the efficiency of the talking. Now a condenser allows the high frequency voice currents to pass through readily, but acts as an apparent high resistance to the low frequency ringing currents. By the use of this principle it is possible to leave the talking circuit with its original high efficiency, and to bridge twenty or more telephones (according to line conditions) across the metallic line and ring one of these regardless of the position of the receivers on the others. In fact, the whole nineteen receivers could be removed for listening in, and the twentieth party successfully rung.

Our No. 8 condenser, shown in Fig. 1, is especially suited for this purpose. It is of one micro farad capacity, and is tested to stand over 300 volts alternating current pressure. Dimensions over-all including terminals, $4\frac{3}{4}''$ x $2\frac{1}{32}''$ x $\frac{25}{32}''$. This condenser can easily be installed in any make of telephone, or we will wire it in the secondary circuit of any of our standard bridging telephones on special order.

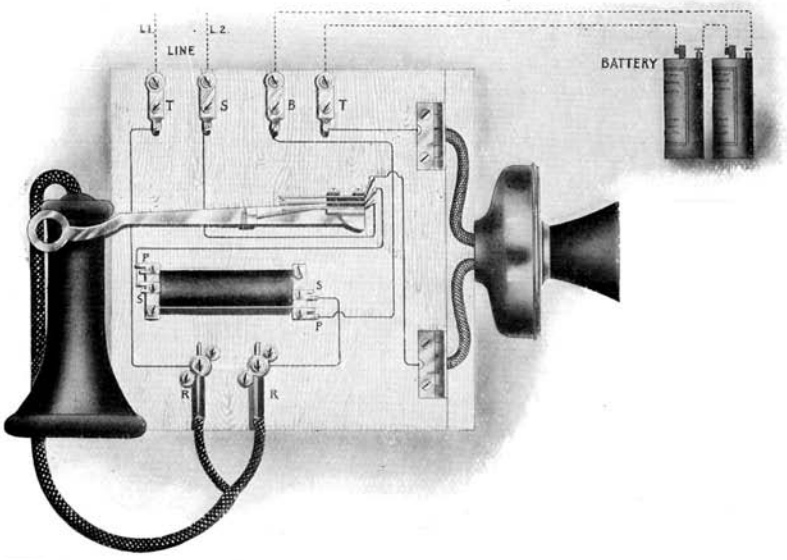
Silent Signaling Telephone

By the use of a direct current hand generator and biased ringer wired in a telephone circuit according to Fig. 7, page 83, it is possible to signal central without ringing the bells of similar instruments bridged across the same line. We make the following telephones for this service:

No. 223. COMPACT DRY CELL TELEPHONE—Oak woodwork, 1,000 ohm biased ringer, 4-bar direct current generator, No. 9-L transmitter, No. 12-A receiver, No. 3 arrester, two cells of dry battery. (Circuit 2687.)

No. 224. Same as No. 223, but walnut woodwork.

Sound-Proof Booth Telephone



THIS instrument is designed for mounting in sound-proof telephone booths where no signaling apparatus is necessary. It consists of the Standard Kellogg long distance talking circuit and apparatus, mounted and wired, as shown in the accompanying cuts.

No. 215. TELEPHONE—Oak woodwork, No. 9-L transmitter, No. 12-A receiver, No. 26 transmitter arm, No. 1-A induction coil, No. 23 type hookswitch.

No. 216. Same as No. 215, but walnut woodwork.

Cut-in Stations

IN order to render toll and rural lines of highest efficiency and reduce the trouble and expense occasioned by intermediate stations, it becomes necessary to have some positive and convenient way of dividing the line and separating the part not in use. By this division double service is possible, and if the line is a long one with many intermediate stations, it might be divided into several pieces, each giving service.

We make three styles of cut-in apparatus for this purpose.

Figs. 1, 2, and 3 are standard bridging cut-in stations made to operate with a plug and three spring jacks. Normally the line is connected through the apparatus with only a high wound ringer bridged across the circuit, as shown in Fig. 1. The intermediate station telephone is connected by cord and plug so that the latter can be

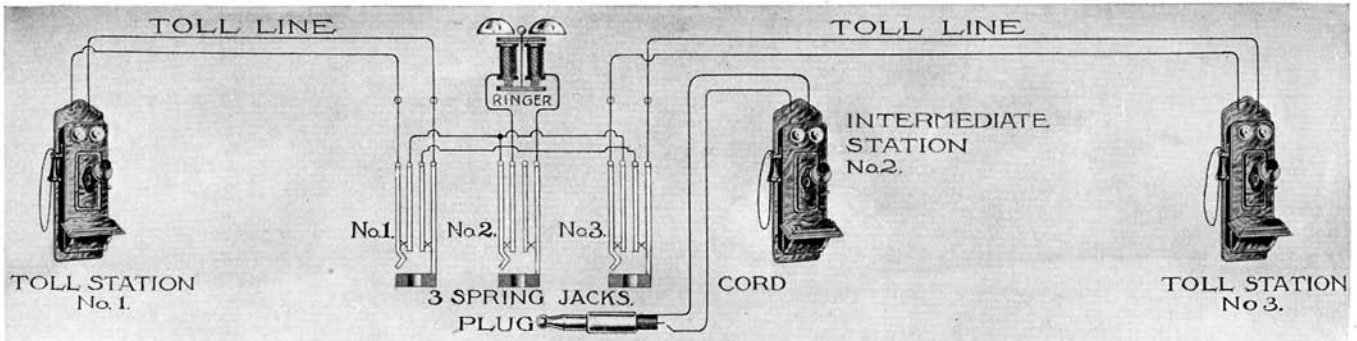


FIG. 1.

Cut-in Stations—continued

inserted for listening purposes into jack No. 2, Figs. 1 and 3, or into jacks No. 1 or No. 3, for connecting one half of the line and cutting off the remainder. When the plug is inserted into jacks No. 1 or No. 3, the cut-in station ringer is bridged across the section of the line then not in use, and that of the intermediate telephone is bridged across the part of the line cut in on. The plug should always be removed from the jacks when the telephone is not in service, but if this should be neglected the two ringers would allow calls to be received from either direction.

FIG. 2.

Fig. 4 shows the circuit of a similar arrangement, made up in the same style of woodwork, for series lines. Its operation is the same as for the bridging cut-in station.

We have greatly simplified the cut-in station apparatus and operation by the use of a double acting key, shown in Fig. 6. The cut-in station telephone is normally bridged across the circuit, as shown in Fig. 5, and either half of the line can be disconnected by throwing the key lever in that direction. This movement of the lever also connects the cut-in station ringer on the half of the line then not in use.

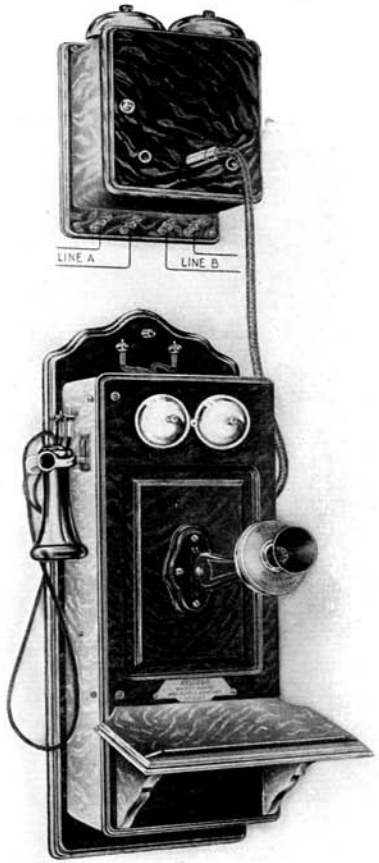


FIG. 3.

Cut-in Stations—continued

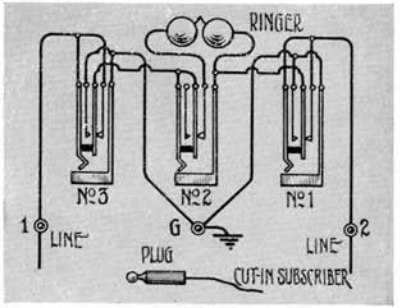


FIG. 4.

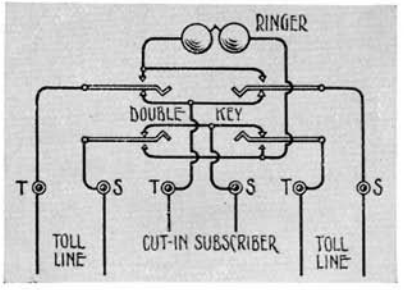


FIG. 5.

All of these instruments are made from high-grade material, carefully wired with soldered connections and provided with pure platinum contacts on all switching springs.

CODE NUMBERS.

No. 1-A. TOLL CUT-IN STATION—For bridging lines, oak woodwork, 1,600 ohm ringer, three No. 56 spring jacks, four binding posts, one No. 3 plug with a 36-inch, two conductor cord attached. See Figs. 1 and 2. (Circuit 1981.)

No. 2-A. Same as No. 1-A, but walnut woodwork.

No. 3-A. TOLL CUT-IN STATION—For series lines, oak woodwork, 80 ohm ringer, three No. 53 spring jacks, three binding posts, one No. 17 plug with a 36-inch cord attached. See Fig. 4. (Circuit 2644.)

No. 4-A. Same as No. 3-A, but walnut woodwork.

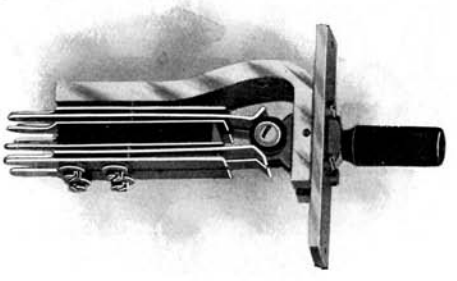


FIG. 6.

No. 5-A. TOLL CUT-IN STATION—For bridging lines, oak woodwork, 1,000 ohm ringer, one No. 30 key, six binding posts. See Fig. 5. (Circuit 3458.)

No. 6-A. Same as No. 5-A, but walnut woodwork.

Extension Bells

THESE extension bells are made up with our standard ringer mounted in a vertical position, with the gongs at the top of the box. The woodwork is well put together, and no apparatus or wiring is mounted on the lid.

No. 2-A. EXTENSION BELL—Oak woodwork, No. 1-B ringer, 80 ohms resistance.

No. 5-A. Same as No. 2-A, but walnut woodwork.

No. 2-D. EXTENSION BELL—Oak woodwork, No. 1-A ringer, 1,000 ohms resistance.

No. 5-B. Same as No. 2-D, but walnut woodwork.

No. 2-E. EXTENSION BELL—Oak woodwork, No. 1-D ringer, 1,600 ohms resistance.

No. 5 E. Same as No. 2-E, but walnut woodwork.

FIG 1.

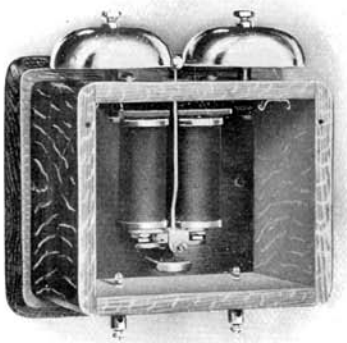


FIG. 2.

Desk Set Boxes

THE desk set boxes shown in the accompanying illustrations and listed below, are made up of standard Kellogg parts, mounted in well built cabinets, which are provided with hinged lids.

FIG. 1.

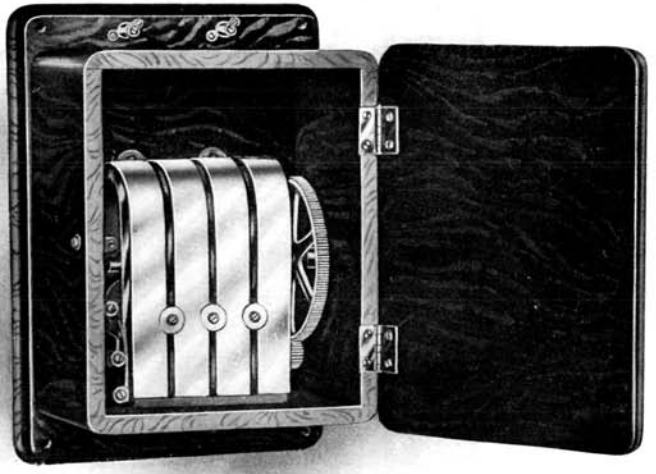


FIG. 2.

No. 52. Oak woodwork, 3-bar generator.
No. 59. Same as No. 52, but walnut woodwork.
No. 24. Oak woodwork, 4-bar generator.
No. 25. Same as No. 24, but walnut woodwork.
No. 57. Oak woodwork, 5-bar generator.
No. 58. Same as No. 57, but walnut woodwork.
No. 6. Oak woodwork, 80 ohm ringer, 3-bar generator.
No. 26. Same as No. 6, but walnut woodwork.
No. 5. Oak woodwork, 1,000 ohm ringer, 4-bar generator.

Desk Set Boxes—continued

No. 13. Same as No. 5, but walnut woodwork.

No. 14. Oak woodwork, 1,600 ohm ringer, 4-bar generator.

No. 15. Same as No. 14, but walnut woodwork.

No. 55. Oak woodwork, 1,000 ohm ringer, 5-bar generator.

No. 56. Same as No. 55, but walnut woodwork.

FIG. 3.

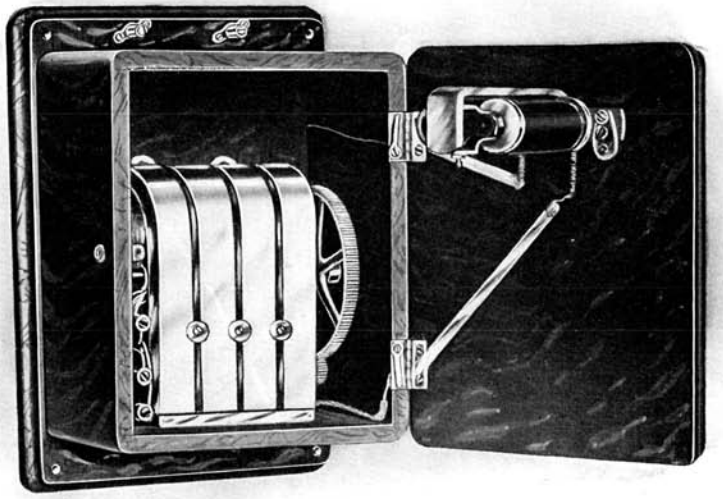


FIG. 4.

No. 53. Oak woodwork, 1,600 ohm ringer, 5-bar generator.

No. 54. Same as No. 53, but walnut woodwork.

No. 27. Oak woodwork, 80 ohm ringer, 3-bar generator, No. 1-A induction coil.

No. 28. Same as No. 27, but walnut woodwork.

No. 16. Oak woodwork, 1,000 ohm ringer, 4-bar generator, No. 1-A induction coil.

No. 17. Same as No. 16, but walnut woodwork.

No. 18. Oak woodwork, 1,600 ohm ringer, 4-bar generator, No. 1-A induction coil.

No. 19. Same as No. 18, but walnut woodwork.

Lineman's Test Sets

THE accompanying illustrations in Figs. 1 and 2, show our testing telephone for linemen's use. It is wired with the standard bridging circuit and equipped with a 1,000 ohm ringer and a four-bar generator, making it possible to make all necessary tests required on the heaviest loaded lines. This box is equipped with our No. 22-L transmitter, a watch case receiver, induction coil, and two cells of a pocket type of dry battery. The watch case receiver holder is connected with the hook-switch, so that when the receiver is in place the talking circuit is open and the signaling mechanism is switched into the circuit with the line binding posts. Fig. 3 shows a simpler outfit, the receiver in this case being also used as a transmitter.

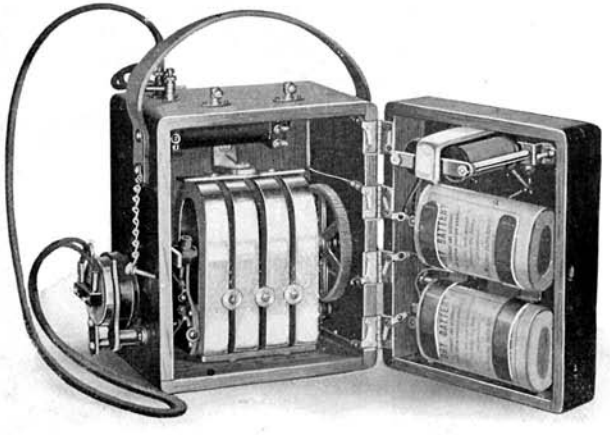


FIG. 1.

FIG. 2.

For certain classes of work this smaller outfit is amply sufficient. This type can be furnished either with a three or four bar generator for series or bridging lines, and as regards ringing is equally as efficient as the other type of test box.

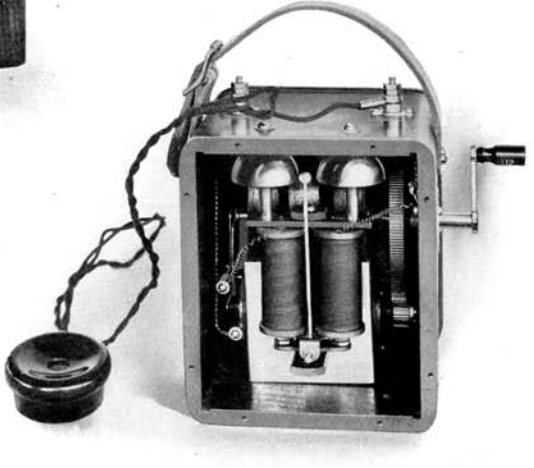


FIG. 3.

Lineman's Test Set

THE accompanying illustrations show an open and closed view of a complete testing telephone for linemen's use. It is wired with the standard bridging circuit, and equipped with a 1,000 ohm ringer and 4-bar generator, so that all the necessary tests required on the heaviest loaded lines can be done with ease and certainty. The talking circuit is provided with a No. 9-L transmitter, watch case receiver, induction coil, and two cells of pocket type dry battery. In fact it is a complete telephone, made as portable as possible, without reducing the efficiency of its parts.

FIG. 1.

Fig. 1 shows the testing set complete and ready for testing, while Fig. 2 is an open view giving a good idea of the accessibility to the various working parts.

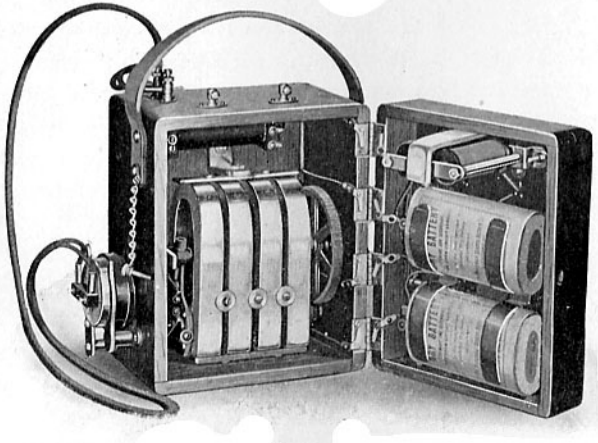


FIG. 2.

The watch-case receiver holder is connected with the hook-switch mechanism located on the interior of the set and is arranged so that when the receiver is in place the talking circuit is open and the signalling mechanism is switched into circuit with the line binding posts.

FIRST EDITION PAGE

Telephone Protectors

WHILE it is possible to construct telephones with extreme care, and reduce to the smallest limit all possible chances of burn-outs by high potential and sneak currents, yet lightning discharges and other electrical disturbances act with no predetermined schedule, and even the most reliable protection often becomes insufficient to meet the demands.

Our No. 3 arrester, described on pages 36 and 37, is a reliable device for an attached form of lightning protection, but for localities where the conditions are severe a simple carbon arrester is inadequate.

A combination fuse and carbon block arrester is an inexpensive form of protection which is much used. The carbon blocks serve as a protection from lightning discharges, while the fuse is made of low enough carrying capacity to blow before current from an affected line will destroy the telephone.

Fig. 2 shows two types of combined protectors for a single line conductor, and Fig. 3 shows similar types for metallic lines.

It will be noticed from these illustrations that we show only carbon blocks mounted in vertical springs. This allows the carbons to be easily removed and replaced for cleaning after lightning storms, as it is necessary to remove all dust from between the carbons caused by the discharges. Fig. 1 shows the position of the mica separator which should always be placed between the carbon blocks before inserting between the springs.

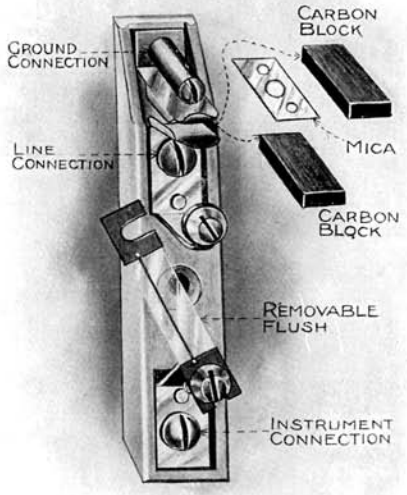
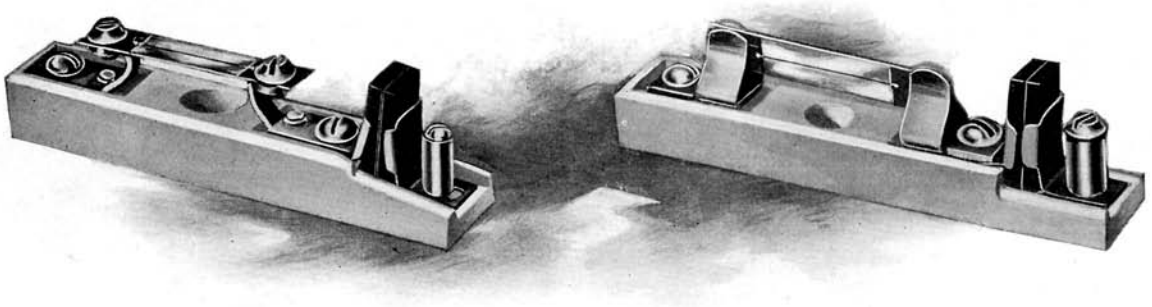


FIG. 1.

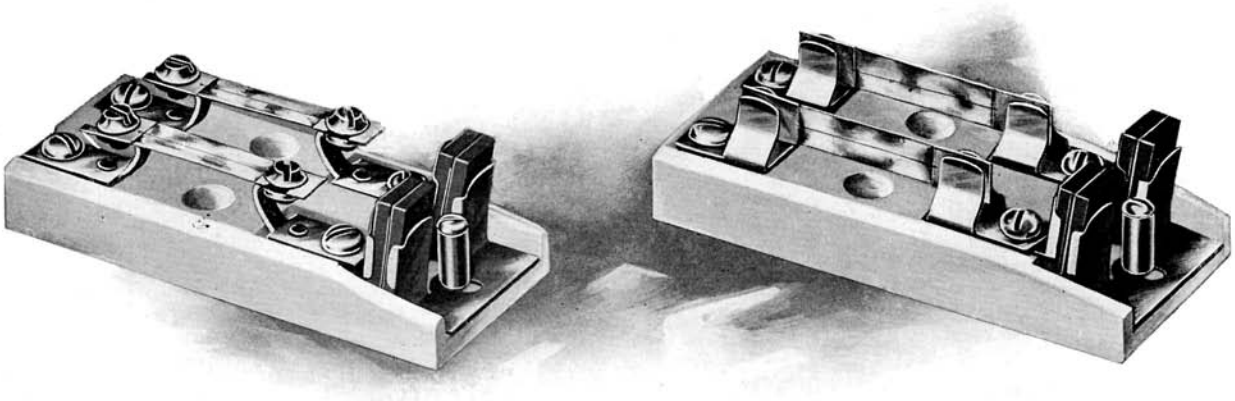
Figs. 2 and 3 show both the Western Union and Postal type fuse connectors. The terminals on the ends of the Western Union style fuses are plain, and are designed to be held in spring clips, while those of the Postal are notched

Telephone Protectors—continued



No. 47. Postal Style (Uses No. 11 Fuse). Fig. 2. No. 42. W. U. Style (Uses No. 8 Fuse).

Telephone Protectors—continued



No. 59. Postal Style (Uses No. 11 Fuse). Fig. 3. No. 57. W. U. Style (Uses No. 8 Fuse)

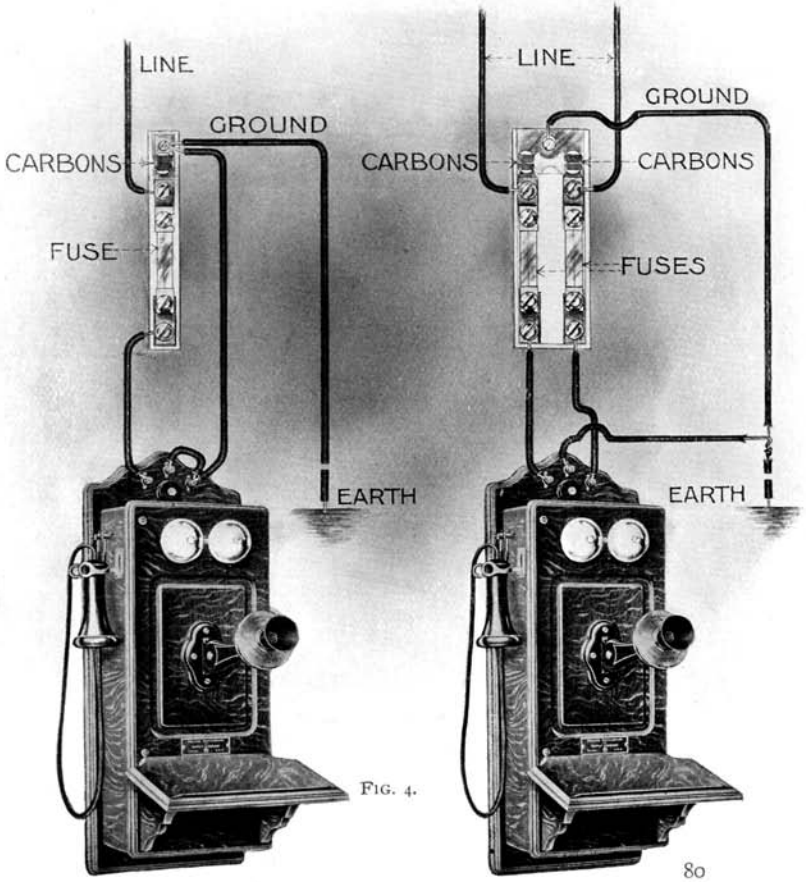


FIG. 4.

Telephone Protectors—continued

to pass under binding screws. We recommend the Postal style, as the connections made through the binding clips and fuse terminals are more reliable. Fig. 4 shows the method of connecting the double and single type fuse blocks.

Fuses are not included with the bases.

CODE NUMBERS.

No. 42. SINGLE POLE WESTERN UNION STYLE PROTECTOR—Upright carbons, spring fuse clips. Uses a No. 8 fuse.

No. 47. SINGLE POLE POSTAL STYLE PROTECTOR—Upright carbons, binding screw fuse connections. Uses a No. 11 fuse.

No. 57. DOUBLE POLE WESTERN UNION STYLE PROTECTOR—Upright carbons, spring fuse clips. Uses two No. 8 fuses.

No. 59. DOUBLE POLE POSTAL STYLE PROTECTOR—Upright carbons, binding screw fuse connections. Uses two No. 11 fuses.

No. 8. WESTERN UNION STYLE FUSE—Mica body with fuse wire soldered to plain copper ends, one-quarter ampere capacity. For protectors Nos. 42 and 57.

No. 11. POSTAL STYLE FUSE—Same as No. 8 fuse but with notched copper ends. For protectors Nos. 47 and 59.

"Way to Talk"

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Electrotypes of the above illustrations, four inches in length, will be loaned to operating telephone companies for printing in their directories.

"Way to Talk"

Electrotypes of the above illustrations, four inches in length, will be loaned to operating telephone companies for printing in their directories.

FIRST EDITION PAGE

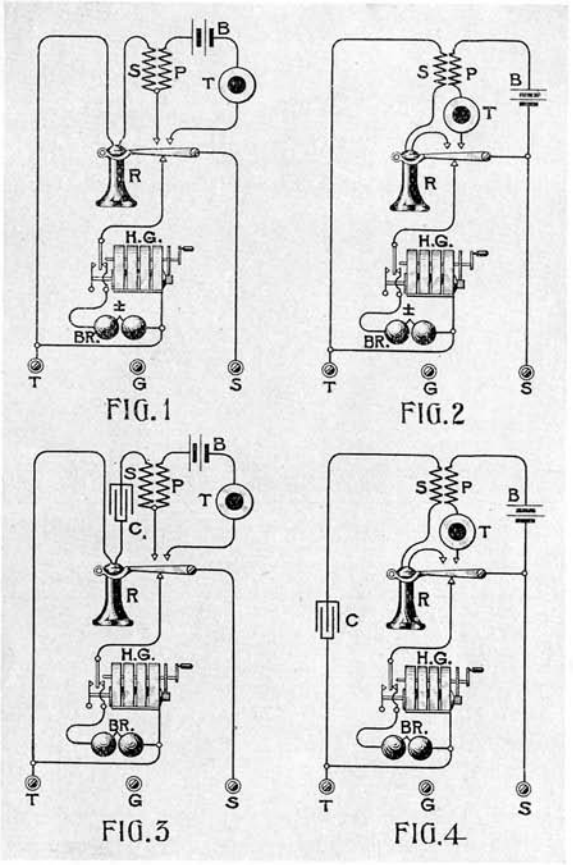


FIG. 1

FIG. 2

FIG. 3

FIG. 4

Telephone Circuits

THE circuits shown herewith are theoretical diagrams, our blue print numbers for complete detailed circuits of each are as follows:

Fig. 1. Standard Bridging Circuit for wall type telephones. Blue Print 2482, wall telephones with removable generator box. Blue Print 2463, wall telephones with compact dry cell type cabinet. Blue Print 2484, wall telephones with residence type cabinet. Blue Print 2556, wall telephones with removable generator box and No. 21 transmitter arm (induction coil in base of arm).

Fig. 2. Standard Bridging Circuit for desk type telephones. Blue Print 3032, desk telephone with standard wiring, induction coil mounted on connecting rack, ringer and generator mounted in desk set box. Blue Print 3053, desk telephone with 6-point connecting rack, and ringer, generator and induction coil mounted in desk set box. Blue Print 3454, desk telephone with induction coil mounted on connecting rack; generator mounted in desk set box, and ringer mounted in extension bell box.

Fig. 3. Bridging Circuit with condenser in secondary wiring of induction coil, for wall type telephones. (See page 68.) Blue Print 2215.

Fig. 4. Bridging Circuit with condenser in secondary wiring of induction coil, for desk type telephones. (See page 68.) Blue Print 2432.

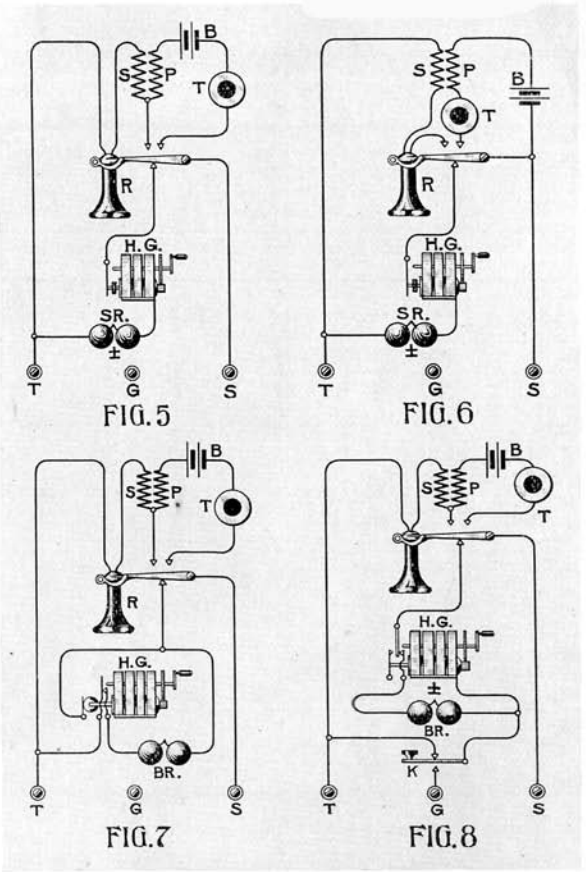
Telephone Circuits—continued

Fig. 5. Standard Series circuit for wall type telephones. Blue Print 2486, wall telephone with removable generator box. Blue Print 2487, wall telephone with compact dry cell cabinet. Blue Print 2488, wall telephone with residence type cabinet. Blue Print 2557, wall telephone with removable generator box, and No. 21 transmitter arm (induction coil in base of arm).

Fig. 6. Standard Series Circuit for desk type telephones. Blue Print 3031, desk telephone with standard wiring, induction coil mounted on connecting rack, ringer and generator mounted in desk set box. Blue Print 3054, desk telephone with 6-point connecting rack, and ringer, generator, and induction coil mounted in desk set box. Blue Print 3920, desk telephone with induction coil mounted on connecting rack, generator mounted in desk set box, and ringer mounted in extension bell box.

Fig. 7. Bridging Circuit with direct current generator for wall type telephones. (See Page 68.) Blue Print 2687.

Fig. 8. Bridging Circuit with generator grounding key for wall type telephones. (See page 61.) Blue Print 2794.



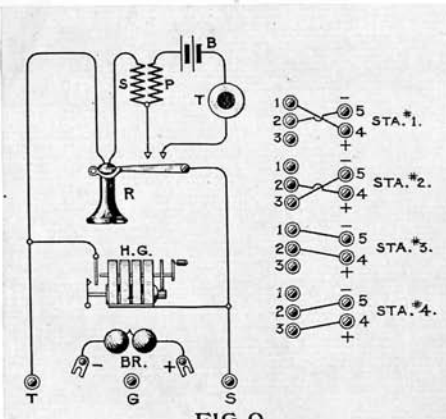


FIG. 9

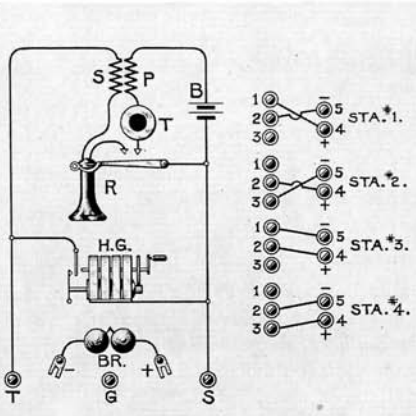


FIG. 10

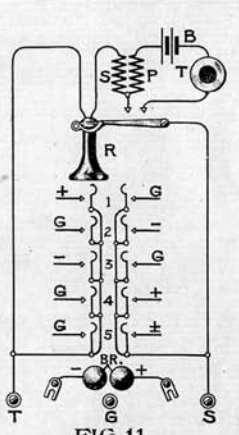


FIG. 11

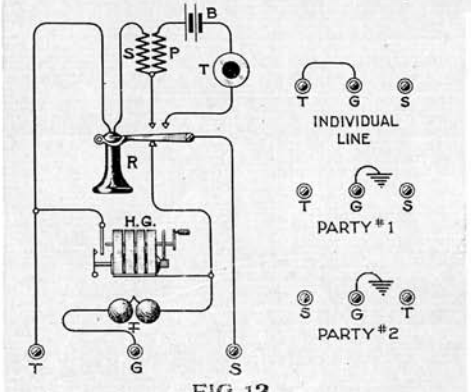


FIG. 12

Telephone Circuits—continued

Fig. 9. Four-party line selective circuit for wall type telephones. (See page 64.) Blue Print 751.

Fig. 10. Four-party line selective circuit for desk type telephones. (See page 64.) Blue Print 3921.

Fig. 11. Four-party line selective call box circuit for wall type telephones. (See page 64.) Blue Print 2774.

Fig. 12. Two-party line selective circuit for wall type telephones. (See page 62.) Blue Print 2064.

Telephone Code Numbers

SERIES, RESIDENCE TYPE TELEPHONE

No. 32. Oak woodwork, 80 ohm ringer and 3-bar generator.
No. 33. Same as No. 32, but walnut woodwork.

BRIDGING, RESIDENCE TYPE TELEPHONE

No. 34. Oak woodwork, 1000 ohm ringer and 4-bar generator.
No. 35. Same as No. 34, but walnut woodwork.
No. 36. Oak woodwork, 1600 ohm ringer and 4-bar generator.
No. 37. Same as No. 36, but walnut woodwork.

SERIES, SINGLE BATTERY BOX TELEPHONE

No. 42. Oak woodwork, No. 20 transmitter arm, 80 ohm ringer and 3-bar generator.
No. 43. Same as No. 42, but walnut woodwork.
*No. 44. Oak woodwork, No. 21 transmitter arm, 80 ohm ringer and 3-bar generator.
*No. 45. Same as No. 44, but walnut woodwork.

SERIES, DOUBLE BATTERY BOX TELEPHONE

No. 46. Oak wookwork, No. 20 transmitter arm, 80 ohm ringer and 3-bar generator.
No. 47. Same as No. 46, but walnut woodwork.
*No. 48. Oak woodwork, No. 21 transmitter arm, 80 ohm ringer and 3-bar generator.
*No. 49. Same as No. 48, but walnut woodwork.

SERIES, TANDEM BATTERY BOX TELEPHONE

*No. 54. Oak woodwork, No. 20 transmitter arm, 80 ohm ringer and 3-bar generator.
*No. 55. Same as No. 54, but walnut woodwork.

SERIES, COMPACT DRY CELL TELEPHONE

No. 58. Oak woodwork, No. 20 transmitter arm, 80 ohm ringer and 3-bar generator.
No. 59. Same as No. 58, but walnut woodwork.

SINGLE BATTERY BOX BRIDGING TELEPHONE

No. 60. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1000 ohm ringer.
No. 61. Same as No. 60, but walnut woodwork.
No. 62. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1600 ohm ringer.
No. 63. Same as No. 62, but walnut woodwork.
*No. 64. Oak woodwork, No. 21 transmitter arm, 4-bar generator and 1000 ohm ringer.
*No. 65. Same as No. 64, but walnut woodwork.
*No. 66. Oak woodwork, No. 21 transmitter arm, 4-bar generator and 1600 ohm ringer.
*No. 67. Same as No. 66, but walnut woodwork.

DOUBLE BATTERY BOX BRIDGING TELEPHONE

No. 76. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1000 ohm ringer.
No. 77. Same as No. 76, but walnut woodwork.
No. 78. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1600 ohm ringer.
No. 79. Same as No. 78, but walnut woodwork.
*No. 80. Oak woodwork, No. 21 transmitter arm, 4-bar generator and 1000 ohm ringer.
*No. 81. Same as No. 80, but walnut woodwork.
*No. 82. Oak woodwork, No. 21 transmitter arm, 4-bar generator and 1600 ohm ringer.
*No. 83. Same as No. 82, but walnut woodwork.
No. 84. Oak woodwork, No. 20 transmitter arm, 5-bar generator and 1000 ohm ringer.
No. 85. Same as No. 84, but walnut woodwork.
No. 86. Oak woodwork, No. 20 transmitter arm, 5-bar generator and 1600 ohm ringer.
No. 87. Same as No. 86, but walnut woodwork.
*No. 88. Oak woodwork, No. 21 transmitter arm, 5-bar generator and 1000 ohm ringer.
*No. 89. Same as No. 88, but walnut woodwork.
*No. 90. Oak woodwork, No. 21 transmitter arm; 5-bar generator and 1600 ohm ringer.
*No. 91. Same as No. 90, but walnut woodwork.

TANDEM BATTERY BOX BRIDGING TELEPHONE

*No. 108. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1000 ohm ringer.
*No. 109. Same as No. 108, but walnut woodwork.
*No. 110. Oak woodwork, No. 20 transmitter arm, 4-bar generator and 1600 ohm ringer.
*No. 111. Same as No. 110, but walnut woodwork.
*No. 116. Oak woodwork, No. 20 transmitter arm, 5-bar generator and 1000 ohm ringer.
*No. 117. Same as No. 116, but walnut woodwork.
*No. 118. Oak woodwork, No. 20 transmitter arm, 5-bar generator and 1600 ohm ringer.
*No. 119. Same as No. 118, but walnut woodwork.

Telephone Code Numbers—continued

BRIDGING, COMPACT DRY CELL TELEPHONE

No. 124. Oak woodwork, No. 20 transmitter arm, 1000 ohm ringer and 4-bar generator.
No. 125. Same as No. 124, but walnut woodwork.
No. 126. Oak woodwork, No. 20 transmitter arm, 1600 ohm ringer and 4-bar generator.
No. 127. Same as No. 126, but walnut woodwork.
No. 128. Oak woodwork, No. 20 transmitter arm, 1000 ohm ringer and 5-bar generator.
No. 129. Same as No. 128, but walnut woodwork.
No. 130. Oak woodwork, No. 20 transmitter arm, 1600 ohm ringer and 5-bar generator.
No. 131. Same as No. 130, but walnut woodwork.

MISCELLANEOUS TELEPHONES

No. 174. Selective Party Line, double battery box, oak woodwork, No. 20 transmitter arm, 2500 ohm biased ringer and 4-bar generator.
No. 175. Same as No. 174, but walnut woodwork.
No. 184. Selective Party Line, compact dry cell box, oak woodwork, No. 20 transmitter arm, 2500 ohm biased ringer and 4-bar generator.
No. 185. Same as No. 184, but walnut woodwork.
*No. 211. Bridging with ringer wired to ground or middle binding post, compact dry cell box, oak woodwork, No. 20 transmitter arm, 1000 ohm ringer and 4-bar generator.
*No. 212. Same as No. 211, but walnut woodwork.
*No. 215. Booth Telephone with local battery circuit, oak woodwork, No. 26 transmitter arm, No. 22-L transmitter and No. 12-A receiver.
*No. 216. Same as No. 215, but walnut woodwork.
*No. 223. Bridging (arranged so that all bells on similar instruments located on same line will remain silent when signaling Central), compact dry cell box, oak woodwork, No. 20 transmitter arm, 1000 ohm biased ringer, 4-bar direct current generator, No. 22-L transmitter and No. 12-A receiver.
*No. 224. Same as No. 223, but walnut woodwork.
*No. 227. Selective Signal 4 party line call box, double battery box, oak woodwork, No. 20 transmitter arm, 2500 ohm biased ringer, 5-bar pulsating and alternating current generator, 5 call buttons, No. 22-L transmitter and No. 12-A receiver.
*No. 228. Same as No. 227, but walnut woodwork.
*No. 229. Bridging with generator grounding key (arranged for calling Central without disturbing other parties on same line, also to call parties on same line without throwing the drop at Central), double battery box, oak woodwork, No. 20 transmitter arm, 1600 ohm ringer, 5-bar generator, grounding key, No. 22-L transmitter and No. 12-A receiver.
*No. 230. Same as No. 229, but walnut woodwork.

BRIDGING AND SERIES DESK SETS

(WITH SEPARATE 6-POINT CONNECTING RACK)

*No. 1. Bridging, oak woodwork, 1000 ohm ringer and 4-bar generator.
*No. 2. Same as No. 1, but walnut woodwork.
*No. 3. Bridging, oak woodwork, 1600 ohm ringer and 4-bar generator.
*No. 4. Same as No. 3, but walnut woodwork.
*No. 5. Series, oak woodwork, 80 ohm ringer and 3-bar generator.
*No. 6. Same as No. 5, but walnut woodwork.

BRIDGING AND SERIES DESK SETS

(WITH INDUCTION COIL MOUNTED ON 6-POINT CONNECTING RACK)

No. 7. Bridging, oak woodwork, 1000 ohm ringer and 4-bar generator.
No. 8. Same as No. 7, but walnut woodwork.
No. 9. Bridging, oak woodwork, 1600 ohm ringer and 4-bar generator.
No. 10. Same as No. 9, but with walnut woodwork.
No. 11. Bridging, oak woodwork, 1000 ohm ringer and 5-bar generator.
No. 12. Same as No. 11, but walnut woodwork.
No. 13. Bridging, oak woodwork, 1600 ohm ringer and 5-bar generator.
No. 14. Same as No. 13, but walnut woodwork.
No. 15. Four-Party Selective Ringer, oak woodwork, 2500 biased ringer and 4-bar generator.
No. 16. Same as No. 15, but walnut woodwork.
No. 17. Series, oak woodwork, 80 ohm ringer and 3-bar generator.
No. 18. Same as No. 17, but walnut woodwork.

BRIDGING DESK SETS

(WITH EXTENSION BELL AND SEPARATE 6-POINT CONNECTING RACK AND INDUCTION COIL)

*No. 19. Bridging, oak woodwork, 1000 ohm ringer and 4-bar generator.
*No. 20. Same as No. 19, but walnut woodwork.
*No. 21. Bridging, oak woodwork, 1600 ohm ringer and 4-bar generator.
*No. 22. Same as No. 21, but walnut woodwork.
*No. 23. Bridging, oak woodwork, 1000 ohm ringer and 5-bar generator.
*No. 24. Same as No. 23, but walnut woodwork.
*No. 25. Bridging, oak woodwork, 1600 ohm ringer and 5-bar generator.
*No. 26. Same as No. 25, but walnut woodwork.

SERIES DESK SETS

(WITH EXTENSION BELL AND SEPARATE 6-POINT CONNECTING RACK AND INDUCTION COIL)

*No. 27. Series, oak woodwork, 80 ohm ringer and 3-bar generator.
*No. 28. Same as No. 27, but walnut woodwork.

NOTE—Orders for all instruments with a star (*) opposite code number are subject to delay, as they are not carried in stock.

Contents

To the Purchaser

TERMS to people of established credit are 30 days net, or 2 per cent discount for cash.

REFERENCES—Unless your standing is known to us, or you have a rating with the Agencies, please have statement of your financial condition and satisfactory references accompany your orders.

C. O. D. shipments will be made if a remittance, sufficient to pay express charges both ways, accompanies order. Goods may be forwarded by freight with sight draft attached to bill of lading, or by express collect on delivery.

SHIPMENTS will be made according to shipping directions received with orders, but in their absence we will use our best judgment in making selections of routes. State whether we shall ship by freight or express. *As far as possible order apparatus by code number.*

PRICES will be cheerfully and promptly furnished on application.

CLAIMS—Goods are carefully packed by experienced men and each article is checked three times before reaching the packing case. Claims for shortage should be made immediately on receipt of goods and should be accompanied by the packer's ticket, which is placed in each packing case. Do not deduct from your remittances any charges for freight or express, unless we shall have signified our intention to allow them.

RETURNED GOODS—Under no circumstances return goods to us without first getting our permission, otherwise we will refuse to receive them. We stand ready to correct at any time errors on our part, and expect our customers to accept liability for their own mistakes. The name and address of the shipper should be plainly marked on returned packages.

LIABILITY—We cannot be responsible for packages after having obtained "in good order" receipt from the transportation company. All claims for breakage and damage should be to the carriers.

Goods ordered to be shipped by mail will only be sent at purchaser's risk of loss or damage.


HIGHEST AWARD
PAN-AMERICAN EXPOSITION
"SYSTEMS AND APPARATUS"