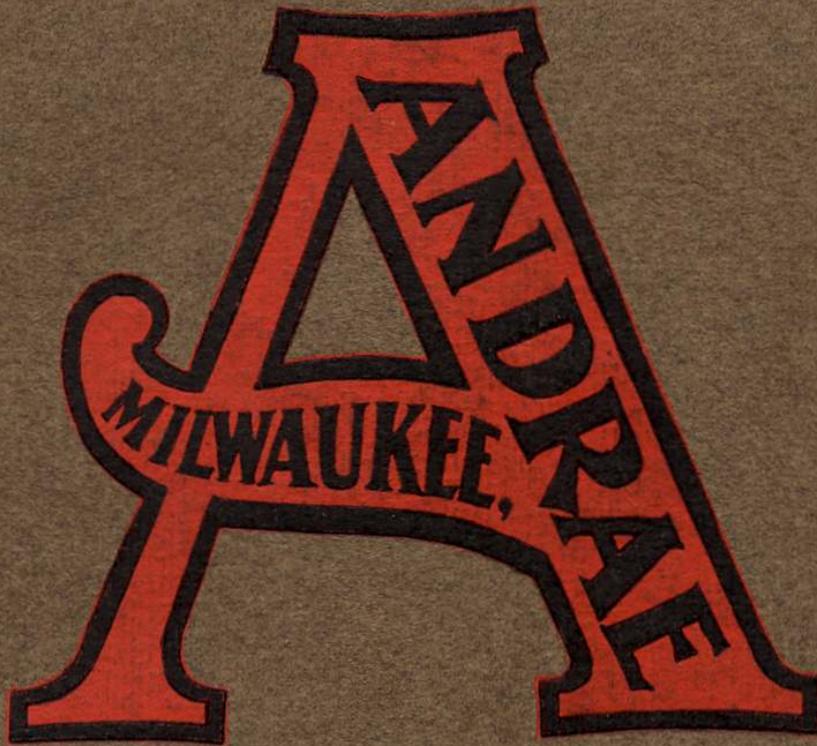


CATALOG NUMBER ELEVEN

TELEPHONES



SWITCHBOARDS

Julius Andrae & Sons Company

MILWAUKEE, WIS., U. S. A.

Introductory

IN PRESENTING this catalog to the trade, we do so with the full conviction that our past efforts to produce telephone apparatus of the highest grade have met with more than a partial degree of success.

We thank our customers and friends for the courtesy and appreciation shown in the past, and will endeavor to merit your future consideration by the maintenance of a high standard of apparatus, fair and courteous treatment, and the handling of your business in a manner deserving thereof.

Andrae apparatus is honestly and conscientiously made by men who thoroughly appreciate the value of simple, durable and reliable telephones and switchboards.

The carrying out of these principles, as shown in the careful design, the use of finest material obtainable, and skillful workmanship, are the secrets of the ANDRAE reputation for highest efficiency and lowest cost of maintenance.

Terms.

Our terms are thirty days, net cash (unless otherwise agreed upon) to purchasers known to us.

We suggest that a remittance or satisfactory references accompany the first order from those not known to us, and who are not rated in the commercial agencies, as this will avoid the delay and inconvenience necessary to the investigation of your financial standing.

C. O. D. shipments cannot be made unless a deposit equal to 25 per cent. of the full amount is sent with order. Goods may be forwarded by freight, with sight draft attached to bill of lading, or by express, collect upon delivery.

Customers Please Note:

1st. We ship standard goods immediately upon receipt of order, but unless you clearly specify by catalog number and code word what is wanted, your order may be delayed. Directions as to proper routing of orders should be given, in the absence of which we use our best judgment. Write orders on separate sheet. If information is wanted upon any subject whatever, you will get same and also your goods much more quickly by having them written separately.

2nd. We employ experienced packers and a force of competent checkers to prevent errors, shortages, etc., and ask that a careful search be instituted before making shortage claims; all claims should be presented inside of ten days for our consideration.

Our responsibility for safe delivery of goods ceases after delivery in good order to carriers, and all claims for goods received in

damaged condition should be presented *at once* to transportation company handling shipment. Goods sent by mail are sent at *purchaser's* risk of loss or damage.

3rd. Under no circumstances return goods to us unless we direct you to do so. Goods returned for any reason should bear shipper's name and address. Errors are made by the best of us, and we stand prepared at all times to correct errors on our part, but we expect our customers to show us some consideration in these matters.

4th. We issue price lists giving the lowest market quotations on all standard goods, and endeavor to have in our customers' hands an up-to-date price list at all times, yet we do not hold ourselves liable for changes in prices without notice. Prices are always for shipment from Milwaukee stock unless otherwise specified, except such goods as are regularly shipped direct from factories, in which cases prices are for factory delivery, unless otherwise agreed upon.

“Pick-Ups.”

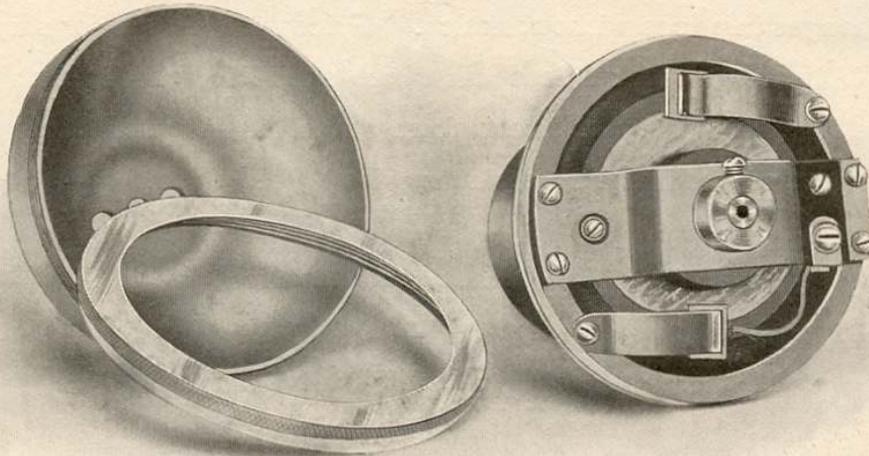
We have established for the benefit of our patrons a system of picking up material not carried by us, which enables us to take your order and make one shipment, thereby avoiding more than one freight charge, and a considerable inconvenience to you.

It must be remembered, however, that a “Pick-Up” necessarily delays an order to some extent, and furthermore, it is sometimes possible that some goods are not to be “picked up,” owing to a shortage in the market.

We are always glad to furnish any information desired, and respectfully solicit your correspondence.

ANDRAE TRANSMITTERS.

The efficiency of Andrae Solid Back Transmitters is the result of years of experimenting, persistent effort and careful perfecting by telephone experts of vast resources. Andrae Solid Back Transmitters, since their advent several years ago, have been tried by some of the most exacting telephone users in America, and the universally favorable expression of satisfactory results derived therefrom, more than substantiate all we claim for them. It is con-



Andrae Solid Back Long Distance Transmitter.

structed upon the latest principles of modern telephony, made with a heavy cast brass front, and heavy stamped back; metal and carbon diaphragms held in place with German silver springs, while the back carbon electrode is held in place by a heavy brass bridge, which in turn is supported by the transmitter front. The granular carbon is exceedingly hard and uniform in size and free from dust, retaining these qualities indefinitely. Each granule has a highly polished irreg-

ANDRAE TRANSMITTERS—CONTINUED.

ular surface and a density not unlike black diamond, being hard enough to cut glass. This carbon is imported for our especial use at a large cost over domestic carbon.

The diaphragm is manufactured in a manner entirely of our own invention, which does away with all side tones, and makes it thoroughly moisture proof. The heavy stamped back or cover is attached in such a manner that no screws are used on the outside of the entire transmitter. Every small minor working part 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 second to none.

Points embodied in the construction of Andrae transmitters are:

An instrument which is proof against "packing" or becoming dead from regular use. The most far-reaching transmission possible, suited for long distance and local connections. An instrument which will not blur or break when talking loud, and not susceptible to foreign sounds or noises in the room. An instrument operating with minimum battery consumption, but withstanding a variation of current without generating the disagreeable frying and scratching noises so prevalent in many transmitters. Small number of parts, accurately made from the best material obtainable, reducing possible chances for trouble to a minimum.

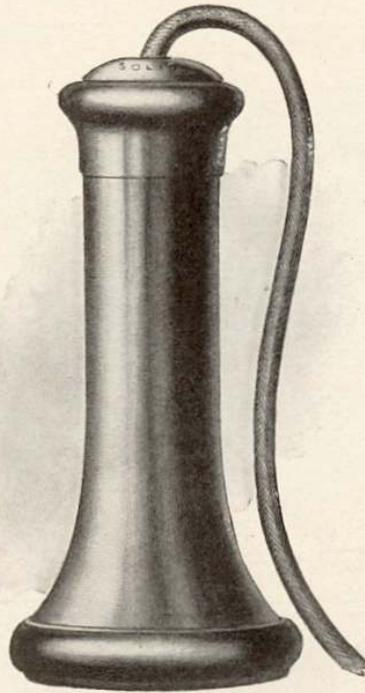
A highly finished transmitter, unexcelled for durability and long life, obtained from careful selection of material used in its construction.

A "perfect" transmitter.

ANDRAE RECEIVER—STYLE D.

Next in importance to the transmitter, in the talking circuit, is the receiver.

Andrae Receivers are the result of careful design tested out in actual operation for all conditions of service. The object in their design is to obtain the highest electrical and acoustic efficiency, and the best mechanical design, with the least possible chances for trouble. Experience has demonstrated that the Andrae is a properly designed and carefully constructed telephone receiver; is not subject to quick



Andrae Solid Receiver.

deterioration, therefore needs no adjustment after leaving the factory, and that all provisions for adjustment serve as a source of trouble and are a detriment rather than an advantage.

Andrae Solid Receivers have all parts moulded in the case, making the adjustment perfect, absolute and permanent. It cannot change, as the magnets cannot move. Neither can atmospheric conditions or undue shocks affect adjustment.

ANDRAE RECEIVER—STYLE D.—CONTINUED.

The cord terminals are enclosed 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. A cord thus fastened will last fully three times as long as with any other form of attachment. Andrae Receivers have all metal parts entirely concealed within their retaining case, obviating all possibility of shocks from lightning or electric light circuits.

ANDRAE INDUCTION COILS.

An efficient induction is requisite to step up the low pressure primary currents furnished by the cells of local batteries to such a magnitude as to penetrate easily the resistance and retardation of the low circuit. Before deciding upon the relative resistance of the primary and secondary windings, we made elaborate tests to determine



Andrae Induction Coil.

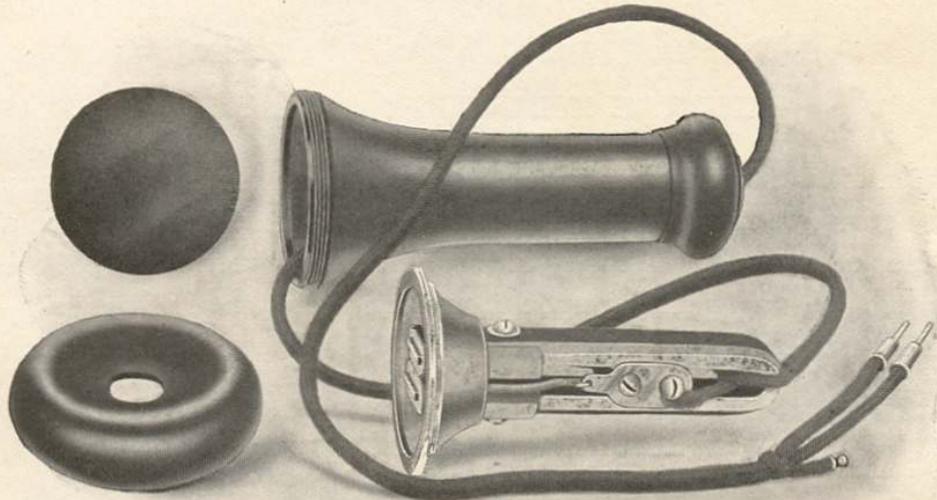
the best combination, and have adopted one which adds greatly to the efficiency of the talking circuit. The coil is wound with silk-covered magnet wire, and the core is made up of annealed iron wires.

The heads are heavy fibre blocks, which afford a good mounting for the terminals and for fastening the coil to the telephone box.

ANDRAE RECEIVER—STYLE A.

Our experience has demonstrated that our Andrae Solid Receiver, as shown on page 6, is the most serviceable of any receiver on the market. To meet the demand for a loose shell receiver however, we offer our Andrae Style A illustrated herewith.

This receiver is made of carefully gauged, interchangeable parts, and best of material, making a permanent and lasting instrument.



Andrae Style A Receiver.

Our Style A Receiver, aside from the loose shell feature, is identical in quality with our well known Solid Receiver. For a receiver of this type it has no superior.

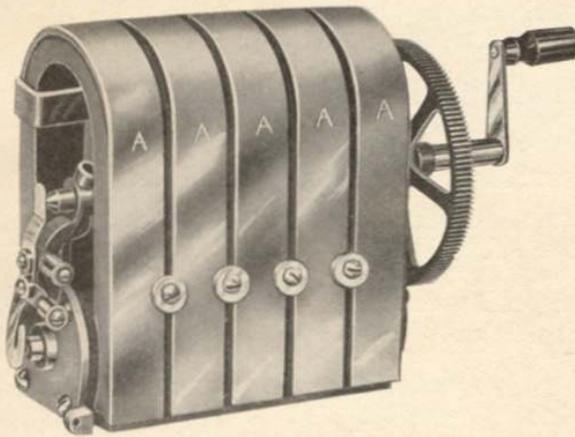
Unless specific directions to the contrary are received, Andrae telephones are invariably equipped with our Solid Receiver Style D.

ANDRAE "GIANT" GENERATORS.

Most Powerful Generator Made.

Generators are an important part of telephones. Many difficulties have been experienced in producing generators of sufficient output with lasting qualities and stability suitable for the exacting requirements of the various classes of magneto call service.

"Giant" generators were designed by pioneers in the business, and



"Andrae Giant" 5-Bar 100,000 Ohm Generator.

are pronounced by experienced users to be as nearly perfect electrically and mechanically as can be made. "Giant" generators are the strongest on the market. This statement, without evidence confirming it, would be no argument in its favor. To substantiate this statement however, it is only necessary to observe the original design, excellent

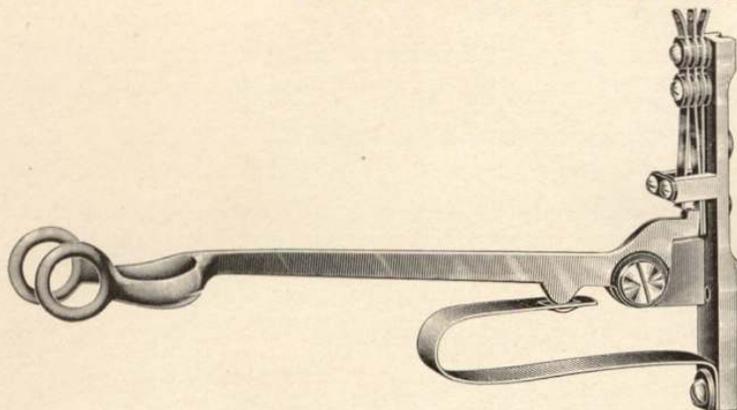
material, and the minute attention given to the smallest details of its construction. The output of a generator depends on its watts. In practice the electrical pressure (volts) must be great enough to penetrate the resistance of a line, and the current (amperes) forced through by this pressure must be of sufficient quantity to ring all of the bridged bells connected across the line. Insufficient output of either of these elements results in a low output of watts. The increased watts output is due to—First, a larger cross section of the armature core; Second, the use of larger wire with a greater number of turns in the armature winding; Third, smaller air gap between the pole and armature surface.

It will be noticed from the following description of the construction of our generator that we have taken advantage of these points, and as a result obtain the maximum effective watt output, and

ANDRAE "GIANT" GENERATORS—CONTINUED.

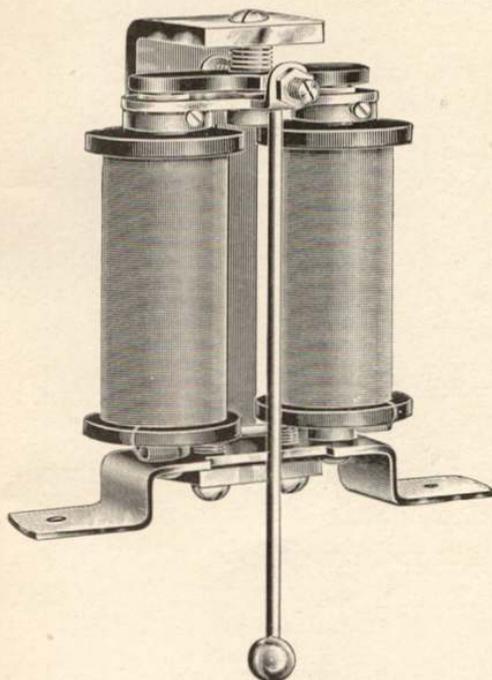
naturally a most powerful completed generator. The armature is laminated, the laminations being punched out of the very best Norway Sheet Steel and driven with high pressure on a steel shaft. Each armature is turned and ground between centers. This construction insures highest permeability, interchangeability and accuracy in bearings of the completed armature. The air gap is the smallest that good engineering will permit. The cross section of our armature is well considered, and we are able to wind larger sizes of wire with more turns than is possible on most generators, thus insuring a large watt output. The wire used on "Giant" armatures is the best silk insulated wire made. The insulation is very thorough, special attention being paid to the insulation of the contact pin, in which so much trouble is experienced in other generators. "Giant" magnets are made from a special grade of steel, imported for our particular requirements. We have special machinery for heating, bending and tempering these magnets. We saturate our magnets individually with a powerful magnetizing apparatus, in such a manner as to insure their full magnetic qualities permanently. Each magnet is covered with a brass nickel plated shield which prevents rusting. Our gears are made of machine cut brass, with an extra wide face, resulting in smooth running gears and will outlast an ordinary telephone. Special attention is paid to the shunt to make the machine quick acting, permanent and positive. Every generator is tested before leaving our factory, and if it fails to produce a certain voltage and current output, is rejected.

Numerous other desirable features commend "Giant" generators to the purchaser of high class telephone apparatus. Special attention is given to the finish, workmanship and care in assembling the various parts. "Giant" generators are made with three, four and five magnets for series and bridging work.

ANDRAE HOOK SWITCH.**Andrae Hook Switch.**

tions are permanently fastened, and that outside of the generator shunt the only movable or switch contacts in the telephone are located in this piece of mechanism, the necessity of a perfect hook switch is appreciated. Having from the first taken great pains in the design of this seemingly unimportant piece of apparatus, we are without a doubt making the most reliable telephone switch on the market. Our new long lever hook switch is self contained, and perfection of contacts cannot be equalled. Contact points are made from pure platinum.

Few telephone manufacturers realize the importance of a properly designed hook switch. When it is considered that all other circuit connec-

ANDRAE RINGERS.**Andrae Ringers.**

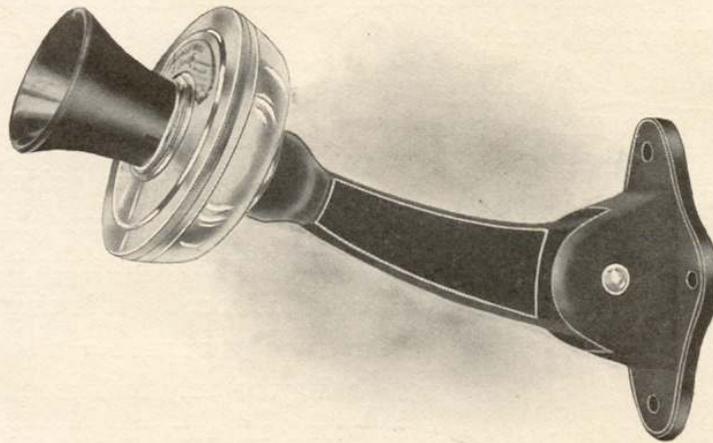
In Andrae Ringers we offer to the telephone public a decided improvement. The feature that appeals to all telephone men is the method of adjustment. It is simple, effective and permanent—a screw driver being the only tool necessary. The cores of our ringers are of double annealed imported Norway iron, and are wound with all silk wire. Our bridging ringers are wound to get high impedance and as many turns as possible to their specific resistance. The gongs are made of bell metal highly nicked and polished. They are fastened by means of screws, to standards which in turn

ANDRAE RINGERS—CONTINUED.

are attached directly to the telephone cabinet. Gongs being mounted separately, it is possible to remove the ringer movement from the box by merely loosening the wood screws which hold it, and not in any way disturbing the gongs.

ANDRAE TRANSMITTER ARMS.

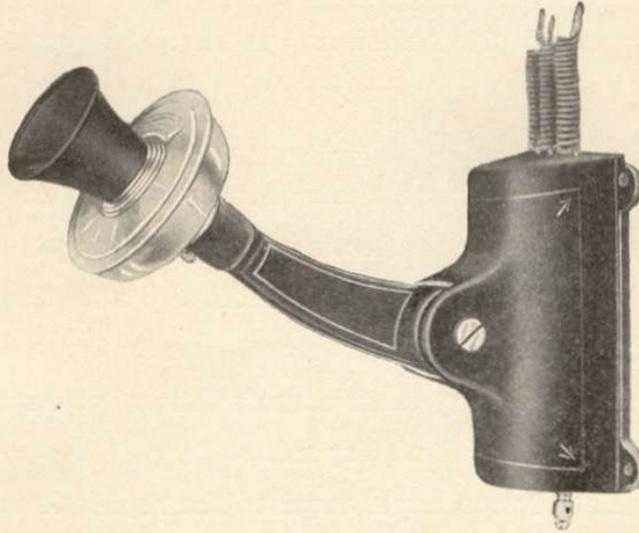
Andrae Telephone Arms receive the same careful attention bestowed upon more important parts of Andrae apparatus. They are made to fit various types of telephone cabinets, being sufficiently long, when attached, to extend the transmitter to a convenient position for speaking directly into the mouthpiece. These arms are made



Andrae Transmitter Arm.

hollow, so that two concealed cords can be used to connect the transmitter with the telephone wiring. The metal is insulated from the telephone circuit, making it impossible to receive a shock from the arm.

The adjusting feature is simple and positive, thus preventing arms from becoming loose in socket.

ANDRAE TRANSMITTER ARMS—CONTINUED**ANDRAE LIGHTNING ARRESTER.**

This arrester has been long known as a most simple and reliable arrester. We are free to confess, however, that in addition to this style, a fuse block type of arrester should be used. The proper place for a lightning arrester is not on the telephone but somewhere in the outside circuit.

ANDRAE TELEPHONE CORDS.

We use only telephone and desk stand cords of the highest grade. This cord not only presents a fine external appearance, but has exceptional lasting qualities.

ANDRAE TELEPHONES.

Having described the more important parts of our apparatus, we will now take up the telephone proper. The mere "throwing to-gether" of the parts previously described, into the form of a telephone, does not necessarily produce a good telephone. It is the careful attention to detail and the proper arranging of these highly efficient parts which insures a lasting telephone, simple in operation, and a prevention of outside troubles, usually affecting its delicate parts. We undoubtedly expend more money on the assembling of our telephones than any other manufacturer, but our success convinces us that this money is well spent.

Andrae Telephones have acquired the reputation of being perfect when leaving our factory, and this reputation we intend to maintain.

FINISH.

All cabinet work is taken from selected stock, thoroughly well seasoned, and skillfully joined to make strong and attractive telephone cabinets. These are thoroughly and evenly finished and present 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 joints, and with the exception of the generator connections, carefully soldered.

All exposed wires are insulated by soft rubber sleeving. Positive continuity of circuit is assured in transferring the wiring to the lid or hinged portion of the telephone cabinet by the use of a hinge with a flat contact spring, each end of which is securely riveted and soldered to the halves of hinge.

ANDRAE TELEPHONES—CONTINUED.**TESTING.**

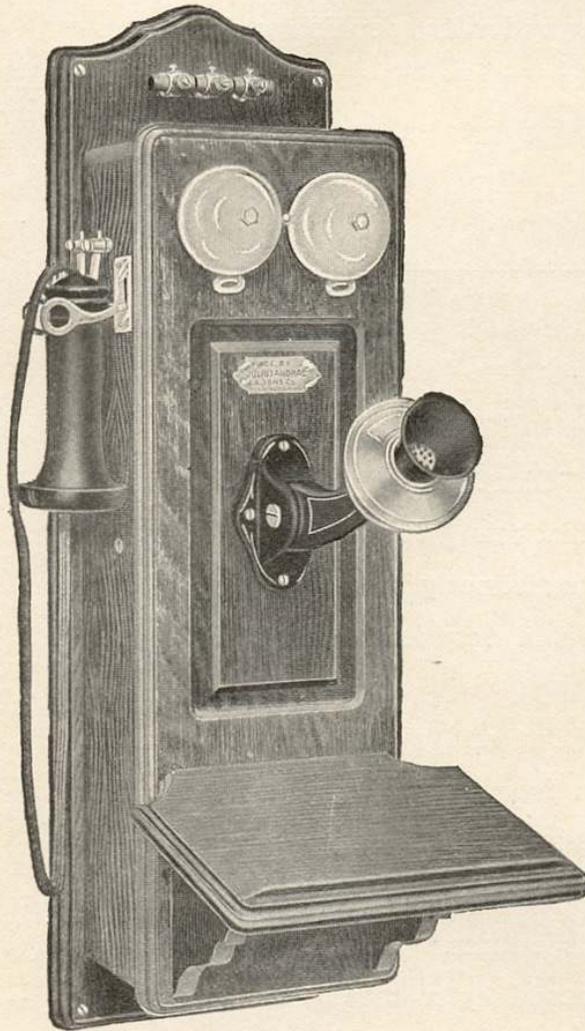
Every precaution is exercised in the testing of Andrae Telephones to see that all is made perfect. Each instrument is adjusted and tested for practical working under its specific requirements.

They are securely packed in strong boxes ready for shipment, and a safe delivery of perfect working telephones is assured.

GUARANTEE.

We guarantee Andrae "Giant" Generators to be the most powerful and durable on the market. We guarantee Andrae Transmitters to talk farther and more distinctly than any other. We guarantee Andrae Solid Receivers will cost less to maintain and are the best sound reproducers made.

We guarantee all telephone and switchboard apparatus furnished by us to be first class in every respect, and to be free from inherent electrical and mechanical defects. We agree to replace or repair any part free of charge, that proves defective in material or workmanship, at any time, upon its return, provided same is properly installed, and the fault is not caused by misuse, ordinary wear, accident or neglect.

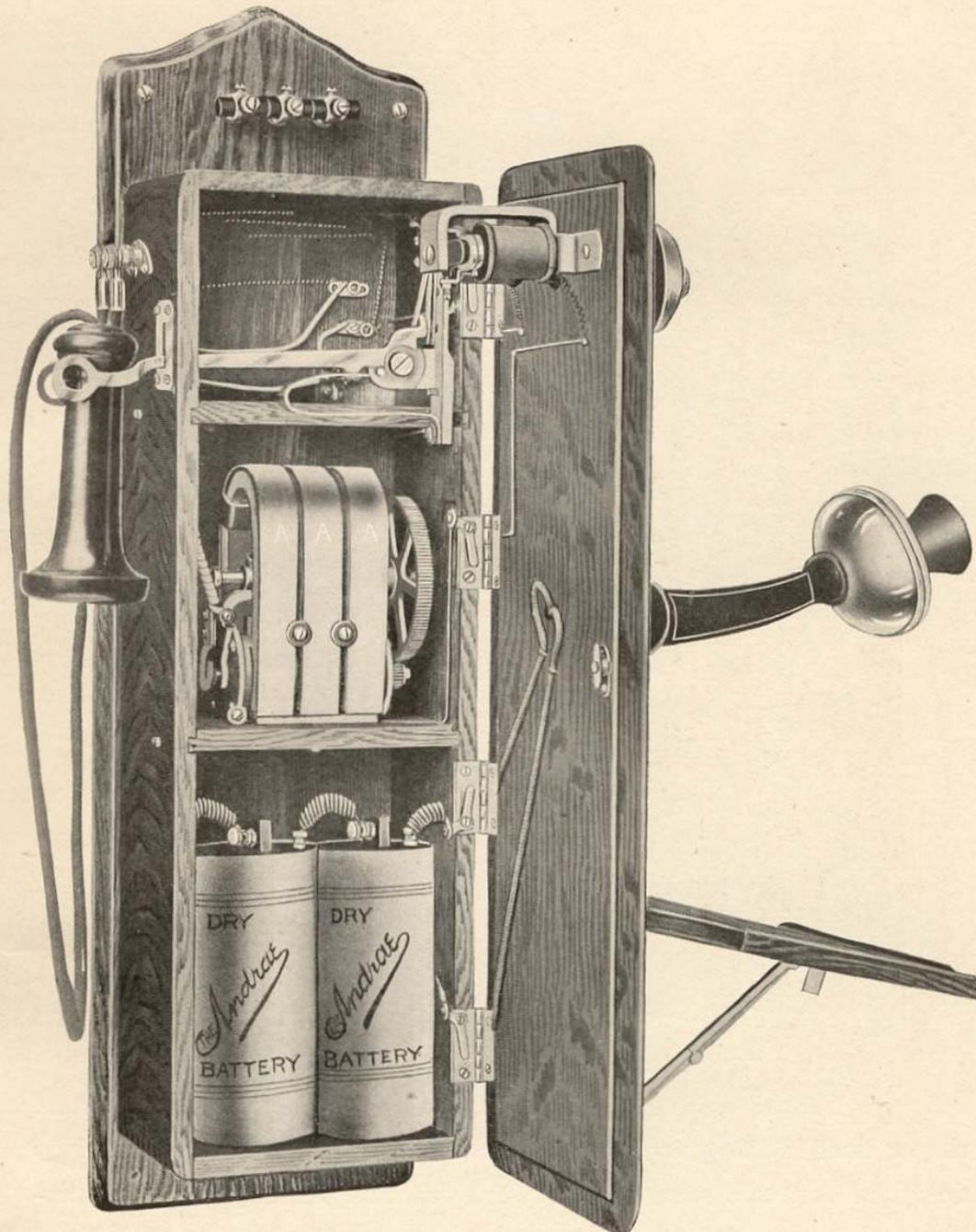
ANDRAE "GIANT" SERIES TELEPHONE.**COMPACT DRY CELL TYPE.**

Andrae "Giant" Series Telephone.

We have adopted the type of telephone shown in accompanying illustration as our standard series telephone. It has won popular favor the past few years, due to its compactness, durability and ease of accessibility to working parts. The woodwork is well made, thoroughly seasoned and highly finished; furnished in quarter-sawed oak or walnut, as desired. The Andrae long distance solid back transmitter, used in this instrument, requires a comparatively small amount of current, insuring long life to the dry cells, reducing the only item of expense to a minimum. Andrae "solid

receiver", "Giant" generator, and standard Andrae parts throughout guarantee a combination unequalled for durability and efficiency.

**ANDRAE "GIANT" SERIES TELEPHONE.
COMPACT DRY CELL TYPE.**



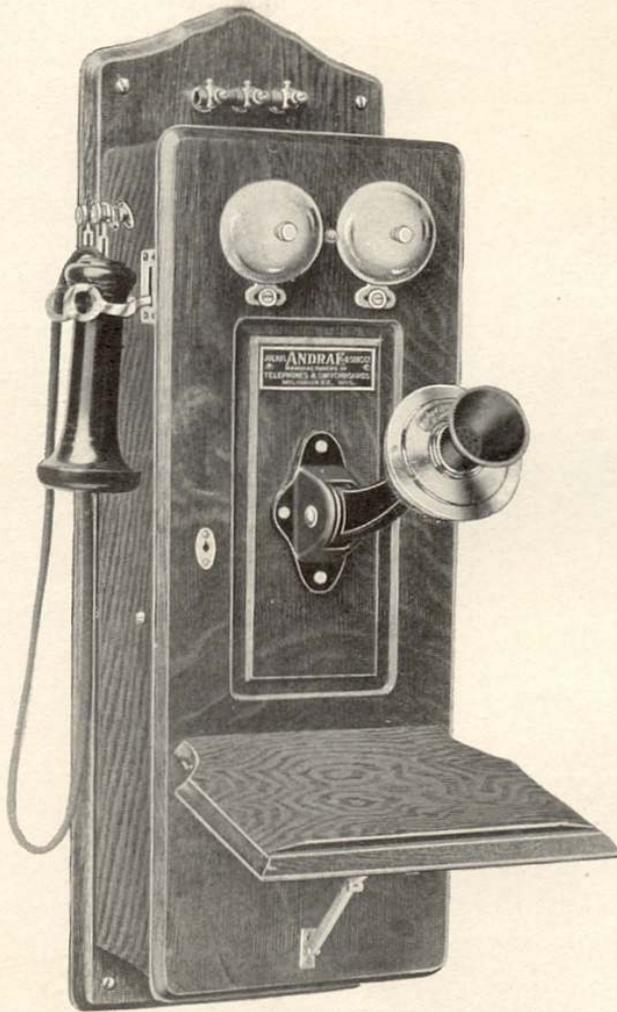
No. 5 "Giant." Open.
SPECIFICATIONS.

Oak woodwork, 3 bar generator, 80 ohm ringer, long distance solid back transmitter, D long distance receiver, silk induction coil, adjustable transmitter arm, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

No. 5. Code word—ABROAD. List Price.....\$17.00

ANDRAE STANDARD "GIANT" BRIDGING TELEPHONE.

COMPACT DRY CELL TYPE.

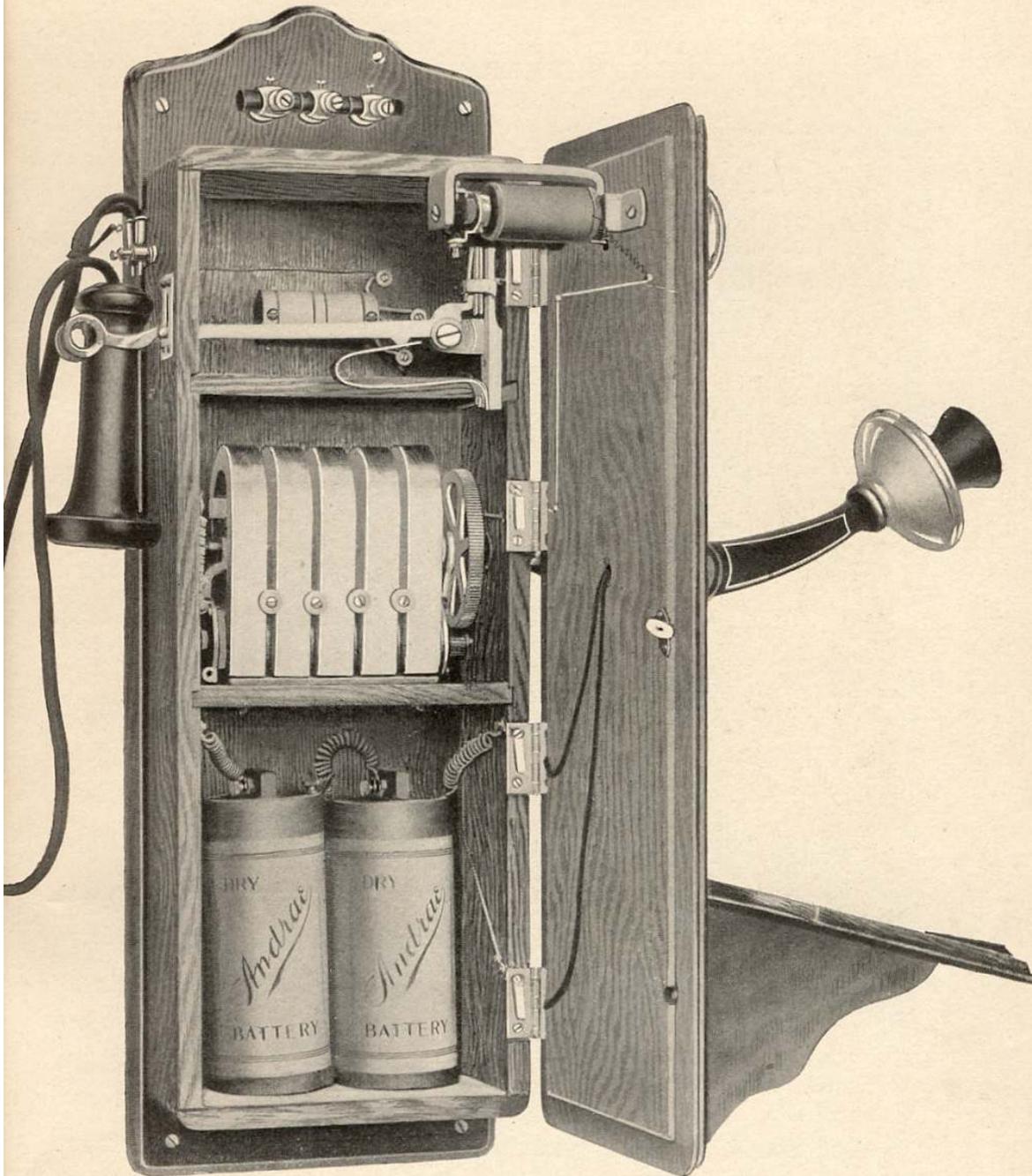


No. 6 "Giant" Telephone.

It is with pardonable pride we call attention to accompanying illustration of our "GIANT" Bridging Telephone, which is our standard bridging telephone for heavily loaded farmers' or toll lines. It is built on the same general lines as our standard compact type series telephone, but the cabinet is larger to accommodate our 5 bar special heavy "Giant" generator. This generator is the most powerful in the world, and the ease with which it rings the most heavily loaded farmers' or toll lines cannot be appreciated until tried. The

ringer used in this telephone is extremely sensitive, being especially designed for this work. Woodwork is exceptionally heavy to compensate for additional weight of generator. The lasting qualities of Andrae apparatus are more than ever appreciated in this telephone. Guaranteed absolutely reliable under the most severe conditions, and recommended where lines may eventually have from twenty to fifty telephones.

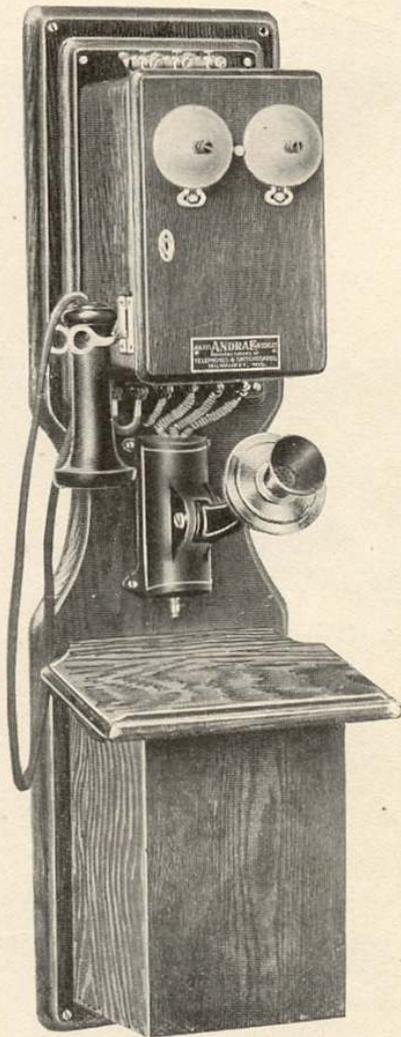
**ANDRAE "GIANT" BRIDGING TELEPHONE.
COMPACT DRY CELL TYPE.**



**No. 6 "Giant." Open.
SPECIFICATIONS.**

Oak woodwork, 5-bar 100,000 ohm generator, 1,600 ohm ringer, long distance solid back transmitter, adjustable arm, D solid receiver, silk induction coil, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

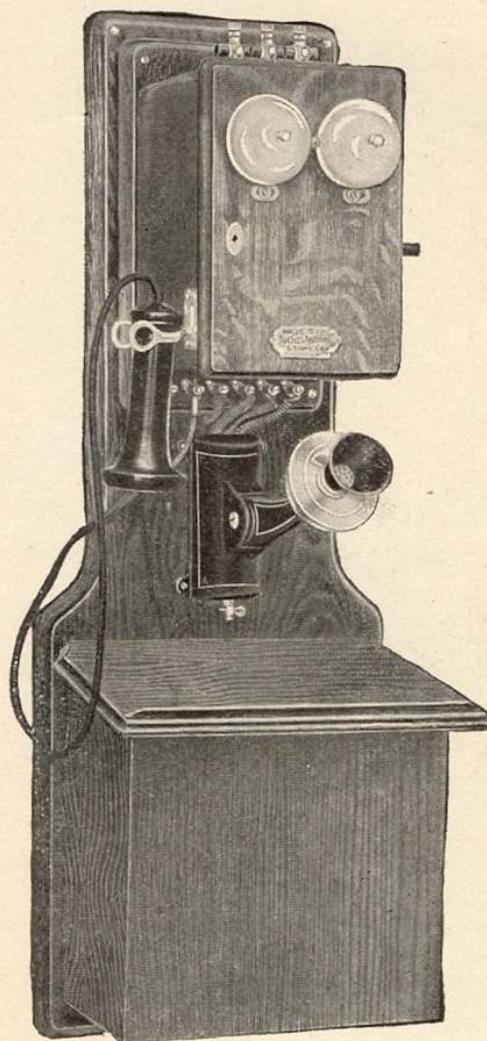
		Ringer Resistance.	List Price.....
No. 6.	Code word—ABRUPTLY.	1,000 ohm.	\$23.00
No. 6A.	“ —ABRUPTION.	1,600 “	24.00
No. 6B.	“ —ABRUPTNESS.	2,000 “	25.00
No. 6C.	“ —ABSCESS.	2,500 “	26.00

ANDRAE "GIANT" SERIES TELEPHONE.**SINGLE BATTERY BOX TYPE.****No. 2 "Giant" Telephone.****SPECIFICATIONS.**

Oak woodwork, 3-bar generator, 80 ohm ringer, long distance solid back transmitter, hollow base adjustable arm, silk induction coil, D solid receiver, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

No. 2. Code word—ABSCIND. List Price.....\$17.00

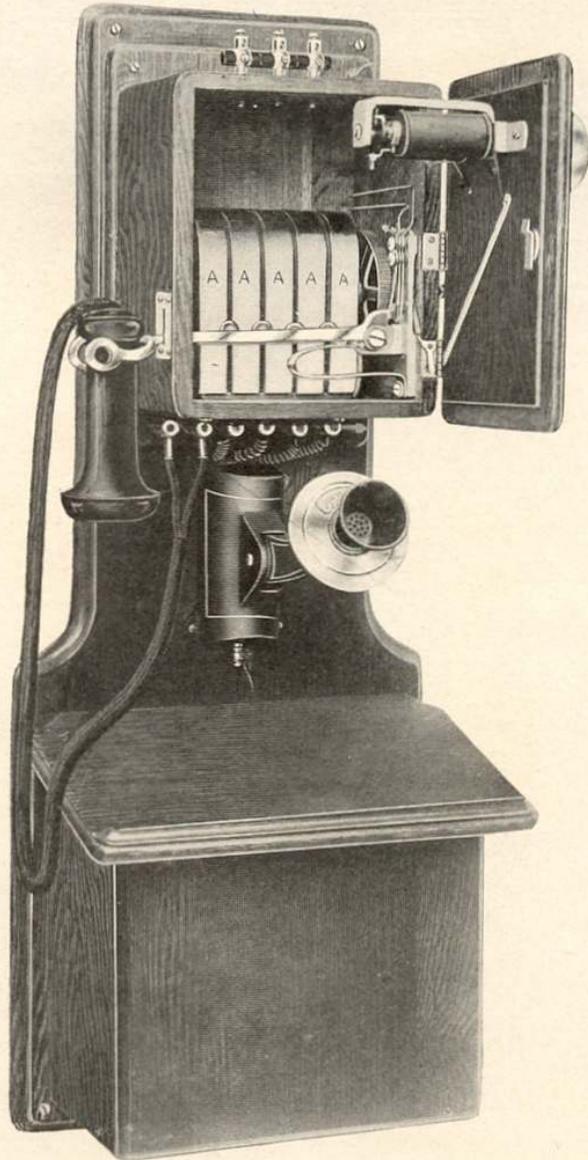
ANDRAE STANDARD "GIANT" BRIDGING TELEPHONE.
DOUBLE BATTERY BOX TYPE.



No. 4 "Giant". Closed.

The Double Battery Box "Giant" Bridging Telephone shown on this page and our Compact Type "Giant" Bridging Telephone No. 6, shown on page 18, are identical in their electrical and mechanical features. The backboards and battery boxes differ, and when wet batteries are going to be used, this type is used exclusively. These telephones operate equally well with dry cells, and these will be furnished unless specified to the contrary.

**ANDRAE STANDARD "GIANT" BRIDGING
TELEPHONE—CONTINUED.
DOUBLE BATTERY BOX TYPE.**



**No. 4 "Giant". Open.
EQUIPMENT.**

Oak woodwork, 5-bar 100,000 ohm generator, 1,600 ohm ringer, long distance solid back transmitter, adjustable arm, D solid receiver, silk induction coil, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

		Ringer Resistance.		
No. 4.	Code word—ABSCONDER.	1,000 ohms.	List Price.....	\$23.00
No. 4A.	" —ABSENT.	1,600 "	"	24.00
No. 4B.	" —ABSENCE.	2,000 "	"	25.00
No. 4C.	" —ABSENTLY.	2,500 "	"	26.00

RESIDENCE TYPE "GIANT" TELEPHONES.

No. 10, SERIES No. 11, BRIDGING.



For residences or hotels, where economy in space is necessary, we recommend the instrument illustrated on this page. These instruments are made up of standard parts, and differ only in that they are not equipped with backboards and battery boxes. The batteries must therefore be located outside of the telephone box. No. 10 is furnished with same equipment as our No. 2. No. 11 is equipped same as our No. 4. For local or long distance service, these telephones have no superior. The electrical and mechanical features are identical with our Standard "Giant" Series and Bridging Telephones, assuring the same satisfactory results secured from all Andrae telephones.

RESIDENCE TYPE TELEPHONES—CONTINUED.**Equipment. No. 10.**

Oak woodwork, 3-bar generator, 80 ohm ringer, long distance solid back transmitter, adjustable knuckle-joint arm, silk induction coil, D solid receiver, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

No. 10. Code word—ABSENTEE. List Price..... \$15.50

Equipment. No. 11.

Oak woodwork, 5-bar 100,000 ohm generator, 1,600 ohm ringer, long distance solid back transmitter, adjustable knuckle-joint arm, D solid receiver, long lever hook switch, platinum contacts, lightning arrester, two cells dry battery.

		Ringer Resistance.		
No. 11.	Code word—ABSENTER.	1 000 ohms.	List Price.....	\$21.00
No. 11A.	“ —ABSINTHE.	1,600 “	“	22.00
No. 11B.	“ —ABSINTHATE.	2,000 “	“	23.00
No. 11C.	“ —ABSINTHIATE.	2,500 “	“	24.00

ANDRAE PORTABLE DESK TELEPHONES.

The Andrae Portable Desk Telephone shown on this page is the most neat appearing, convenient, durable, and reliable instrument that can be produced. As will be noticed in the illustration, it is a self-contained stand. The transmitter stem and hook switch are all mounted together on a steel frame. A sheet iron plate conveniently

ANDRAE PORTABLE DESK TELEPHONES—CONTINUED.

fastened to the base protects the induction coil and connections, which are very substantial. The hook switch is as simple and durable as our long lever type. The pedestal is artistically designed and built of strong brass castings, heavily nickel plated.

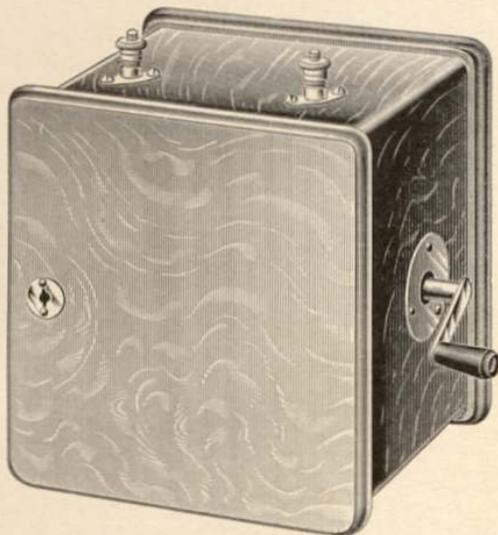
No. 7. For Series Work. Equipment.

Stand as shown in illustration, including Andrae long distance solid back transmitter, D solid receiver, silk induction coil, hook switch and terminal block with a 7-foot connecting cord, 3-bar hand generator and 80 ohm extension bell, mounted separately in oak boxes, two cells dry battery.

No. 7.	Code word—ABSOLUTIST.	List Price.....	\$19.00
No. 7D.	“ —ABSOLVABLE.	Desk Standard only, complete, less generator and extension bell....	12.00



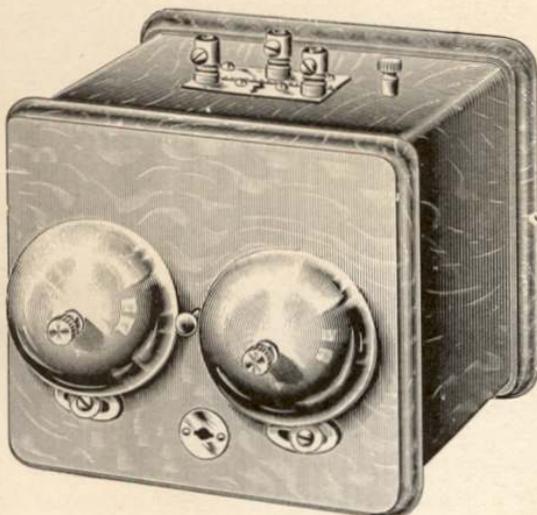
ANDRAE PORTABLE DESK TELEPHONES—CONTINUED.



Hand Generator.

Andrae Portable Series or Bridging Desk Stands are identical, in so far as the standard proper and talking circuit are concerned. They differ, however as to generators and extension bells, each being equipped with these according to their specific requirements. Generators and extension bell shown herewith are finished in oak, designed for service and durability.

No. 8. For Bridging Work. Equipment.



Extension Bell.

Stand, as shown on foregoing page, including Andrae long distance solid back transmitter, D solid receiver, silk induction coil, hook switch and terminal block with a 7 foot connecting cord. The 5-bar 100,000 ohm generator, and 1,600 ohm extension bell, are mounted separately in oak boxes. Two cells dry battery.

		Ringer Resistance.	
No. 8.	Code word—ABSOLUTISTIC.	1 000 ohms.	List Price.....\$23.00
No. 8A.	“ —ABSOLVE.	1,600 “	“ 24.00
No. 8B.	“ —ABSOLUTION.	2 000 “	“ 25.00
No. 8C.	“ —ABSOLUTORY.	2,500 “	“ 26.00
No. 8D.	“ —ABSOLVER.	Desk Standard only, complete, less generator and extension bell 13.00	

ANDRAE HAND MICROTELEPHONE, SERIES AND BRIDGING.



The Hand Microtelephone shown on this page, is generally used in connection with a hand generator and extension bell, as shown on preceding page. It combines our long distance solid back transmitter and solid watch-case receiver. The hook switch is dispensed with, a contact in the microphone replacing same. It is especially desirable, when insufficient space prohibits the use of a desk telephone, as it can easily be attached to the side of a desk. Doctors will also appreciate its use, as it can be used as an extension to the wall telephone and placed within easy reach at night. These instruments are efficient and unexcelled for quality and durability.

Combination No 16. For Series Work.

Oak woodwork, 3-bar "Giant" hand generator, 80 ohm extension bell, hand microphone, consisting of Andrae long distance solid back transmitter and solid watch-case receiver, lightning arrester, two cells dry battery.

No. 16. Code word—ABSINTHIAN.
List Price.....\$22.00

Combination No. 17. For Bridging Work.

Oak woodwork, 5-bar 100,000 ohm "Giant" generator, 1,600 ohm ringer, hand microphone, consisting of Andrae long distance solid back transmitter, Andrae solid watch case receiver, lightning arrester, two cells dry battery.

		Ringer Resistance.		
No. 17,	Code word—ABSOLUTE.	1,000 ohms.	List Price.....	\$25.00
No. 17A.	" —ABSOLUTELY.	1,600 "	"	26.00
No. 17B.	" —ABSOLUTENESS.	2,000 "	"	26.50
No. 17C.	" —ABSOLUTISM.	2 500 "	"	27.00
No. 17H.	" —YANKEE	Hand Microphone only.....		13.00

ANDRAE ADJUSTABLE DESK TELEPHONES.

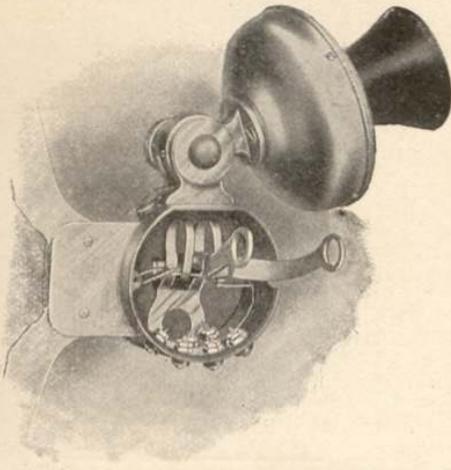
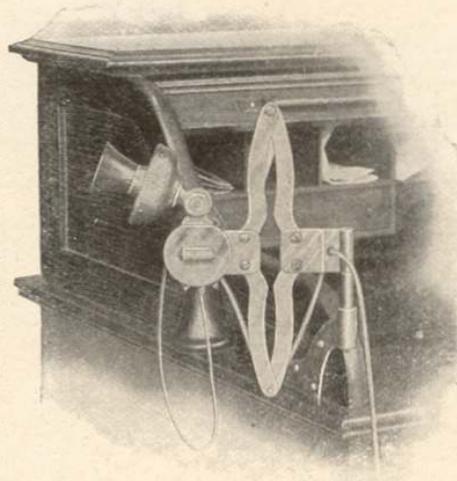


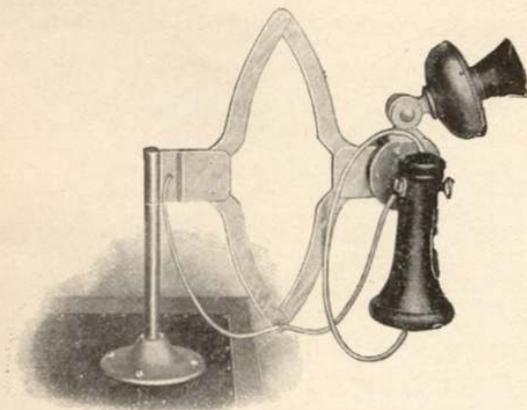
Fig. A. Cover Removed Showing Switch and Connections.

The instrument shown in the accompanying illustrations contains a desk stand and an adjustable desk stand holder combined in one. This instrument is very compact and light, and is of a very graceful design. It can be attached equally well to any vertical or horizontal flat surface or to any style desk. It is 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 by its use will be fully appreciated by the subscriber. Its construction pre-



No. 1 Closed and Swung Out of Way



No 5. For Flat Top Desk.

vents foreign noise or jar from being directly communicated to the vital parts of the telephone, and imparts sounds with exceptional clearness. Fig. A shows the cylindrical box with cover removed, which incloses the hook switch and cord connections, and to which the transmitter is adjustably attached.

ANDRAE ADJUSTABLE DESK TELEPHONES — CONTINUED.

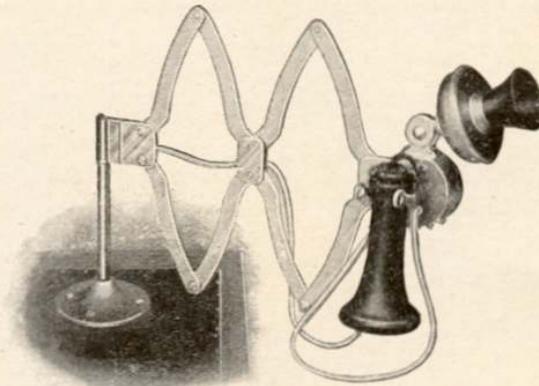
The hook switch springs are German silver with platinum contact points, and are entirely insulated from the metal of the case and receiver hook. The adjustable lever arms and base are made of steel, highly nickel plated, and will stand severe abuse without breakage. All of the above desk stands are equipped with Standard Andrae transmitters and receivers, and a four conductor silk desk cord.

Prices, complete, as above specified.

			List Price.
No. 1.	Code word—ABSOLVABLE	For roll top desk.....	\$16.00
No. 3.	“ —ABSOLVATORY.	For wall or other vertical flat surface	16.00
No. 15.	“ —ABSORB.	For flat top desk or other horizontal flat surface.....	16.00
No. 12.	“ —ABSORBABLE.	For roll top desk, double length...	17.50
No. 14.	“ —ABSORBENT.	For wall or other vertical flat surface, double length.....	17.50
No. 16.	“ —ABSORPTION.	For flat top desk or horizontal flat surface, double length.....	17.50

Following prices must be added to all adjustable desk stands if complete instrument is wanted, including hand generator, extension bell, induction coil, and terminal block.

No. 13.	Code word—ABSORPTIVE.	Induction coil and terminal block	\$ 1.50
“	—ABSTAIN.	3-bar generator, 80 ohm extension bell.....	8.00
“	—ABSTINENCE.	5 bar generator, 1000 ohm extension bell.....	10.00
“	—ABSTINENT.	5-bar generator, 1600 ohm extension bell.....	11.00
“	—ABSTEMIOUS.	5-bar generator, 2000 ohm extension bell.....	12.00
“	—ABSTERGE.	5-bar generator, 2500 ohm extension bell	12.50



No. 6. Double Length for Flat Top Desk.

BELL EXPRESS SWITCHBOARD.

Our Bell Express Switchboards have proven of such inestimable value to our customers during the years that they have been on sale and in use, that even with our well known ability for progressiveness and improvement, we have been unable, at the time of presenting this catalog to the public, to find a substitute or a more highly improved switchboard than the one we now call to the attention of our patrons and customers.

The time has passed when intelligent purchasers of equipment must be told all the various little details of switchboard construction. A few facts have been learned by experience. One of these stands out prominently, and that is that the most successful service has been obtained with mechanical self-restoring drops and jacks.

Our Bell Express Switchboards are made in 100 capacity cabinets, of which two or three may be placed side by side, if desired, to increase the ultimate capacity to the number of 300 single lines running into the exchange without the use of transfer or trunking equipment. We manufacture the switchboards also in 200 capacity cabinets, in each one of which 200 complete Bell express drops and jacks may be mounted without any transfer equipment, so that one operator may handle 200 subscribers, which is very easily possible with the improved self-restoring drop of our manufacture.

These 200 capacity cabinets are so constructed that their ultimate capacity may be increased to an amount as high as 2400 lines. This is accomplished by means of transfer equipment. In this case, but 160 drops and jacks are mounted in each operator's position. The reason for this is, that we have found out, after careful experiments, that an operator can handle 200 lines, when not incumbered by the necessity of having to transfer some of the calls. In the larger exchanges, where transferring between switchboards is necessary, it is advisable to load the operator with no more than 160 lines. For small exchange purposes, where the ultimate capacity of the plant will never be in excess of 200 subscribers, or even 300, we advise the use of our 100 capacity switchboard. If the exchange is to be started with any number of subscribers less than 100, for instance, 50, it is not necessary to put in the switchboard more than five complete cord circuits, as experience has taught us that there need be cord circuits only to the extent of ten per cent. of the total number of connecting lines in the switchboard.

BELL EXPRESS SWITCHBOARD—CONTINUED.

There are, as a general rule, two distinct classes of drops and jacks in a switchboard. Those drops and jacks used for series or local line work, and those drops and jacks used for bridging, country line, or toll work. There is no difference in construction between the bridging drops and jacks and the series drops and jacks, and they both occupy the same space at the switchboard. The only difference in these drops and jacks is in the winding of the drop coil. For series work, the drop coil is wound to 250 ohms, and for bridging work the drop coil is wound usually to 1600 ohms, although in some instances 1000 ohms or 2500 ohms is used.

When series telephones are used on the line, it is necessary to use the series drop and jack, and series telephones should be used only where there is but one telephone to be connected to the said line. In exceptional cases two telephones may be used, both series, on the same line, but this is not advisable. When more than one telephone is used on a line, the telephones should all be of the bridging type, and in this case bridging drops and jacks must be used. Therefore for all country telephone work, bridging drops and jacks should be mounted on the switchboard, and for local telephone work series drops and jacks should be used. The mechanical self-restoring drops and jacks act in a dual capacity. The drop consists of a fine wire coil, which is connected with the incoming line wires, and which operates the drop shutter, when current from the telephone instrument is sent over the line to call the central station. The jack portion of the equipment consists of springs which are also connected to the line wires, and through which connection is made by means of the plug in the switchboard. When the plug is inserted into the jack, the movement of the springs raises the drop shutter to its normal position, so that it is ready to receive another call. This reduces the work of the operator, by not requiring her to manually restore the drop.

In the 100 capacity cabinets the drops and jacks are mounted in banks of five, and it is advisable in ordering, to purchase a number of drops and jacks equivalent, if possible, to some multiple of five.

The function of the connecting cords and plugs on the switchboard resides only in connecting different lines together by means of the springs in the jacks.

Each complete cord circuit consists of two plugs, two connecting cords, one attached to each plug. These plugs are mounted on a

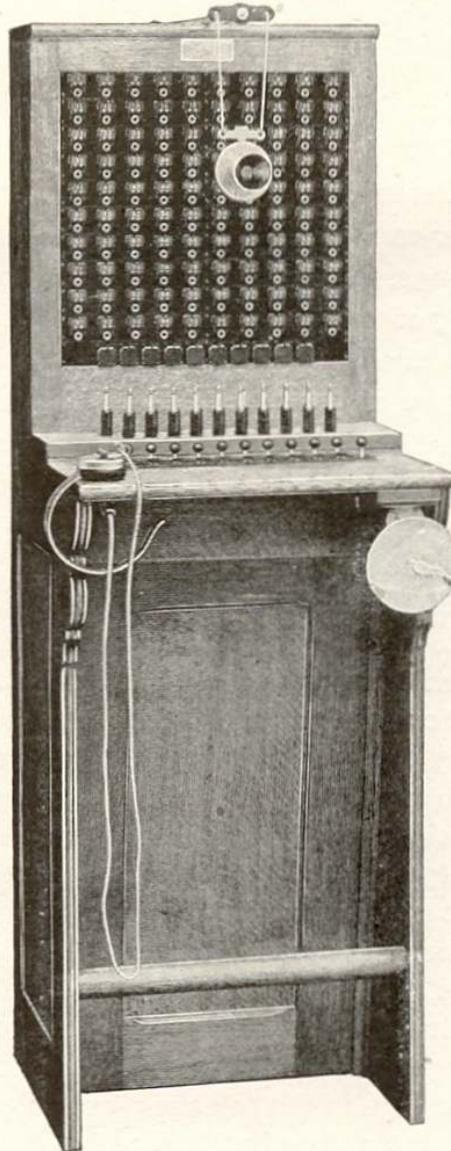
BELL EXPRESS SWITCHBOARD—CONTINUED.

part of the board where they are easily accessible, and from where they are connected directly to the remaining portions of the cord equipment. In addition to the cords and plugs, one complete cord circuit consists of a clearing-out drop, which is the drop mounted below the line drops and jacks in a switchboard, and which is adapted to convey signal to the operator when two subscribers, who have been in conversation, have completed their use of the line. The other things necessary in a complete cord circuit is a listening key, and a two-way ringing key. The listening key is so arranged that when it is depressed, the operator can listen on the particular cord circuit to which this ringing key belongs, thus connecting herself to the particular line into which the plug of this cord circuit is connected. The two-way ringing keys, which are absolutely necessary, are also mounted in the keyboard and form part of each cord circuit, and are used to ring out on either the front or back plug of each cord circuit, so that it is not necessary to change plugs when calling either one of the two telephones connected by one cord circuit.

Switchboard cable must also be attached to the switchboard drops, and this can be done so much more easily in the factory, that it is always advisable to specify a certain amount of cable attached to the switchboard when ordering the complete outfit.

Both the 100 capacity and 200 capacity switchboards are finished in oak or cherry of the very best kiln-dried wood, filled and thoroughly finished in a substantial and workmanlike manner. All joints are glued, and all cabinet work is of the very best. The plug shelf is provided with the very best leather covering most securely glued, and highly polished brass plug seats are countersunk in the plug shelf to receive the plugs when not in use. The key shelf is constructed of substantial oak carefully finished, and is hinged at its inner edge. The operator's jack is mounted on the key shelf, as are also listening and two-way ringing keys. A flexible cable, doubled back on itself, leads from the key springs to the clearing-out drops, and cord mounting in the rear of the switchboard. This cable is hand formed, thoroughly boiled in beeswax after forming, and well strapped and laced.

A complete operator's set is mounted on each position, consisting of all the necessary apparatus, such as receiver, head bands, cord, plug and jack, operator's transmitter, cords, hanger, mounting, cord weights, induction coil, hand generator, power generator, switch, and other necessary materials completely wired.

BELL EXPRESS SWITCHBOARD—CONTINUED.**100-DROP CAPACITY CABINET.**

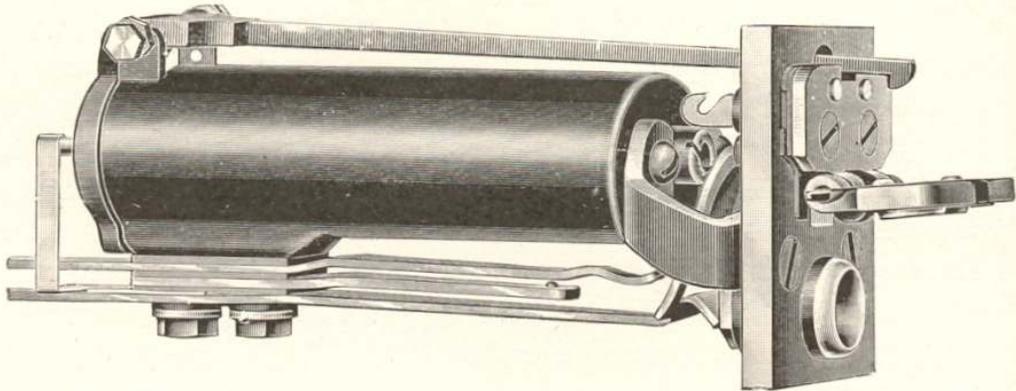
The accompanying cut illustrates our 100 capacity switchboard cabinet, fully equipped with 100 Bell express self-restoring drops and jacks.

BELL EXPRESS SWITCHBOARD—CONTINUED.

The complete board includes 10 complete cord circuits, of which the 10 clearing-out drops are shown mounted below the line drops. See illustration on opposite page.

Each cord circuit includes ringing and two-way listening keys. Switchboard cable attached to these drops can be furnished any length desired. In specifying length of cable, the amount from base of switchboard should always be given.

If it is seen that the ultimate capacity of the switchboard will exceed 250 or 300, our 200 capacity switchboard section should be used, and this can be increased to 2400 lines ultimate capacity, if necessary. This 200 capacity switchboard, when fully provided with apparatus, gives as rapid and efficient service as any multiple central energy lamp line switchboard ever devised.

BELL EXPRESS SWITCHBOARD—CONTINUED.**SELF-RESTORING DROP AND JACK.**

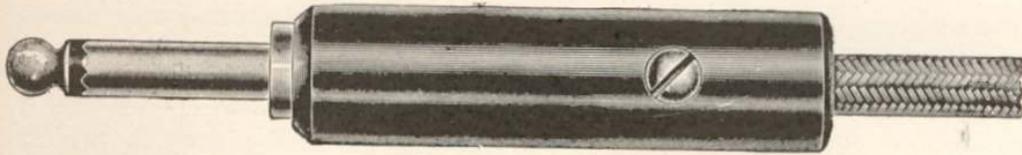
The accompanying cut illustrates one of our Bell express drops and jacks mounted on an iron frame. The drop and jack is self-contained, and may be easily removed as one part, by loosening the two screws which are seen on the front of the iron strip. The drop coil is wound with the very best silk insulated, soft drawn copper wire, and heavy fibre end pieces are provided on the soft iron core.

Substantial terminals are mounted in one of the fibre end pieces, and a soft iron enclosing shell is provided around the drop coil. The armature and shutter arm are copper plated.

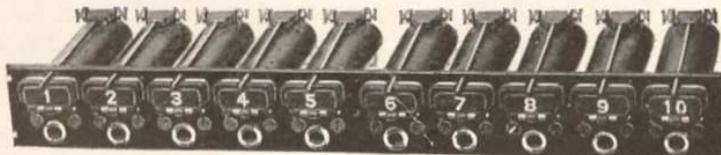
The jack springs are of the very best German silver, bolted to the shell of the drop. Mica insulation is inserted between these springs. When the plug is inserted in these jacks, the desired movement of one of the springs restores the shutter to its normal position.

The two line springs of the jack are soldered directly to the terminals of the drop coil, so that only two line connections are necessary for each switchboard.

The number plates are punched, and have raised numerals. The night alarm contact is of a wiping nature, and thus very positive in its action. The armature is carefully pivoted between set screws provided with nuts, thus admitting of an easy adjustment. All other parts of the drop are punched from brass, which is the very best metal that can be employed for such purposes.

BELL EXPRESS SWITCHBOARD—CONTINUED.**BELL EXPRESS PLUG.**

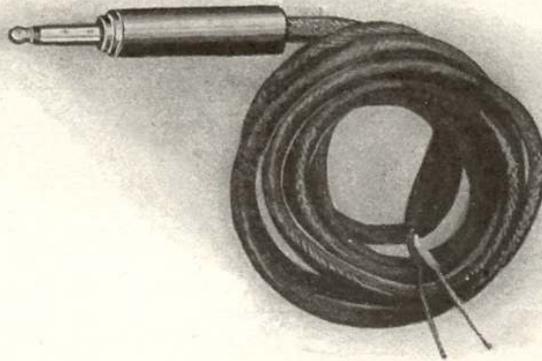
The Bell Express Plug is constructed in the most substantial manner, having two concentric contacts. The innermost, or tip contact has a bronze tip at one end, bronze being the very best metal that can be employed in such cases, as it occasions less wear when coming in contact with the German silver springs. The outer, or sleeve contact, as shown, is provided with a zigzag end at one extremity, so that the rubber insulation may thoroughly imbed itself, to prevent future displacement. A substantial rubber sleeve is provided, and secured by means of a set screw. The cord terminals are easily fastened in the plug, and substantial means are provided on the inside of this plug to secure the cord, so that no strain is occasioned on the cord tips.

BELL EXPRESS DROPS AND JACKS.

The accompanying cut shows one bank of our Bell Express drops and jacks, having ten mounted on one iron strip. A single drop and jack is shown below. Such a bank, as shown here, is ready for mounting in the switchboard by means of screws fitting into the holes at either end of the iron strip.

Additional drops and jacks may thus very readily be added to our switchboards in banks of five or ten, and they are, for this reason, the most flexible and easily changed of any on the market. The number plates may be easily removed and changed on the shutters, without removing the shutters. This is also a great advantage.

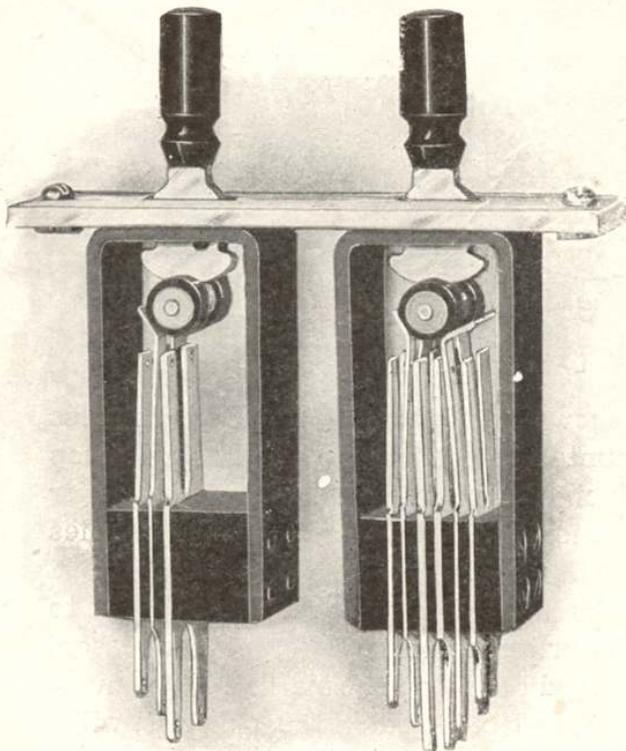
BELL EXPRESS SWITCHBOARD—CONTINUED.
PLUG AND CORD



The plug and cord shown are most substantial, the plug being provided with a heel-piece to which the cord may be fastened, and brass clips are fastened to the cord, so that it may be readily connected to the plug.

RINGING AND LISTENING KEYS.

Our new and latest improved switchboard key is shown in the accompanying cut. The great advantage of having two operating handles is utilized, and thus forms a construction which is the same as that adopted for the best multiple switchboards. All springs are of high grade German silver. They are of requisite length to afford



good spring action with least breakage. All springs are provided with platinum points, insuring substantial contact at all times by eliminating the possible bad effects of corrosion.

The springs are all mounted on hard rubber sleeves, through which the screws pass which secure them to the base. This obviates all danger of short circuits between the springs and the screws securing them to the base.

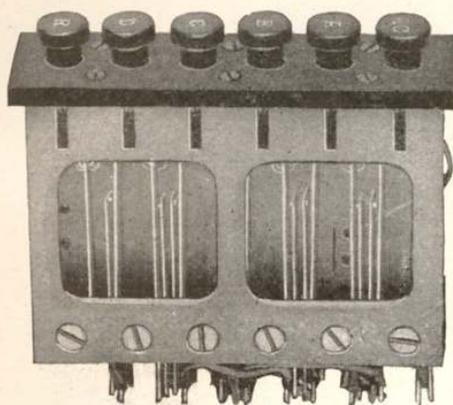
The movement of the springs is effected by a roller mounted upon the

BELL EXPRESS SWITCHBOARD—CONTINUED.

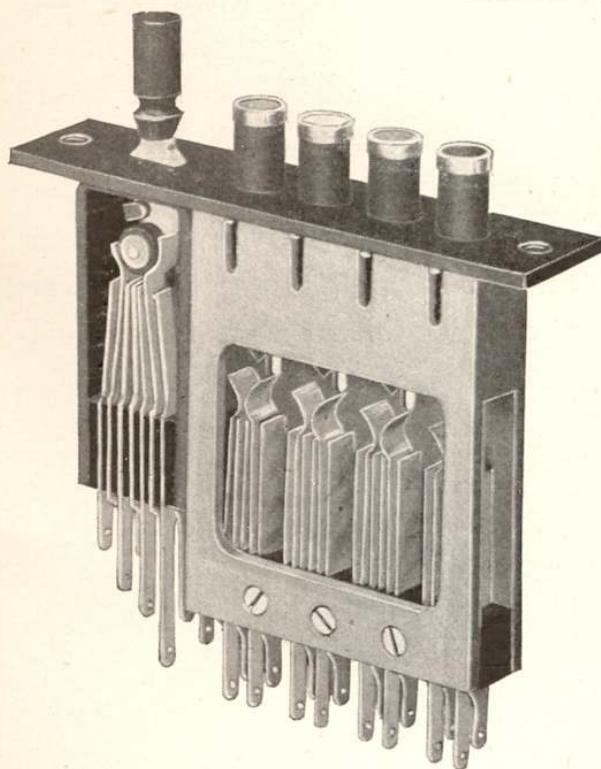
RINGING AND LISTENING KEYS.

handle, and thereby no friction is exerted on the springs, all the wear and tear being localized on the roller. All of these features are absolutely necessary to a good key, and we cheerfully recommend same to our customers with a liberal guarantee.

SELECTIVE KEYS.



Master Selective Key No. 54.



Selective Key No. 78.

Each switchboard, in addition to the regular ringing and listening keys, is provided with a master selective key, No. 54, which is mounted on one side of these keys, and is used for ringing single or four parties on our Leich four-party selective system. Selective key No. 78 is used where it is desired to have a four-party key in every cord circuit. When ringing regular subscribers by means of list-

ening and ringing keys, button marked "A C" of the selective key must remain in a depressed condition. If it is desired to ring any party on a four-party line, either of the buttons marked "A", "B", "C", or "D" should be depressed before using the ringing key, as this master key selects ringing current for ringing various telephones on the same line. High class four-party lines are essential now-a-days for up-to-date exchanges.

BELL EXPRESS SWITCHBOARD—CONTINUED.**OPERATOR'S EQUIPMENT.**

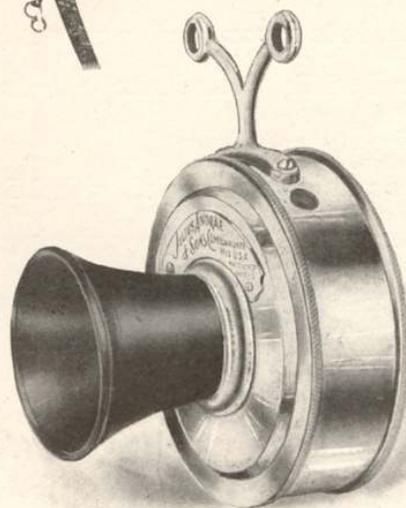
Operator's equipment, which accompanies these switchboards, consists of our No. 45 receiver, head-band, cord, plug and jack, operator's transmitter, hanger, and mounting, together with the induction coil and high grade hand generator of our "Giant" type, also power generator switch. The operator's receiver is constructed of an aluminum case with hard rubber cap, having aged steel magnets, provided with the very best soft iron cores, wound with very best silk insulated soft drawn copper wire. The head-band is pivoted in such a manner that it is very easily adjusted and holds the receiver in its correct position. The head-band is covered with leather, so that no rusty metals can come in contact with the hair of the operator, the leather at the same time providing a soft mounting. The diaphragm of the receiver is of best Ferotype iron. The cords, which are attached to the receiver, are of high grade copper tinsel, with silk insulation throughout, and terminate in substantial clips. The transmitter is provided with the very best materials it is possible to obtain, the carbons being of such hardness that they will scratch glass. The mountings are substantially made, and the transmitter cords are most durable. The induction coil is wound with the finest silk insulated soft drawn copper wire. The Giant hand generator provided with the switchboard is made of imported steel magnets, capable of ringing any line over which it is possible to talk.

BELL EXPRESS SWITCHBOARD—CONTINUED.

OPERATOR'S EQUIPMENT.



Operator's Receiver.



Operator's Transmitter.

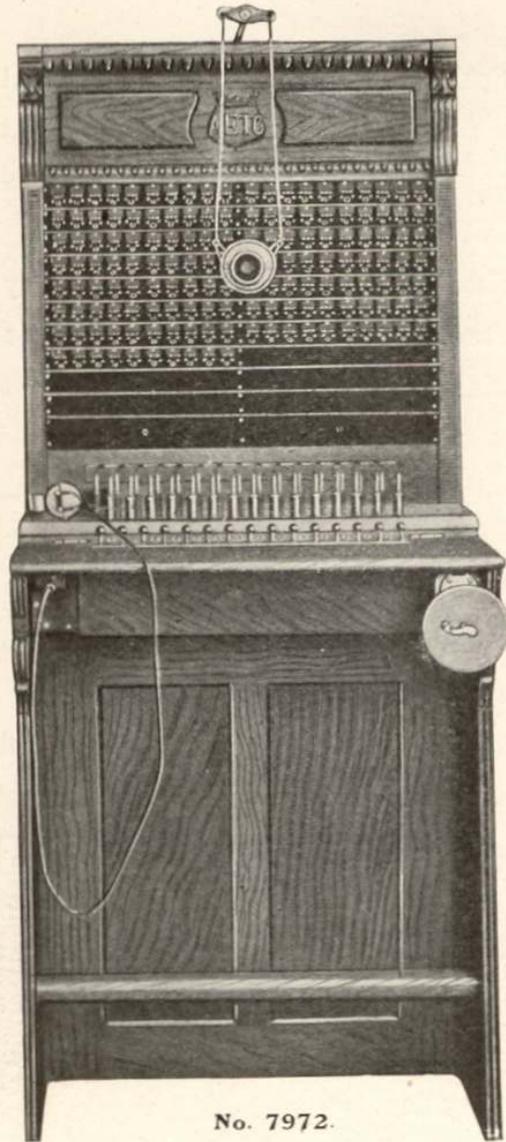
BELL EXPRESS SWITCHBOARD—CONTINUED.**200-DROP CAPACITY CABINET.**

In all exchanges where the ultimate capacity will be above 300 lines at any time, a switchboard of our 200 capacity type should be chosen in preference to 100 capacity switchboards. The reason for this is that the 200 capacity switchboards can be provided with 160 subscribers' lines, and at the same time be provided with transfer equipment for an increase up to an ultimate of 2500 subscribers' lines. Our Bell Express drops are of such size, that it is possible to equip this switchboard, No. 7972, with 200 self-restoring Bell Express drops and jacks, so that in an exchange having up to 200 subscribers, one operator may handle the entire number, on account of the rapidity in operation with our Bell Express self-restoring drops and jacks. Thus you can save the price of the additional operator, who would be necessary if two 100-line switchboards were used. This saves you \$185 per year in salary alone. It is a good investment to have 200 drops to the operator, and our Bell Express switchboards are the very ones which make this possible.

200 line switchboards are provided with 15 cord circuits, and are large enough to accommodate 18. In ordering, specify whether cable is to be attached to the drops and what length it is to be from the base of the switchboard.

BELL EXPRESS SWITCHBOARD—CONTINUED.

200-DROP CAPACITY CABINET.



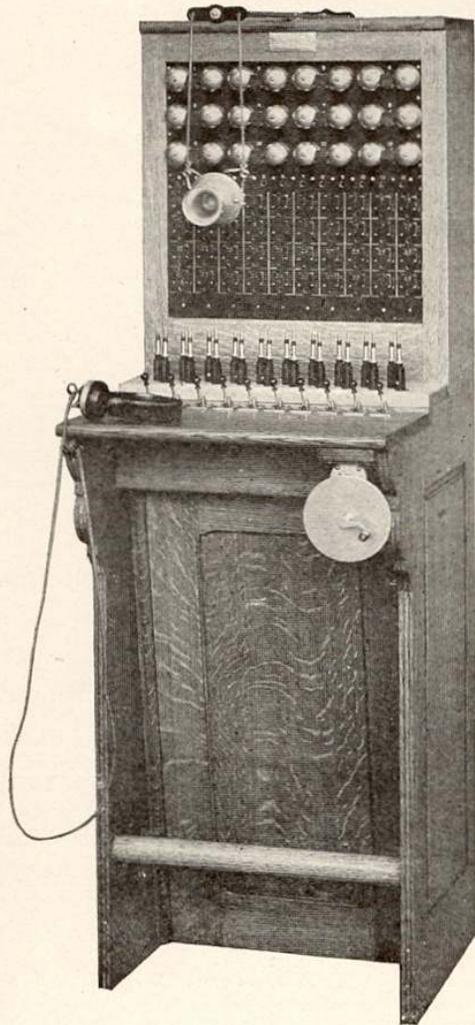
No. 7972.

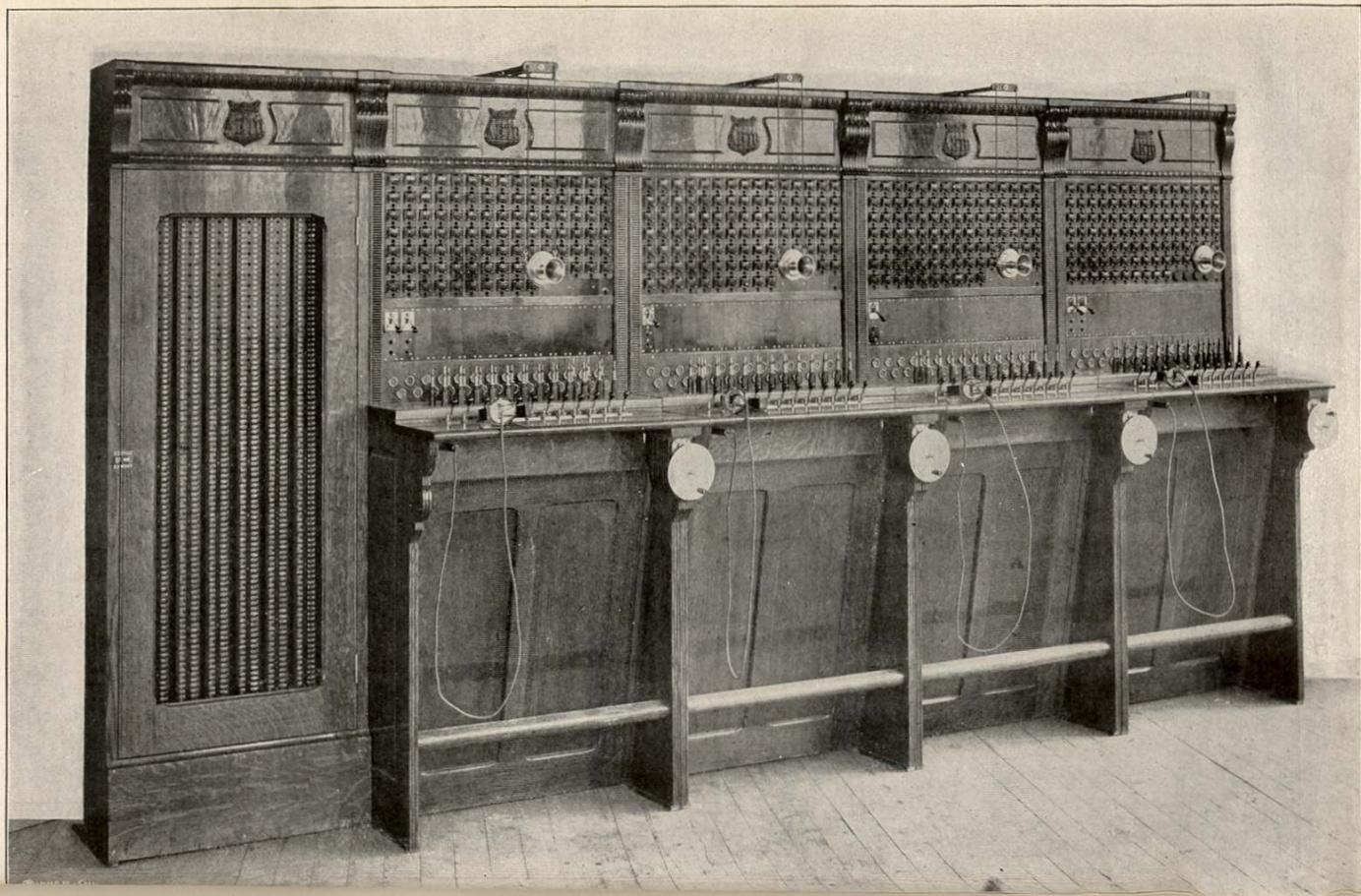
BELL EXPRESS SWITCHBOARD—CONTINUED.**COMBINATION SWITCHBOARD.**

The accompanying cut shows our combination switchboard, which may be provided with bridging bells, in addition to the regular series and bridging drops. The ringers of these bells may be wound to anywhere from 1000 to 2000 ohms as specified, but 1600 ohms is recommended. These bells are used for country telephone lines, where several of them enter the same exchange, and where it is desirable to distinguish the number of signals that are transmitted over the line. By this method, the operator at the switchboard may distinguish whether the call is for central, which is the case if one ring only is heard, or whether she is to disregard the signal, it being for some other person of the same line, which is the case if more than one ring is given. Thus an operator does not need to be continuously at the switchboard. For this reason the bridging bells give better service than a night bell, as with only a night bell attached to the drops it is impossible to distinguish the number of rings, unless the operator is continuously at the switchboard. These combination switchboards are provided with a regular operator's set, the same as our other switchboards, and are constructed with either 100 or 200 line capacity cabinets. Each bell is provided with a drop shutter, so that it is unnecessary to depend upon the sound of the bell alone to distinguish the calling line.

BELL EXPRESS SWITCHBOARD—CONTINUED.

COMBINATION SWITCHBOARD.





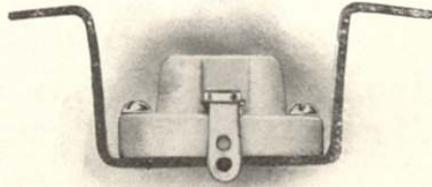
BELL EXPRESS SWITCHBOARD—CONTINUED.**TRANSFER EQUIPMENT.**

Pages 48 and 50 show our preferred transfer system. The circuit drawing illustrates the method of operating, when a call is to be transferred from one switchboard to another—one which is beyond the reach of the operator. The operator who starts the call is designated as the "A" operator, and the one who receives and completes the call as the "C" operator. When the operator at the "A" board inserts the calling plug into the transfer jack the lamp at the "C" board is ignited. At the same time the "A" operator depresses the order wire key and connects her operator's set with that of the "C" operator, simultaneously giving the "C" operator the number desired. The "C" operator takes the transfer plug corresponding to the ignited lamp and inserts it in the called subscriber's jack. The removal of the plug from the plug seat extinguishes the lamp at the "C" board, and the two subscribers may now talk. The supervision is under control of the "A" operator, and when the disconnection signal is given, the "A" operator removes the plugs, including the one from the transfer jack above mentioned. This again ignites the lamp at the "C" board, notifying the "C" operator to remove the plug, and replacing the transfer plug in the plug seat, again extinguishes the transfer lamp. This is the well known flash light transfer system and 12 volts battery is recommended. The material necessary for one complete one-jack or one-circuit transfer one way between two boards comprises:—

- One order wire key.
- One transfer jack.
- One set battery.
- One lamp.
- One lamp socket.
- One lamp prism.
- One plug.
- One plug seat.
- One plug seat switch.
- One cord.
- One cord weight.

BELL EXPRESS SWITCHBOARD—CONTINUED.

TRANSFER EQUIPMENT.



No. 21 Socket.



No. 828.



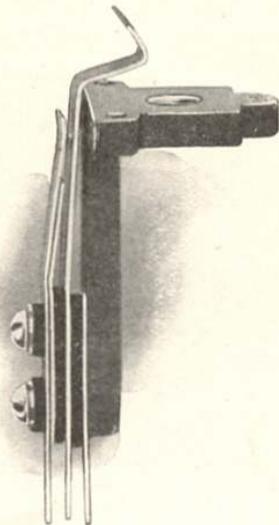
No. 10 Lamp, 4 to 45 Volts.



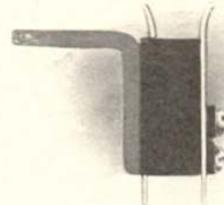
No. 19 Prism.



No. 2 Lamp, 4 to 45 Volts.



No. 7 Switch.

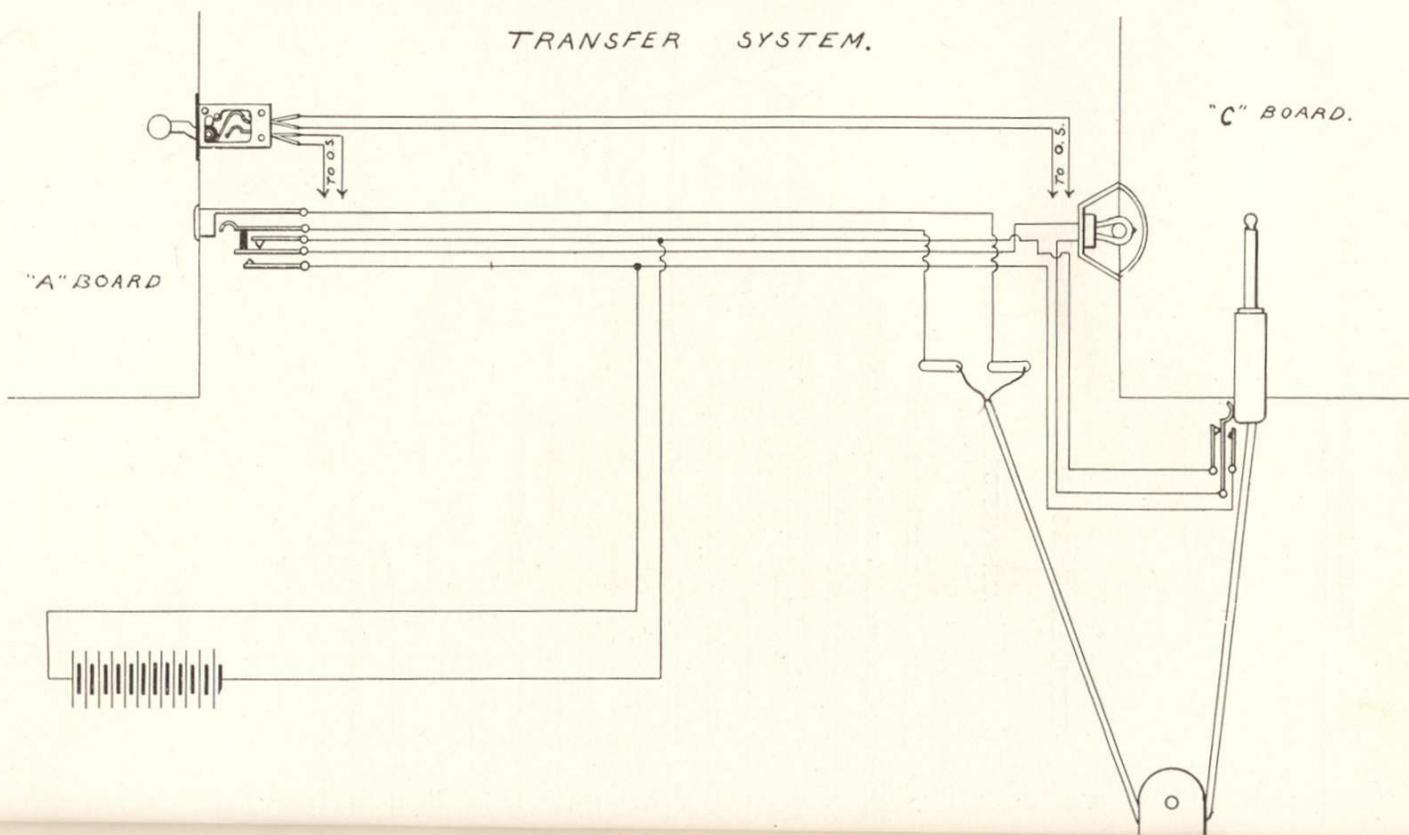


No. 18 Socket.

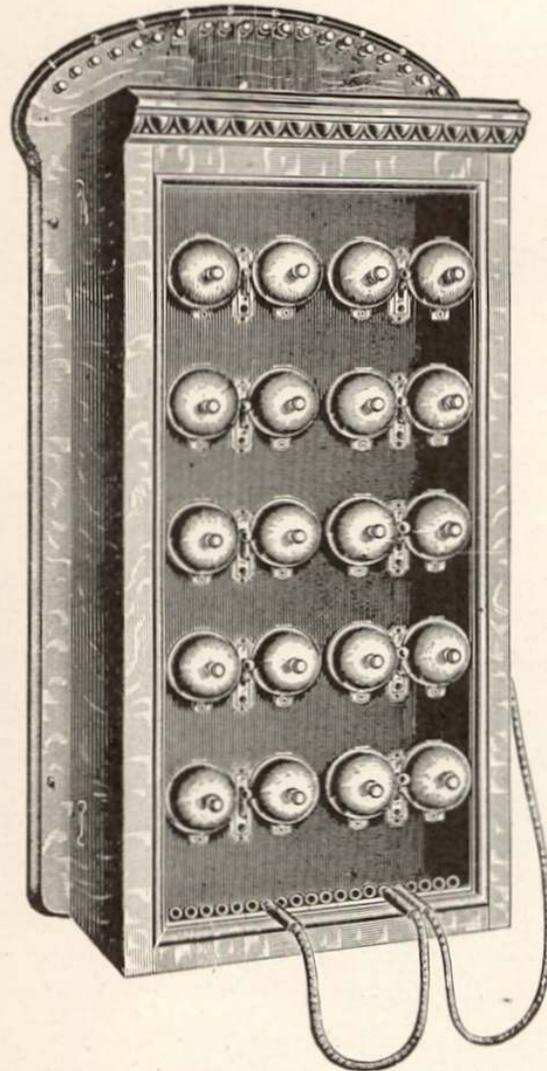
BELL EXPRESS SWITCHBOARD—CONTINUED.**TRANSFER EQUIPMENT.**

Of course, in order to transfer a call back again, the material above out-lined would have to be doubled, thus a duplicate of the material above mentioned would provide transfer facilities both ways between two boards. It is understood that with the material as stated only one circuit each way between two boards is contemplated. Under normal conditions it is always necessary to have more than a one-circuit transfer each way between two switchboards and a two-circuit transfer each way is generally provided, although three and even four transfers each way between switchboards are sometimes used. In order to arrive at the correct amount of material which is necessary for a two-circuit transfer, one way between two boards it is necessary to duplicate all the materials specified in the above list excepting the order wire key. One order wire key suffices, as the order wire key simply connects the operator's sets together irrespective of which one of the jacks of the particular transfer is used. The various materials comprised in the above list are shown on the accompanying page.

TRANSFER SYSTEM.



COUNTRY PARTY LINE SWITCHBOARD.



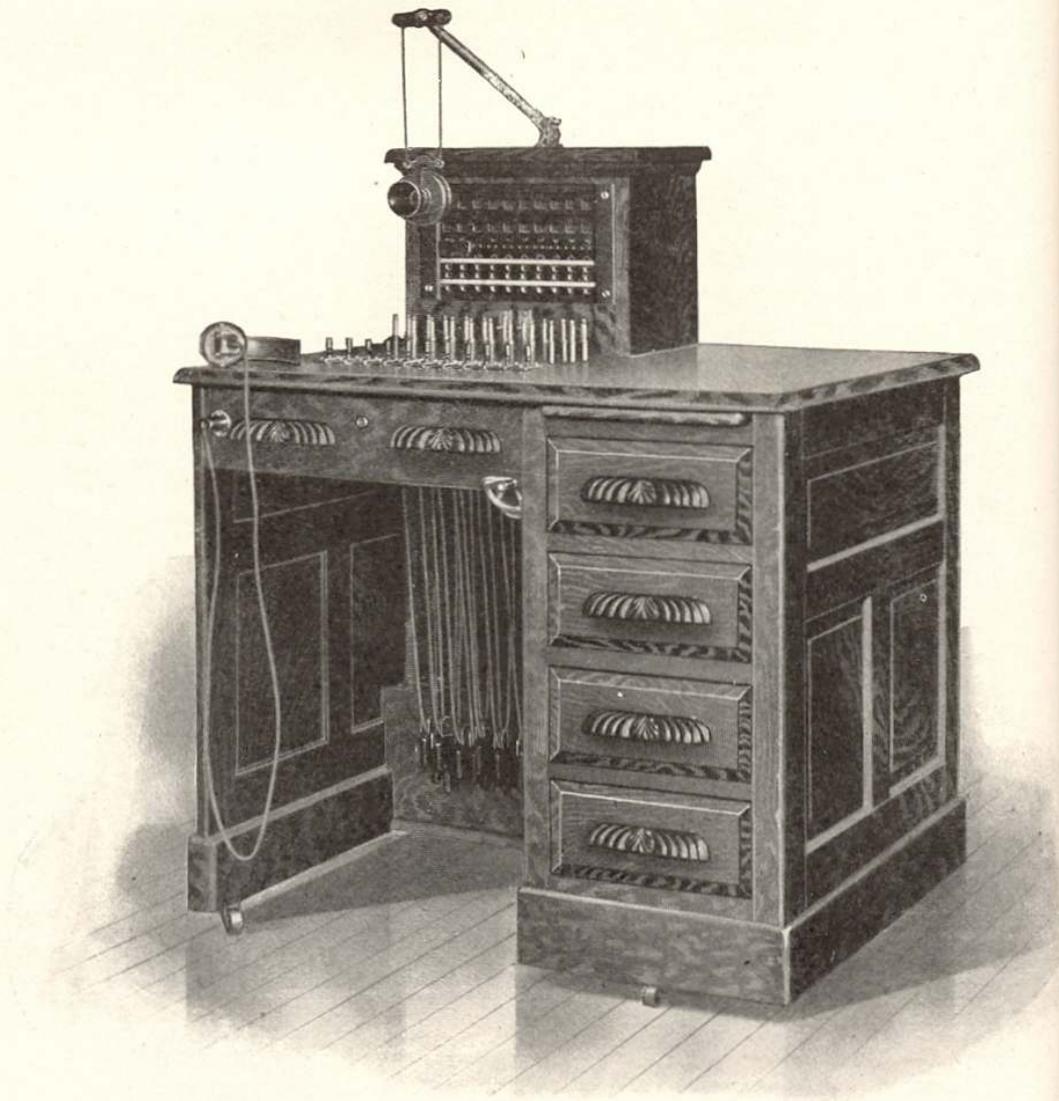
No. 220.

Our wall cabinet country party line switchboard can be used with either wall or desk telephone. It is provided with two pairs of connecting cords and plugs and an additional cord and plug to be attached to the telephone with which it is used. Made up for any number of lines.

Code word—QUOTING. 10-line wall cabinet only, equipped with one operator's plug and cord, and one pair of connecting plugs and cords. List Price\$12.00

For each indicating bell and duplicate jack installed add:

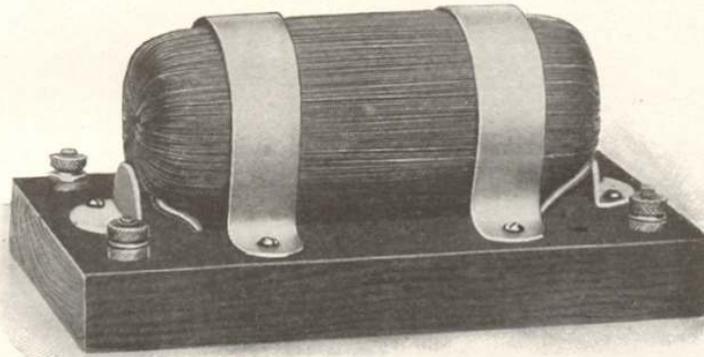
1000 ohms.....	Metallic circuit, \$6.50	Ground circuit, \$5.50
1600 "	" 7.00	" 6.00
2000 "	" 7.00	" 6.50
2500 "	" 8.00	" 7.00
Extra connecting plugs and cords,	" per pr., 4.50	" 3.00

BELL EXPRESS TOLL DESK.

No. 200.

BELL EXPRESS TOLL DESK No. 200.

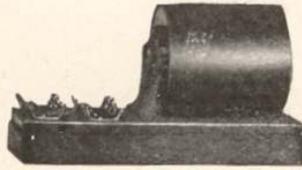
The accompanying cut shows one of the great variety of toll or chief operators' desks that we manufacture. We also are prepared to furnish our regular toll cabinet with drawers on one side only, having a top similar to the one shown. Any character of line equipment may be mounted in the top, such as bridging bells, Bell Express drops, Bell style drops and jacks, or lamp line equipment. Any number of cord circuits, ringing keys, and any character of operator's equipment may be provided; repeating coils furnished for the cord circuits, repeating coil keys provided and everything mounted in accordance with the latest toll line practice. A different style of top may be provided so as to accommodate pigeon holes if desired. The cost of the equipment depends very largely on the quality and design of the cabinet used, and in ordering it is well to specify about how much is to be allowed for cabinet purposes.

REPEATING COILS AND THEIR USES.**No. 18A Repeating Coil.**

When a metallic circuit is joined to a grounded line, the connection is not made direct, but through a repeating coil. This is done to prevent the balance of the circuit being destroyed by an uneven arrangement of lines. A repeating coil is also beneficial in reducing the disturbance on lines in other ways. It has been found that a short line subject to disturbances, if joined to a metallic circuit, will cause the whole line to become noisy and difficult to talk over. By making connection through a repeating coil, the disturbance is eliminated and a quiet line throughout is obtained. It is customary, in places where a long grounded line is connected to a local exchange system in a town where local lines are subject to induction disturbances, to equip a complete metallic line, extending same from the central office to a point beyond the influence of street railway or other power and electric lighting currents, and to join the grounded line with the metallic circuits by means of a repeating coil, placed at such point in order to secure freedom from troublesome induction. For work of this nature on magneto lines we recommend our No. 18A repeating coil which is adapted both for talking and ringing, as it has primary and secondary windings of such efficiency and thorough insulating qualities that both of the functions may be subserved by the same coil; proportion of winding 1 to 1. The very highest grade of soft drawn iron wire is used for the core, and all ends are carefully concealed. The terminal wires are of heavy copper throughout, to prevent breaking and are securely soldered to brass binding posts.

Code word—YACHT. List Price.....\$10.00

REPEATING COILS AND THEIR USES—CONTINUED.

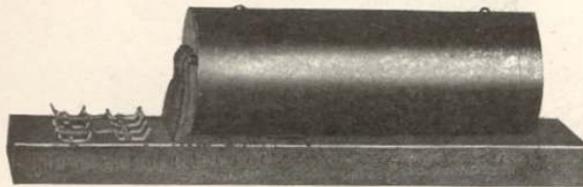


No. 2A Repeating Coil.

The small iron enclosed repeating coil No. 2A is used to connect toll or magneto to central energy lines, where both a ringing and talking through service is required.

The coil consists of four concentric windings with over-lapped iron wire core, proportion of windings by turns, 1 to 1; all windings brought out to soldering connections. A condenser can be connected between terminals.

Code word—YACHTING. List Price\$15.00

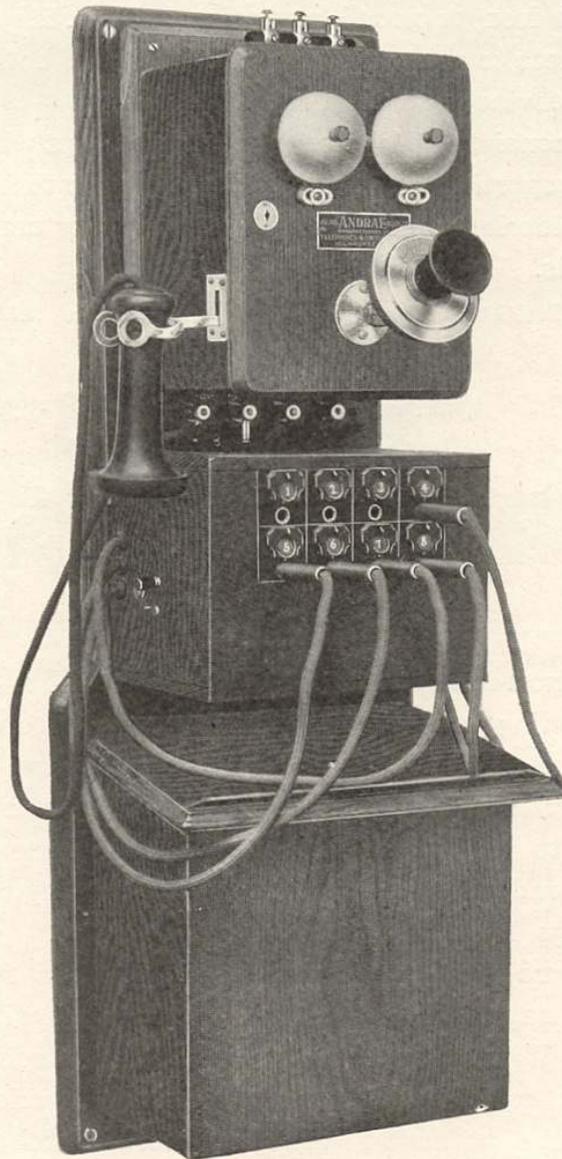


No. 3A Repeating Coil.

Our large iron enclosed repeating coil No. 3A is constructed of four separate windings arranged on the "sandwich" order, to provide the highest kind of efficiency. The core and shell are of the softest kind of highest grade iron obtainable. The eight terminals of the coils are brought out to substantial terminal plates. The windings are so arranged that a condenser may be cut in between any two lines; proportion of windings 1 to 2.

In ordering repeating coils, to be installed in switchboards or for other work, always describe lines in connection with which same are to be used. Whether complete metallic, grounded or common return. Whether equipped with series wound or bridging bell telephones. If for use at central stations where switchboards are employed, or on separate toll line switchboard. This information is necessary to assist us in devising arrangements adapted to meet requirements of service demanded.

Code word—YAGER. List Price.....\$11.00

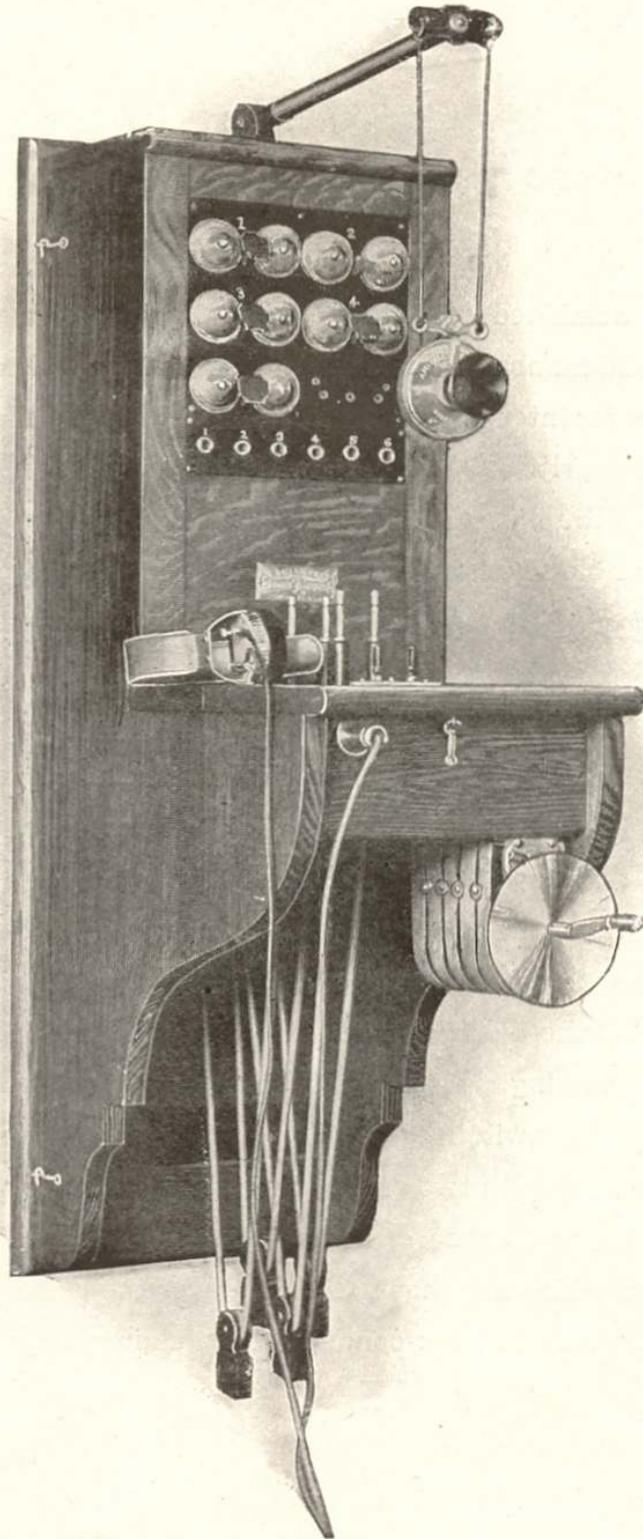
COMBINED TELEPHONE AND SWITCHBOARD—CONTINUED.

No. 199.

COMBINED TELEPHONE AND SWITCHBOARD.**No. 199.**

Our combined telephone and switchboard is of great utility where a small number of lines enter a switching station, and is especially useful for inter-communicating farm lines at a farmhouse. The telephone comprises all of the necessary parts of a telephone, as will be seen from the illustration, and in addition, is provided with cord and plug, the cord being attached to the terminal at the side of the telephone box. The plug is to be inserted in the small jack provided below the "ring-off", or clearing-out drops (not shown in the illustration), so that telephone may be connected with any line when the particular cord circuit attached to the jack is inserted in any subscriber's line jack. The hand generator in the switchboard is of our 5-bar type. The cabinet provided below the transmitter, contains all the subscribers' line equipment, and we can mount 16 of our self-restoring drops and jacks, or our Bell style drops and jacks therein. A cable is brought out of the back of switchboard, and is connected to the terminal for incoming subscribers' lines. This terminal is mounted on the side of the switchboard. The combined telephone and switchboard is provided with two sets of cords, as illustrated. The ultimate capacity of this switchboard is 16 drops and jacks. By means of the cord circuits, which are shown hanging over the battery box, any four entering lines may be inter-connected for talking purposes.

COUNTRY SWITCHBOARDS—CONTINUED.



No. 222.

COUNTRY SWITCHBOARDS.

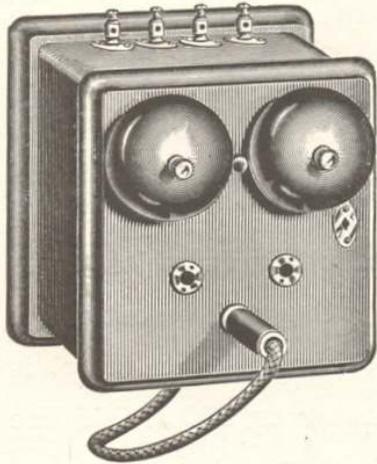
SMALL EXCHANGE SWITCHBOARDS. No. 222.

To meet the great demand for small switchboards, which are to be placed in some convenient space, where they will be out of the way, we have provided our wall cabinet, as shown herewith, which is equipped with the same high class material as our 100 or 200 line switchboards. The transmitter is adjustably mounted with cord weights, the key shelf is hinged, and everything is similar in construction to our latest type switchboard. The switchboard may be provided with any number of cord circuits up to five. The cabinet is hinged, and is easily opened, so that connection to the rear with line wires may be readily made. The generator is also of our strongest type. The switchboard is capable of accommodating an ultimate of 10 bridging bells or 50 self-restoring Bell Express drops and jacks. Bell style drops and jacks may also be mounted, if desired. The cabinet work is of the very best highly polished oak, so the switchboard makes a neat and finished appearance.

The cut shows bridging bells mounted in place of drops and jacks.

WATERLOO JACK.

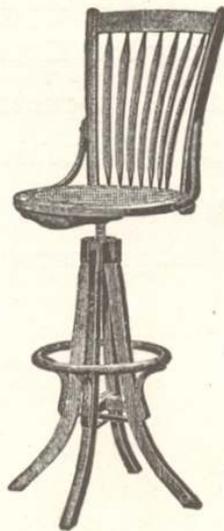
Our Waterloo jack, shown on this page, is to be used where a through toll line passes through an exchange. The object of the Waterloo jack is as follows :



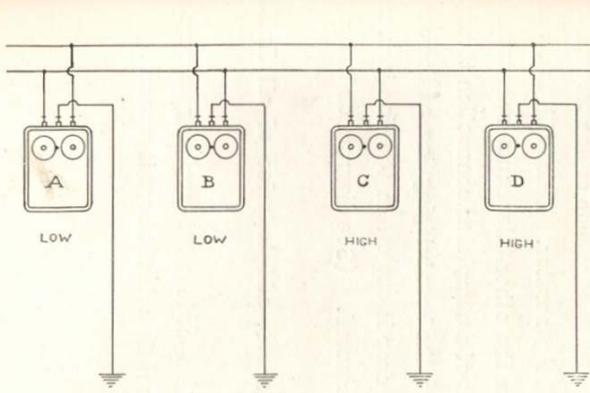
Two incoming lines of a toll line are connected to the left hand terminals at the top of the box. The out-going line is connected with the right hand terminals at the top of the box. A telephone is to be connected to the lower terminals of the jack box. If the plug is inserted in the left hand jack, the right section of the line is cut off, and conversation may be had with the left hand section. If the plug is inserted in the right hand jack, the left hand section of the toll line is cut off, and conversation

may be had with the right hand section. If the plug is inserted in the central jack, the telephone is simply bridged on the line.

SWITCHBOARD OPERATOR'S CHAIR.



Code word—QUOTIENT. List Price.....\$10.00



LEICH'S FOUR PARTY SELECTIVE TELEPHONES.

THOUSANDS IN SUCCESSFUL OPERATION.

CENTRAL ENERGY OR MAGNETO.

No springs to adjust. No relays. Condensers in circuit to stop the battery flow.

A few of the larger exchanges now using the system: Mansfield, O.; Youngstown, O.; Massillon, O.; Lima, O.; Trenton, N. J.; Ft. Worth, Tex.; Paducah, Ky.; Jackson, Tenn.; Reading, Pa.; Allentown, Pa.; Tampa, Fla.; Brazil, Ind.; Kewanee, Ill.; Springfield, Mo.

Only alternating currents used for ringers.

Write for Special Descriptive Bulletin.

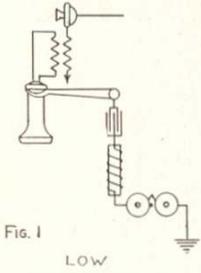
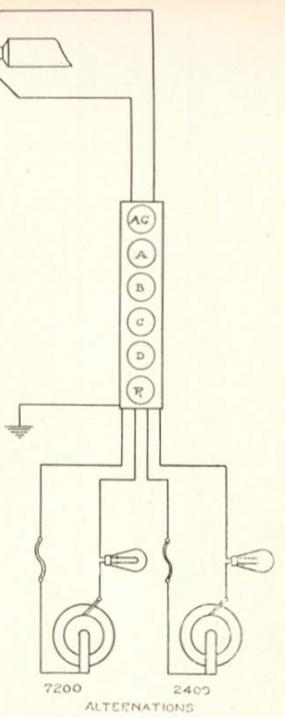


Fig. 1

LOW

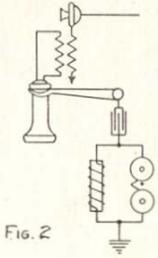


Fig. 2

HIGH

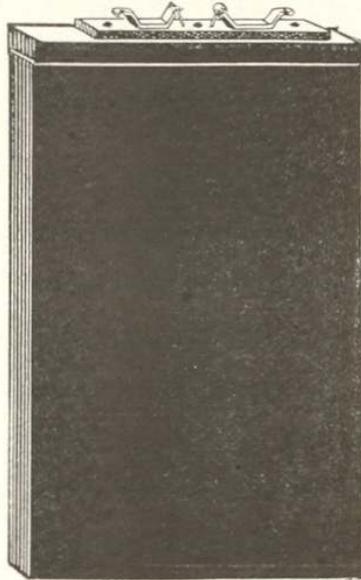
THE ONLY RELIABLE AND FULLY GUARANTEED SYSTEM. FULLY COVERED BY PATENTS.

**ANDRAE SELECTIVE CALLING BRIDGING TELEPHONE.
WITH GROUNDING DEVICE.**

To meet the demand for a telephone that will enable a subscriber to call central without disturbing other parties on the same line, and that will permit subscribers to call each other without throwing the drop at central, we offer our selective calling telephone. It will be noticed that a key has been introduced, so that when pushed, the generator will be connected between the sleeve binding post No. 1 and ground binding post G. 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 on 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 is cut off in the line jack, and the best grade of transmission is assured. (See diagram on last page of Catalog.)

For telephones wired as above, add to price of all Andrae bridging telephones 50 cents net.

Add code word "Quoth" to code word applying to regular bridging telephones, when telephone described above is wanted.

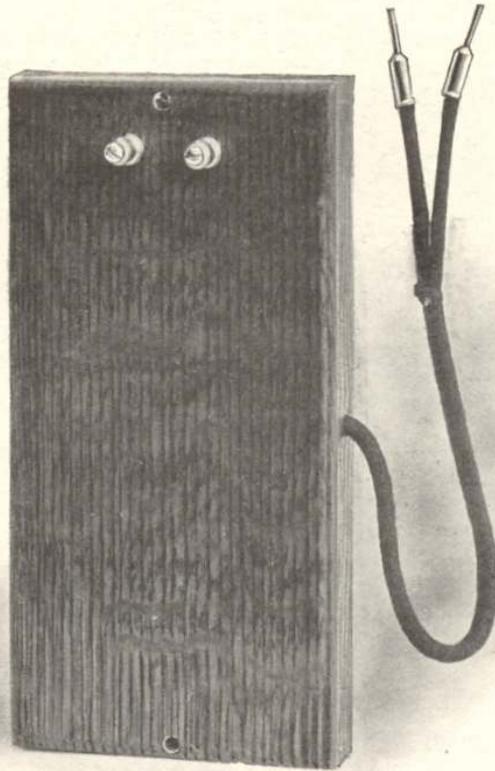
ANDRAE TELEPHONE CONDENSERS.

The general tendency of subscribers on rural telephone lines to leave the receiver off of hook, or to "listening in" has formed one of the greatest difficulties to successful operation, and has greatly limited the usefulness of these lines.

Numerous remedies have been offered by telephone manufacturers, but in most cases the improvement of the signalling conditions has decreased the efficiency of the talking. Our condenser allows the high frequency voice current to pass through readily, but acts as an apparent high resistance to the low frequency ringing current. By the use of this principle, it is possible to leave the talking circuit with its original high efficiency, and to bridge any number of telephones across the metallic line and ring one of these regardless of the position of the receivers on the others. As a matter of fact, all but one of the receivers could be removed, and the last one could be successfully rung.

Our XX condenser shown herewith, is especially suited for this purpose. It is of one micro farad capacity, well made, and carefully tested to stand about 300 volts alternating current pressure.

This condenser can easily be installed in any make of telephone, or we will wire it in the secondary circuit of any of our bridging telephones, when specified, at an additional cost of 75c per telephone.

ANDRAE TELEPHONE CONDENSERS—CONTINUED.

The accompanying cut illustrates our new form of condenser, especially adapted for use in connection with telephones already in operation. Its construction obviates the necessity of employing an expert to install it. It is only necessary to fasten condenser to wall beside telephone; then remove ends of receiver cord from telephone and attach them to binding posts on condenser case, afterward fastening cord coming from side of condenser case to binding posts on telephone formerly

occupied by receiver cords. After attaching condenser to telephone, ring up someone on the line, turning crank rapidly; while turning crank, watch your lightning arrester very carefully and see if current sparks from one carbon to the others. If so, you must separate them just enough to prevent sparking, *and no more*. Number 400 carbon block lightning arrester is especially recommended for use with this condenser. If you can transmit your signals perfectly from one end of line to the other, with all your receivers hung up, we guarantee that the two stations farthest apart on the line, may ring one another as well, if not better, with all the receivers off the hook, as when they were all hung up; and we also guarantee that the talking service will be as good, if not better, than before. This guarantee applies only to bridging telephone lines.

Code word—QUACK. List Priceeach, \$2.50

STYLE XX CONDENSERS. Illustrated on page 63.

1 —M. F., in tin case.	List Price...	\$1.50
1½— " " "	"	1.80
2 — " " "	"	1.90

HIGH-GRADE

TELEPHONE

ACCESSORIES

==== AND ====

CONSTRUCTION

MATERIAL

JULIUS ANDRAE & SONS CO.

MILWAUKEE, WIS., U. S. A.

INTER-COMMUNICATING TELEPHONES.

In addition to instruments shown on preceding page, we manufacture a complete line of inter-communicating telephones adapted for interior use in hotels, residences, offices, factories, etc. The large variety of designs prevents us from illustrating them in this Catalog.

Write for complete special bulletin and prices covering same.

ERICSSON'S GENUINE IMPORTED SWEDISH TRANSMITTERS AND RECEIVERS.

This apparatus has a reputation all over the world, and is too well known to make it necessary to furnish a detailed description at this time. We furnish these receivers and transmitters on any of our telephones illustrated on preceding pages at following additional net prices over the regular price of telephones.

List Price.

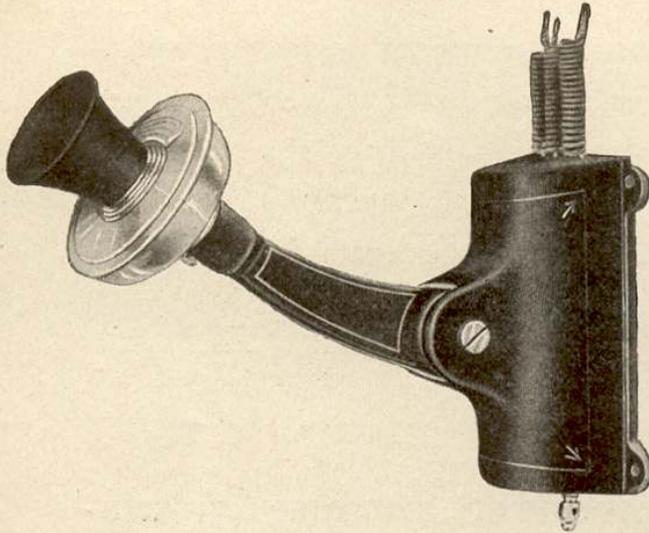
No. 570.	Code word—ABSTERSE.	Ericsson's imported transmitter	.....\$1.60
No. 547.	“ —ABSTERSION.	“ “ bi-polar receiver,	1.50

HOLTZER-CABOT GENERATORS.

Without conceding any superiority, we will, when customers prefer Holtzer-Cabot generators to our popular "Giant" generators, furnish same without delaying orders. Andrae telephones will be equipped with H.—C. 3-bar series and 4-bar bridging generator, with ringers corresponding with ringers used on Andrae 3-bar series and 5-bar generators without additional cost.

Write for special prices and further information.

ANDRAE TRANSMITTERS.



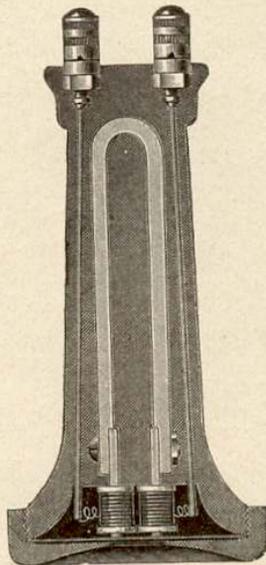
Code Word.	List Price.
ACCUSTOM. Transmitter only.	\$3.00
ACCUSER. Transmitter with adjustable arm and induction coil	\$4.90

ANDRAE SWITCHBOARD TRANSMITTERS.

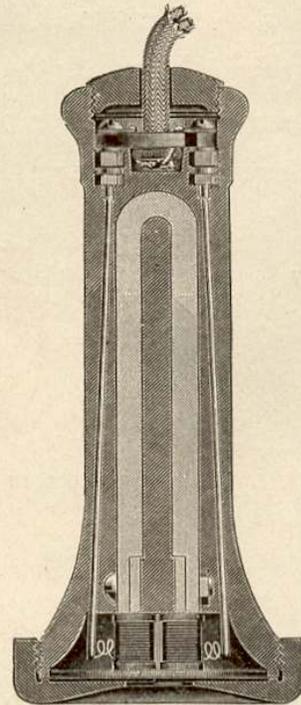
Code Word.	List Price.
YARD.....	\$5.00

(See page 41.)

ANDRAE RECEIVERS.



Style C.

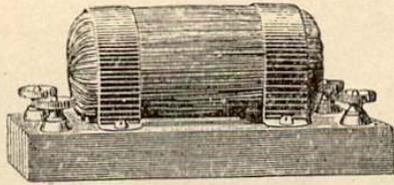


Style D.

Code word—ACE.	Style C.	List Price.....	\$2 00
“ —ACELDAMA.	Style D.	“	2.50
“ —YARE.	Style A (See page-8)	List Price.....	2.50

Complete description of Andrae transmitters and receivers will be found on pages 4 to 8.

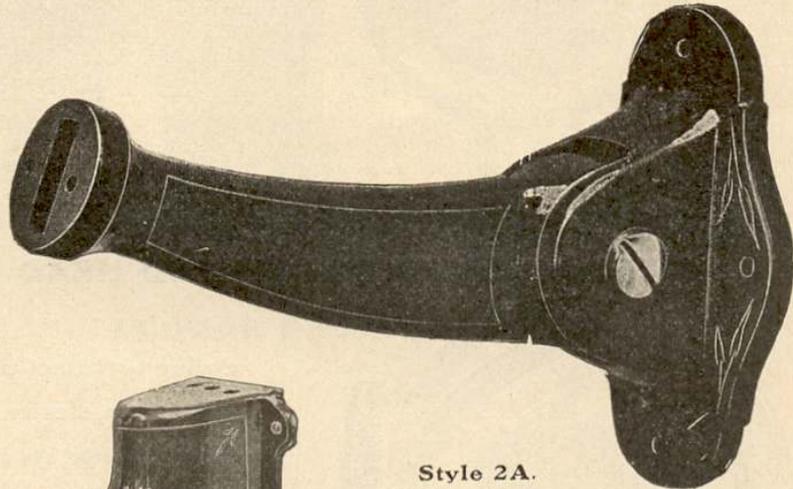
REPEATING COIL, STYLE XX.



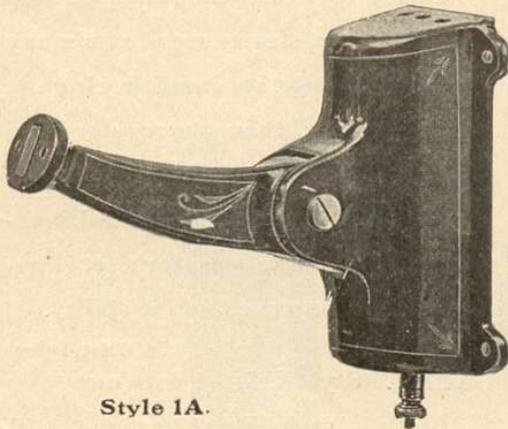
Our repeating coil, or telephone transformer, is correct in design. The magnetic circuit is complete without air gap. The iron is laminated, and while enough of it is used to carry the magnetic lines generated, there is no excess of iron to add impedance to the talking circuit.

Code word—ADJUSTER. List Price \$8.00

ANDRAE TRANSMITTER ARMS.



Style 2A.



Style 1A.

Our transmitter arms are equipped with a friction joint which allows easy and quick adjustment. They are finished with a high grade of japan, and neatly ornamented. Style 1A is adapted for mounting induction coil in base. Style 2A is well suited for instruments where the induction coil is placed in the magneto box.

Code word—ACID.	Style 1A.	Andrae arm.....	List Price, \$0.50
“ —ACIDITY.	“ 2A.	“	“ .60

CARBON DIAPHRAGM—For Transmitter.

Code word—ACIDIFY. EachList Price, \$0.16

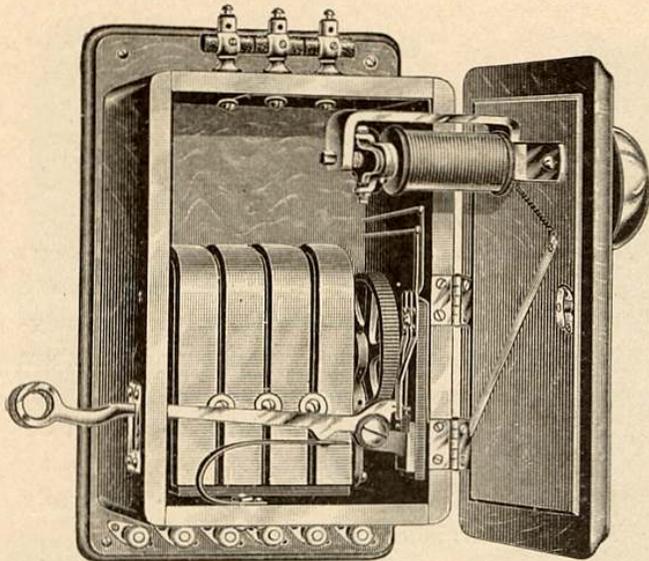
TRANSMITTER MOUTHPIECES.

Code word—ACIERAGE.	Hard rubber, male thread	List Price, \$0.15
“ —ACERATE.	“ female “	“ .15

GRANULAR CARBON—Imported, for Transmitters.

Code word—ACINIFORM.	Per pound	List Price, \$3.00
“ —ACLINIC.	“ ounce.....	“ .25

“GIANT” MAGNETO BELLS.

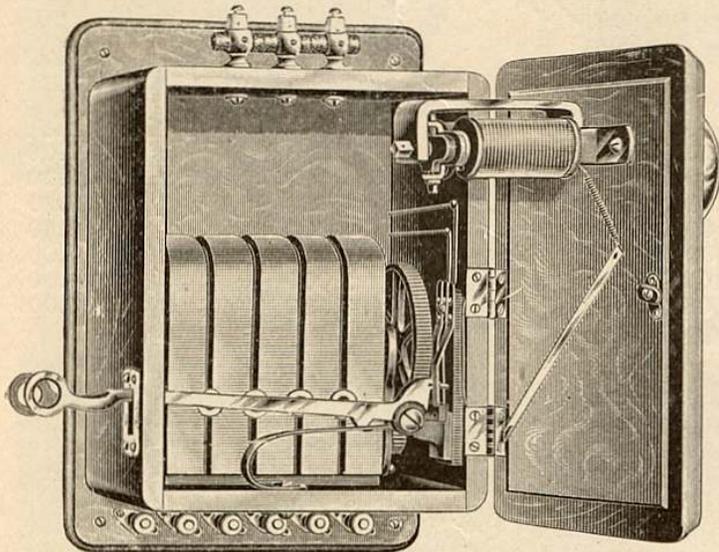


“Giant” generators and parts illustrated herewith are described on pages 9 to 12 of this catalog. “Giant” series magneto bells complete, with long lever hook switch; 80 ohm ringer, and six binding posts on bottom for receiver, induction coil and batteries. Wired ready for telephone back board.

Code word—ACME.	3-bar rings through	10,000 ohms.....	List Price,	\$8.00
“ —ACUE.	3-bar	“ 15,000 “	..... “	8.50
“ —ACOLYTE.	3 bar	“ 20,000 “	..... “	9.00

If hook is not required, deduct 50 cents from net price of bells.

“GIANT” BRIDGING MAGNETO BELLS.



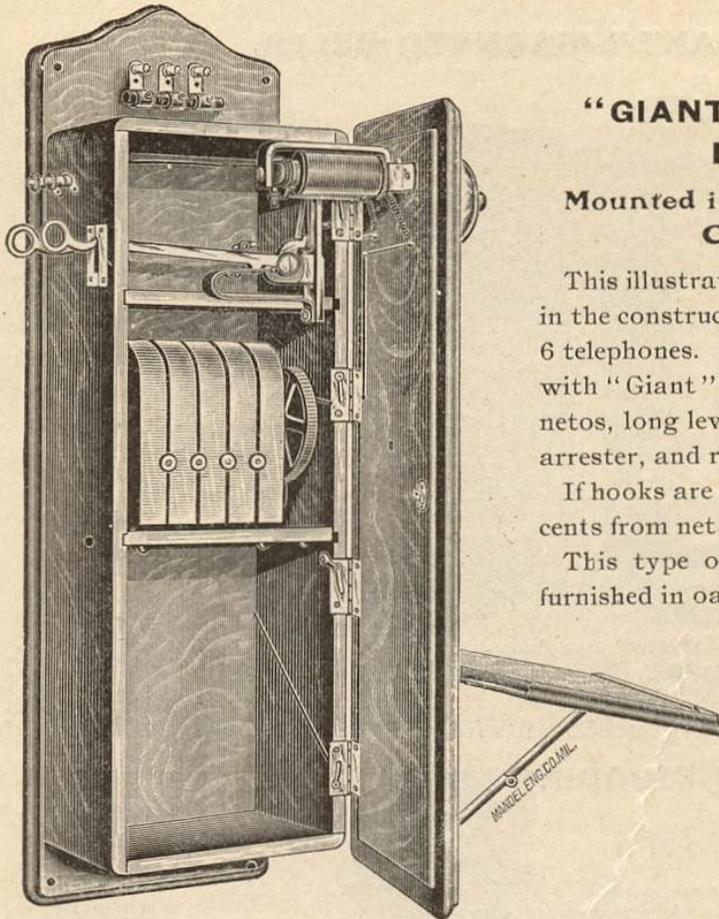
Made with 4 and 5 magnet bars. Complete, with long lever hook switch; ringers as indicated, and six binding posts on bottom for receiver, induction coil and batteries. Wired ready for telephone back board.

	Ringer Resistance.		4-bar.	5-bar.
Code word—ACONITE.	1000 ohms.	List Price	\$10.50	\$11.50
“ —ACORN.	1600 “	“	11.00	12 50
“ —ACOUSTIC.	2000 “	“	13.00	13.50
“ —ACOUSTICS.	2500 “	“	14.00	14 50

If hook is not required, deduct 50 cents from net price of bells.

“Giant” generators are mounted in dove-tailed corner, handsomely finished oak or walnut boxes.

Unless otherwise instructed, we send oak, it being generally used.



“GIANT” MAGNETO BELLS.

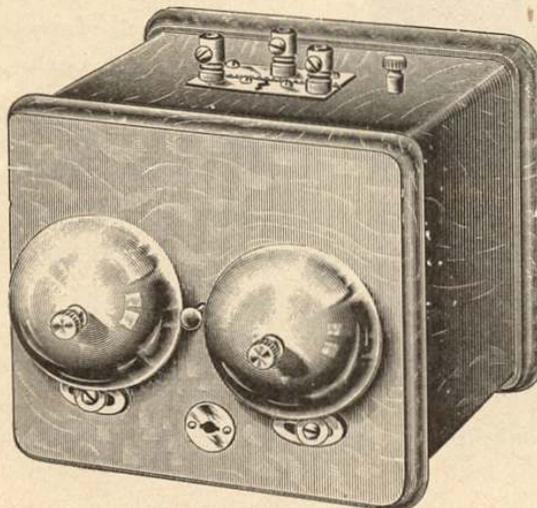
Mounted in Compact Type Cabinets.

This illustration shows cabinet used in the construction of our Nos. 5 and 6 telephones. It is furnished complete with “Giant” series, or bridging magnetos, long lever hook switch, carbon arrester, and ringer.

If hooks are not wanted, deduct 50 cents from net price.

This type of cabinet is generally furnished in oak.

Code Word.	Series.	10,000 ohms,	3 magnet bars,	80 ohm ringers,	List Price.
ACQUAINT.	Bridging.	50,000	4	1,000	\$10.00
ACQUIESCE.	“	50,000	4	1,600	12.00
ACQUIRE.	“	100,000	5	1,000	12.50
ACQUISITIVE.	“	100,000	5	1,600	13.50
ACQUIT.	“	100,000	5	2,000	14.00
ACRE.	“	100,000	5	2,500	14.50
ACREAGE.	“	100,000	5	2,500	15.00

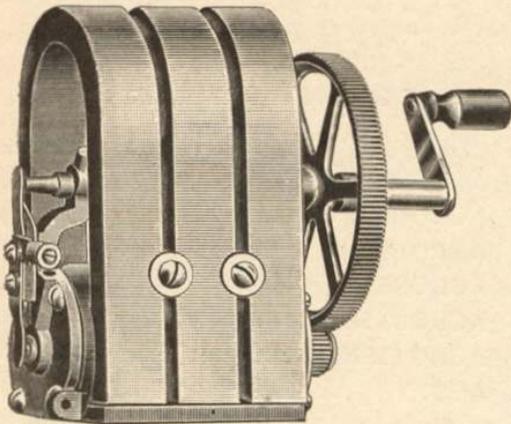


EXTENSION BELLS.
Complete in Oak or Walnut Box.

Code Word.	80 ohms	List Price.
ACTRESS.	.....	\$2.80
ACTOR.	160 “	3.00
ACTUAL.	1000 “	4.00
ACTUARY.	1600 “	5.00
ACTUATE.	2000 “	5.50
ACTUATION.	2500 “	6.00

Extension Bell.

"GIANT" MAGNETO PARTS.

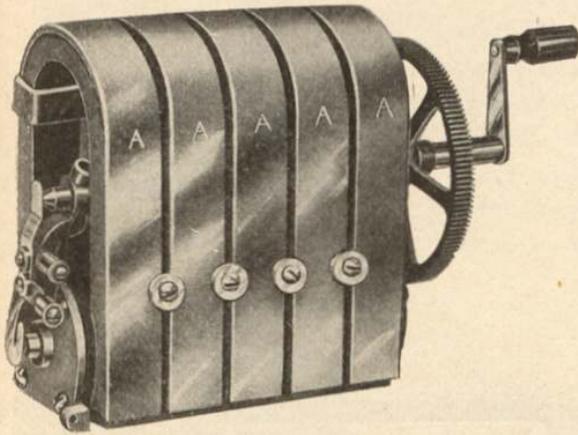


GENERATORS ONLY.

SERIES.

Code Word.

ACTION. 3 magnet rings
through 15,000 ohms.
List Price.....each, \$4.40
4 magnet rings
through 20,000 ohms.
List Price.....each, \$5.70



BRIDGING OR SERIES.

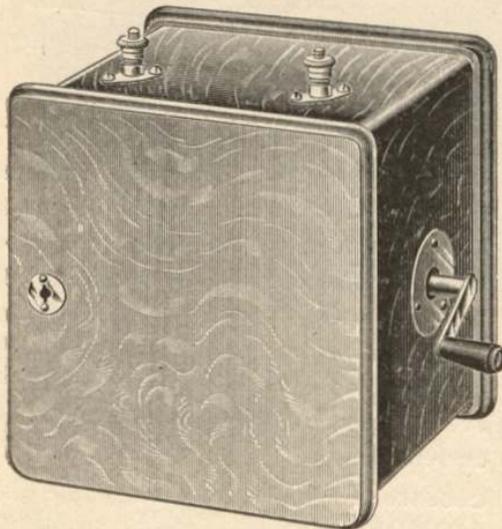
Code Word.

ACTIVE. 4 magnet rings
through 50,000 ohms.
List Price.....each, \$6 00

BRIDGING.

Code Word.

ACTIVELY. 5 magnet rings
through 100,000 ohms.
List Price...each, \$7.00



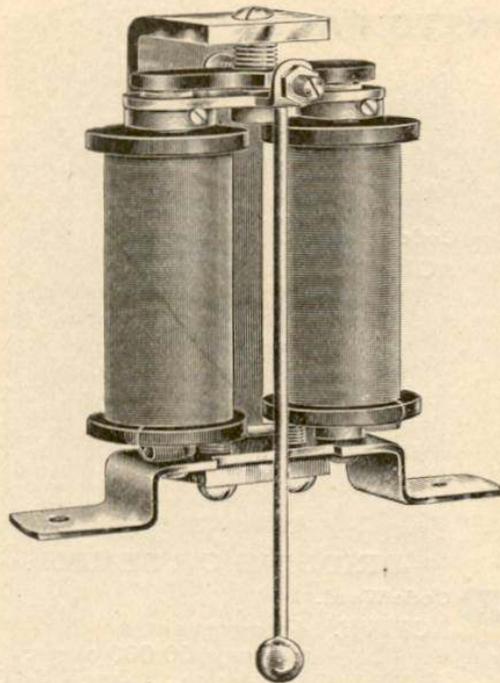
**"GIANT" HAND, OR
DESK GENERATOR.**

**Mounted in Oak or Walnut Boxes or
on Wood Base.**

Code Word.		List Price.
ACRED.	3 magnet.....	\$5.50
ACRID.	4 "	6.50
ACRIDITY.	5 "	8.00

When these generators are to be used under desks or on switchboards in inverted position, this should be stated in ordering same, so that oil holes may be placed in proper position.

Hand Box Generator.



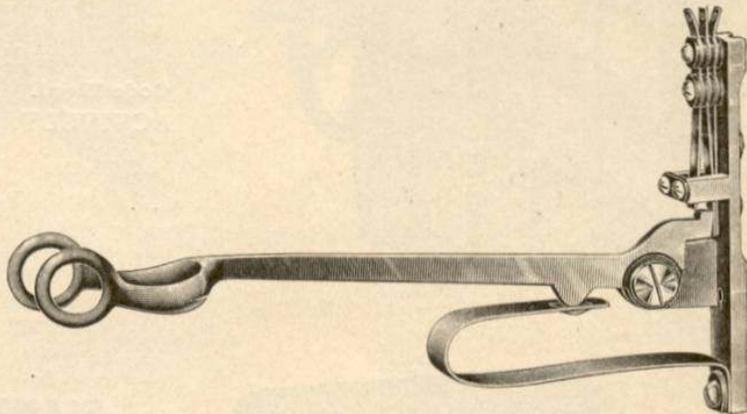
Long Lever Hook Switch.

"GIANT" RINGERS.

Code Word.	Resistance.	List Price
ACROGEN.	80 ohms.....	\$1.80
ACRONICAL.	160 "	2.10
ACROPOLIS.	500 "	2.50
ACROSS.	1000 "	3.30
ACROSTIC.	1600 "	3.60
ACROTISM.	2000 "	4.40
ACT.	2500 "	5.10

If gongs are wanted, add 10 cents to net price.

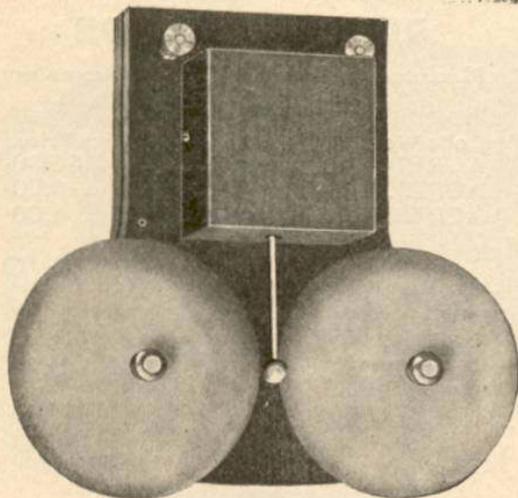
Code Word.	List Price.
ACTING.	\$1.50



Loud Ringing Extension Bell.

In response to a demand for a direct current bell, built upon the same lines as our alternating current loud ringing extension bell, we have recently designed a bell of superior quality. With the exception of a few minor changes in the electrical construction, it is similar in every respect to our present alternating current bell.

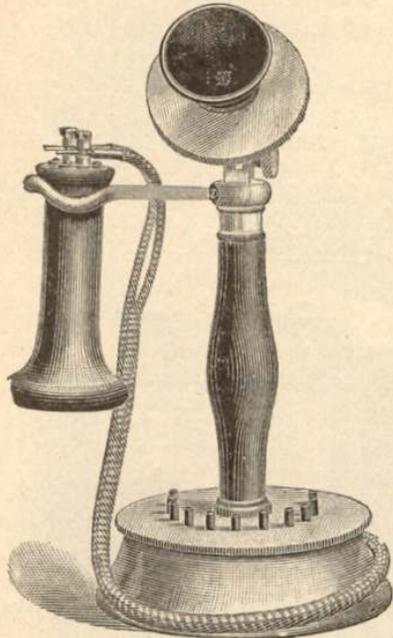
Code Word.	List Price.
ADMIRE.	Each..... \$11.00



Direc Curren

THE ANDRAE AUTOMATIC TELEPHONE.

For Interior Inter-Communicating Systems.



Desk Type.

These cuts represent our automatic switch telephones, the design of which is to eliminate all the little troubles and annoyances that have heretofore been experienced in the use of private telephone systems. Great care is taken in making up these telephones, to see that every part is perfect, and not made in a way that can give any trouble, so that if they are installed right there is every reason for the system giving the most perfect service.

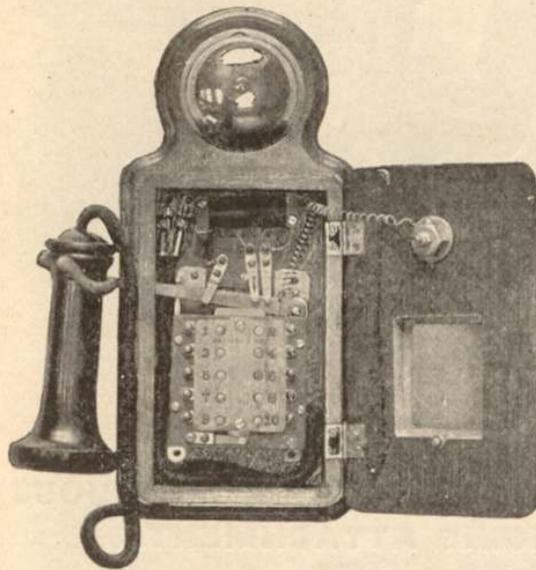
The automatic feature provides against the accidental or unintentional leaving open of the circuit by failure of the user to return or replace the switch lever to the initial position or contact, as practiced in most forms of telephone switches.

It is also adapted for bringing into circuit a number of stations simultaneously.

In operating the telephone, remove the receiver and place to the ear, then press in the pin

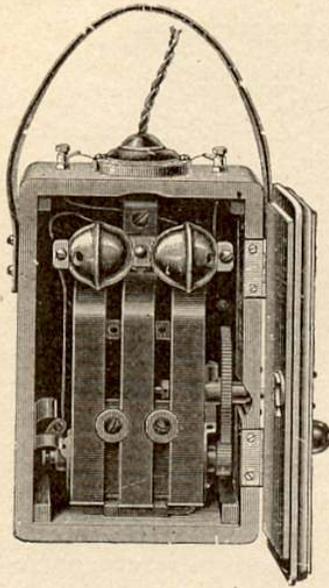
of the number of the station desired to call, or if it is the wish to speak to several stations at the same time, push in all the pins of the numbers wanted, and circuits are established with each; the call being made by pressing a button, as usual. When conversation is finished, there is but one natural place to put the receiver, and as soon as this is placed on the hook, the whole system is automatically restored to its normal condition.

The following prices will compare favorably with any automatic switch telephone now on the market.



Wall Type. Open.

Code Word—ACACIA.	Wall sets, 10 stations or less.	List Price.....	\$14 00
“ —ACACIO.	Desk “ 10 “ “	“	18.00
“ —ACADEMY.	Wall “ 11 to 16 stations.	“ ..	16.00
“ —ACADEMIC.	Desk “ 11 to 16 “	“	20.50
“ —ACALEPH.	Wall “ 17 to 26 “	“	20.00
“ —ACANTHUS.	Desk “ 17 to 26 “	“	26.00



H.-C. TESTING MAGNETO.

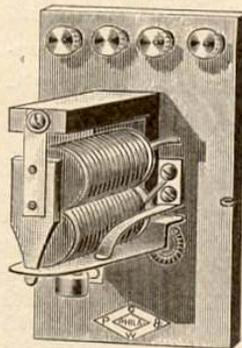
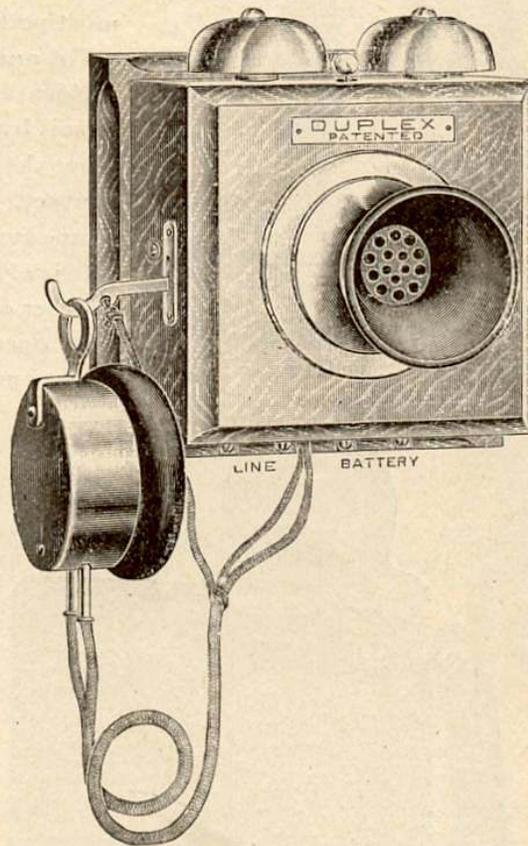
We list here standard sizes we keep in stock, but can furnish testing magnetos to ring up to as much as 125,000 ohms when desired. Prices upon extra high resistance bells will be given on application

	Ringer Resistance.	List Price.
Code word—ADEPT.	10,000 ohms.....	\$8.00
“ —ADEQUATE.	15,000 “	8.50
“ —ADFFECTED.	25,000 “	9.50
“ —ADHERE.	35,000 “	10.50
“ —ADHERENT.	40,000 “	11.50
“ —ADHESIVE.	50,000 “	12.50

DUPLEX BATTERY TELEPHONE.

Designed for private use between house and barn, offices in buildings, etc. Fully guaranteed to talk as far as any battery telephone made, and as easy to install as a common electric bell.

Code word—ACCURATE. List Price Per Pair. \$10.00



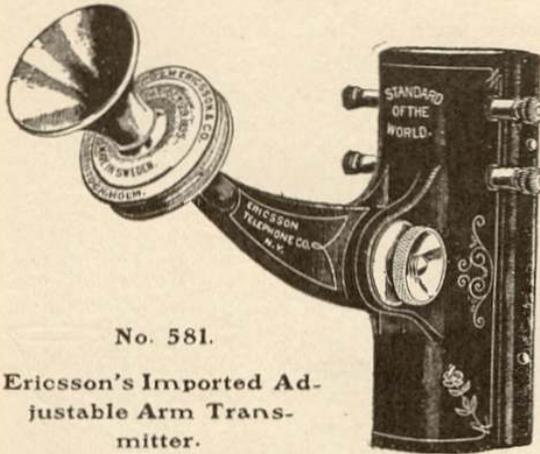
AUTOMATIC DROP OR CONTINUOUS RINGING ATTACHMENT.

For use on battery or telephone circuits. The closing of the main circuit causes the drop to fall, thereby closing the local circuit and causing the bell to ring until raised again.

Code word—ADJUTRIX. List Price. For use with battery, \$1.50
 “ —ADJUVANT. “ “ magneto, 2.00

THE ERICSSON GENUINE IMPORTED MICROPHONE.

Mounted on Adjustable Arm.

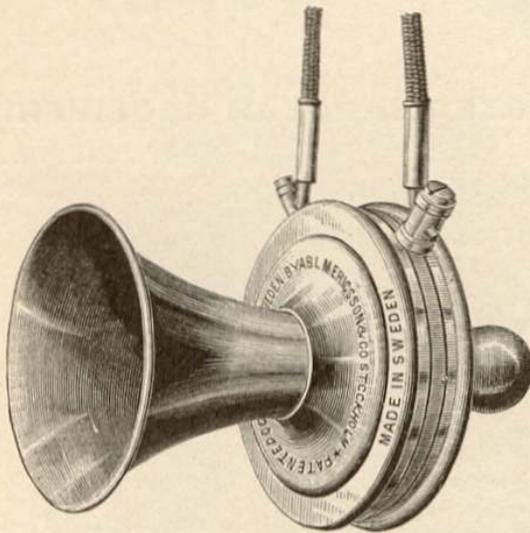


No. 581.

Ericsson's Imported Adjustable Arm Transmitter.

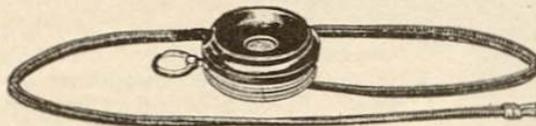
Code Word.	List Price.
ACTINIC.	Transmitter only, \$3.25
ACTINISM.	“ Adjustable arm and Induction coil in base..... 5.50

ERICSSON'S IMPORTED SWITCHBOARD TRANSMITTER.



Code Word.	List Price.
ACTINIS.	Transmitter with two 6-foot cords..... \$4.75

ERICSSON'S IMPORTED BI-POLAR.
Aluminum Watch-case Receiver, with Cord.



No. 551. Code word—ACULCATE. Imported. List Price\$3.00
The smallest and neatest made. Light and handy.

GENUINE ERICSSON HAND MICROTELEPHONE.

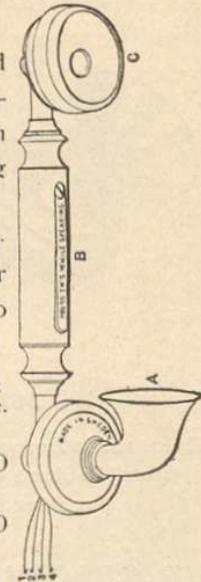


No. 520. Imported.

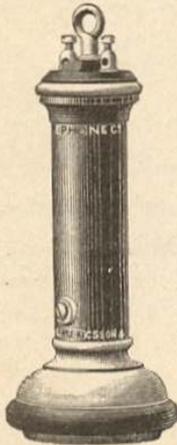
Ericsson's imported coal grain hand microtelephone with contact fastenings. A complete telephone within itself, so far as talking and receiving are concerned.

This instrument is light, very convenient and handy to use. Ask for diagram of wiring, showing how to connect.

Code Word.		List Price.
ACUMEN.	No. 520 with single contact.....	\$15.50
ACUTE.	No. 525 with double contact	17.00

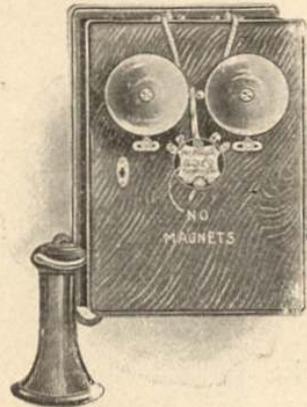


No. 525. Imported.



ERICSSON IMPORTED BI-POLAR RECEIVER.

List Price.
Code word—ADAGE. No. 547. Ericsson's receiver\$2.80



THE G. D. EXTENSION CIRCUIT CLOSER.

New Model.

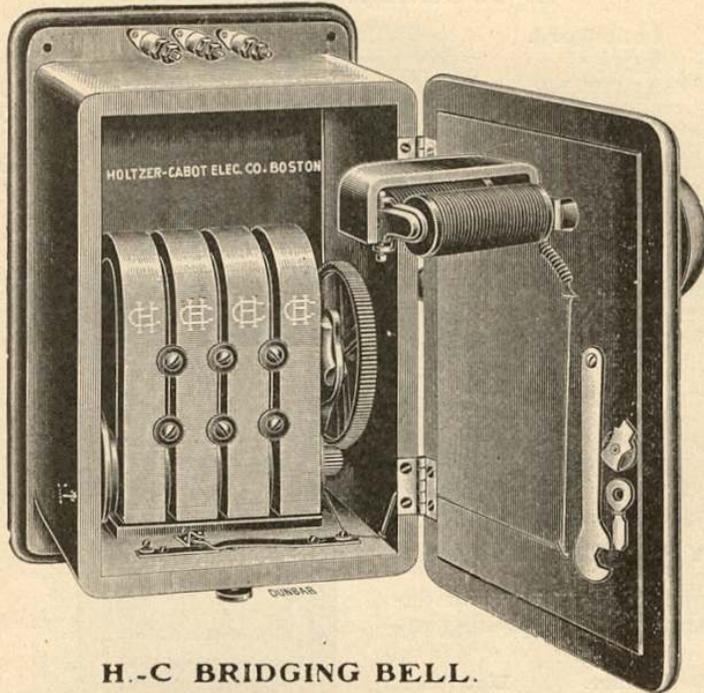
As shown in the cuts herewith, this device fastens on the front of the magneto box. The bell clapper strikes the lever, when the telephone rings, and raises the latch, thus releasing the shutter. This closes the extension battery call bell circuit until the shutter is restored by hand. The small switch at the bottom may be used to open the extension circuit, so that the extension bell will not ring when the shutter falls, if so desired. Excels, because cheaper, simpler, more reliable. No magneto to burn out. Goes in a suitable place, out of the way.



Code word—ADMEASURE. G. D. circuit closer. List Price.....\$1.50

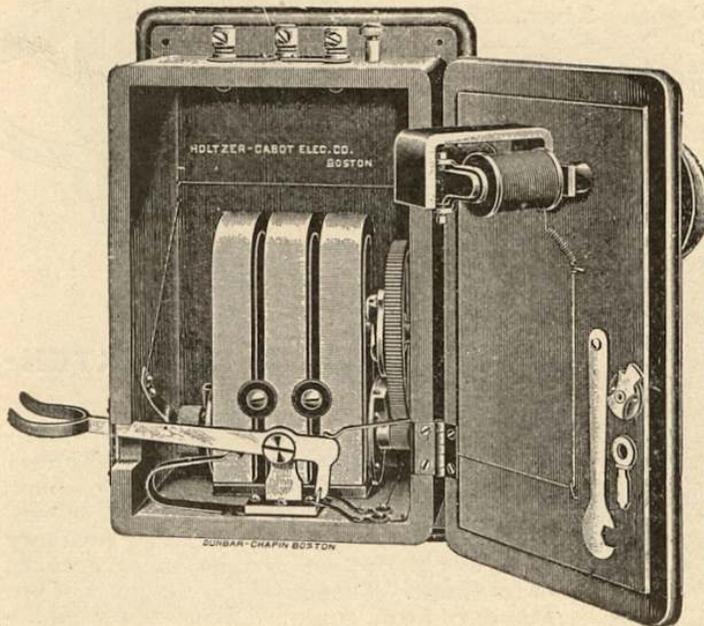
H.-C. MAGNETO BELLS AND PARTS.

H.-C. SERIES BELL.



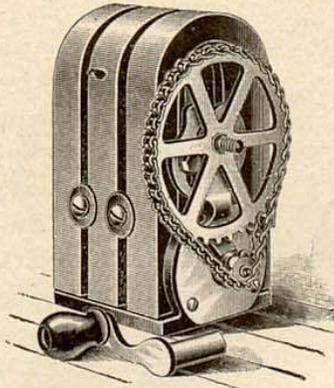
The H. & C. magneto bells and parts are carried in stock by us, assuring prompt shipments. Users of high grade telephone apparatus are thoroughly familiar with these goods, making detailed description unnecessary. All H.-C. magneto bells are furnished complete in oak or walnut boxes with long lever hook switch, ringer, and six binding posts on bottom for receiver, induction coil and battery.

H.-C BRIDGING BELL.



The H.-C. bridging bells are equipped with four permanent magnets ringing through 40,000 to 50,000 ohms or with five permanent magnets ringing through approximately 100,000 ohms.

Code Word.		Rings Through.		Ringer Resistance.	List Price...
ADAGIO.	704T.	10,000 ohms.	3 magnet.	80 ohm.	\$8 75
ADAMANT.	705T.	15,000 "	3 "	80 "	... 9.05
ADANSONIA.	706T.	20,000 "	3 "	80 "	... 9.50
ADEPT.	734T.	50,000 "	4 "	1000 "	...12.10
ADAPTABLE.	735T.	50,000 "	4 "	1600 "	...12 60
ADAPTER.	1739T.	100,000 "	5 "	1600 "	...14.50

H.-C. MAGNETO BELL PARTS.**H.-C. GENERATORS ONLY.**

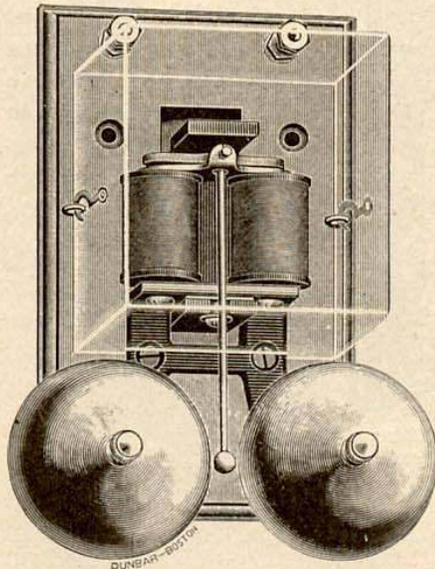
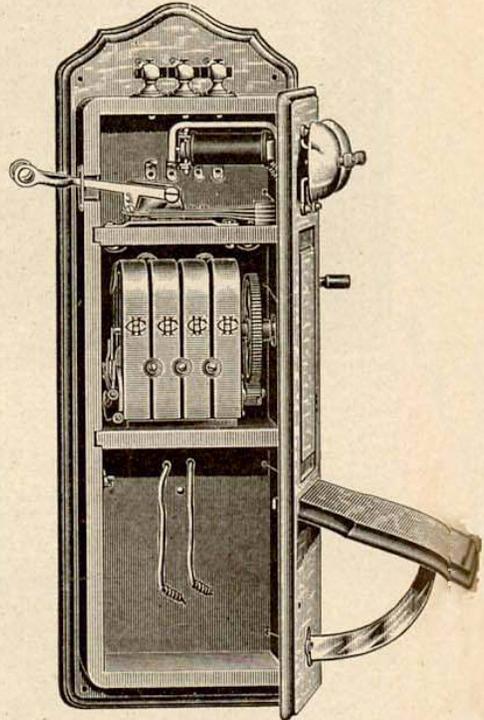
Series Generator.

Code Word.		Rings Through.		List Price.
ADD.	710T.	10,000 ohm.	3 bar	.... \$4.40
ADDIBLE.	711T.	15,000 "	3 "	..... 4.80
ADDITIVE.	712T.	20,000 "	3 "	..... 5.20
ADDER.	736T.	50,000 "	4 "	..... 6.00
ADDITION.	1736T.	100,000 "	5 "	..... 7.50

H.-C. CABINET TYPE MAGNETOS.

These cabinets are equipped with series or bridging bells, hook switch, and carbon lightning arresters.

Code Word.		Ringer Resistance.		List Price.
ADDER.	333T.	80 ohm.	3 bar.....	\$10.40
ADDICT.	333T.	1000 "	4 "	..... 13.70
ADDLE.	333T.	1600 "	4 "	..... 14.20
ADDRESS.	333T.	1600 "	5 "	..... 16.10



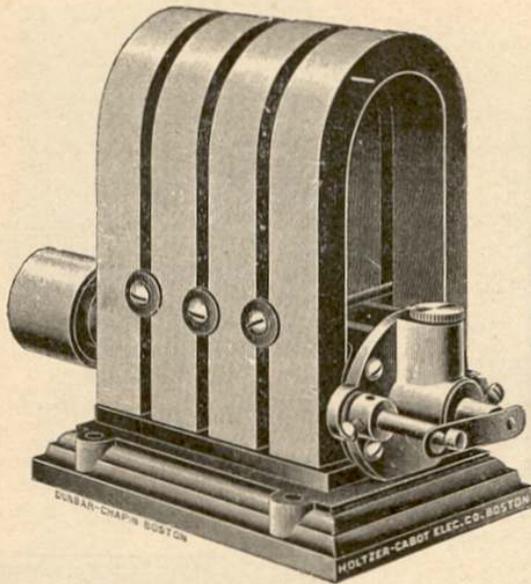
H.-C. Special Extension Bell.

HOLTZER SPECIAL EXTENSION BELL.

The accompanying cut illustrates a very convenient type of extension bell. It is neat and compact in appearance, and is well adapted for many places where the ordinary form would not be permissible on account of its shape. The striker movement is of our standard form, equipped with patented adjusting device and required resistance.

Code Word.	No.	Resistance.	List Price.
ADDUCE.	727 A. T.	80 ohm.	\$3.50
ADDUCENT.	730 A. T.	1000 "	4.50
ADDUCIBLE.	731 A. T.	1600 "	4.90

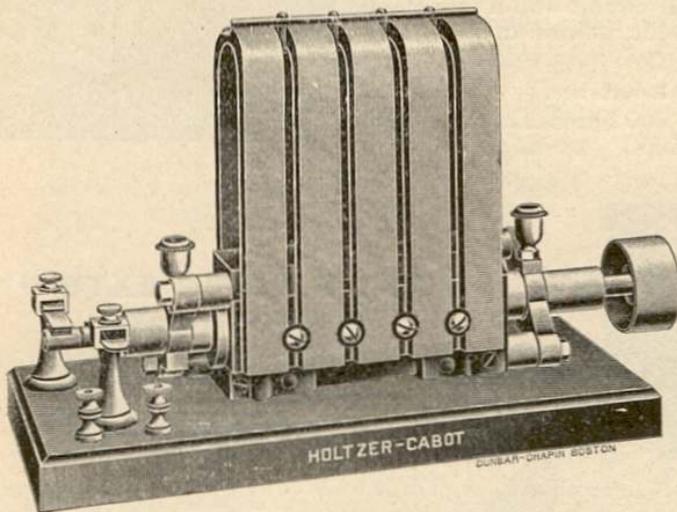
H.-C. POWER GENERATORS.



To meet the demand for a reliable power generator suitable for small exchanges, we offer the new H.-C. 4-magnet style. This is a powerful generator, and it has a current output quite ample for exchanges up to 500 subscribers. For larger exchanges up to 2000 subscribers, we would recommend the 5 magnet size, while for exchanges from 2000 subscribers upwards, the special 5 magnet style shown below is the most desirable. These generators have long bearings, and are provided with grease cups, so that they require practically no attention. The base is of metal, the armature is laminated, and the general finish of the machine is first class.

Code word—ADDUCTOR. No. 741T. 4 magnet. List Price.....\$15.20
 " —ADENOLOGY. No. 742T. 5 " " 20.20

H.-C. SPECIAL POWER GENERATOR.



For exchanges of 2000 subscribers and upwards the H.-C. 5 magnet special power generator is recommended. This generator is constructed with closed fields separated by solid brass sections. It has long phosphor bronze bearings and a steel armature shaft, and is provided with grease cups. There is no question regarding its durability under constant service.

This machine gives a current output sufficient for the largest exchanges.

Code word—ADENOSE. No. 743 T. List Price.....each, \$50.50

Prices and circulars of D. C. and A. C. belted and direct connected motor generators on application.

PORTABLE TESTING SETS.

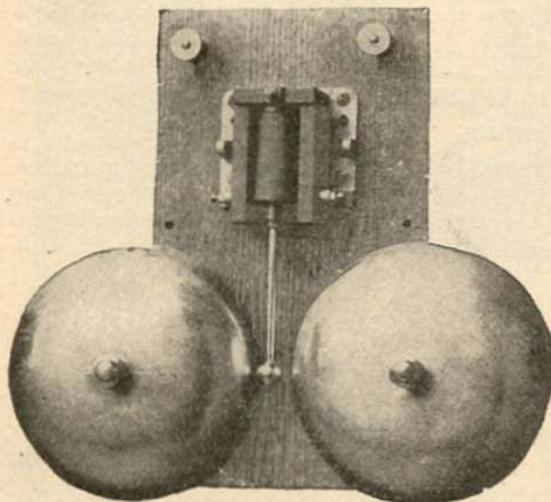
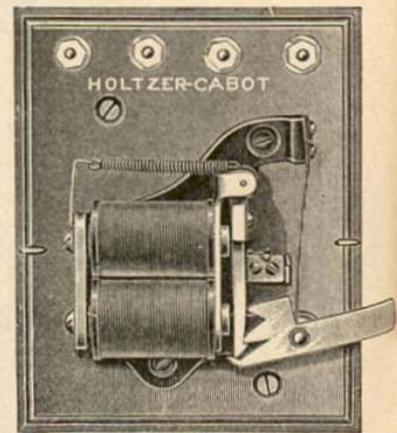


Code Word.	List Price.
ADIEU. Testing set complete with 3 magnet generator and 80 ohm ringer	\$25.25
ADIPOSE. Testing set complete with 4 magnet generator and 1000 ohm ringer,	28.25
ZEMINDAR. 5 magnet generator and 1600 ohm ringer.....	30.00

H.-C. MAGNETO CIRCUIT-CLOSING ATTACHMENT.

In many places the ordinary magneto and extension bells do not ring long or loud enough to be heard; especially is this true in noisy factories. In such cases this attachment will be found valuable. It is arranged to close a local circuit and a vibrating electric bell located at different points may be rung by this means.

Code Word.	Resistance.	List Price.
ACROATES. No. 802 T.	80 ohms.....	\$3.00
ACROBAT. No. 803 T.	1000 "	4.50



LOUD RINGING EXTENSION GONGS.

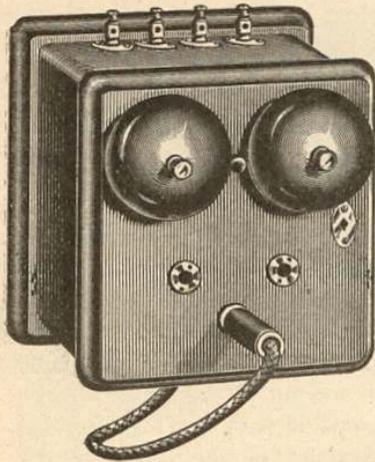
For Telephone Circuits.

STYLE L. R.

These bells can be wound to any required resistance from 80 to 10,000 ohms.

Code Word.	Resistance.	List Price.
ADET.	80 ohms.....	\$9.00
ADJURE.	1000 "	9 50
ADJUST.	1600 "	9.75

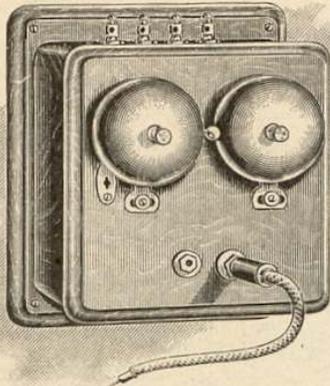
ANDRAE CUT-IN STATIONS.



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, separating the part not in use. By this double service is possible, and if the line is a long one with many intermediate stations, it might be divided into several sections, each giving service. These cut-in stations are equipped with three spring jacks, fuse plug, bridging ringer and brass gong. Either or both ends of the line can be used at same time, or the operator can listen-in on the center jack.

Code Word.

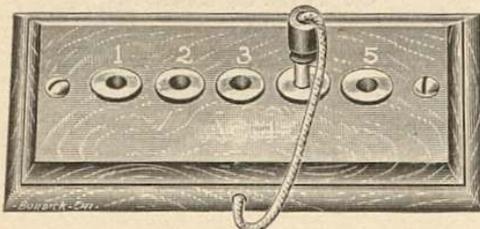
ACCURSE.	Cut-in station with 1000 ohm ringers.	List Price.....	\$11.00
ACCUSE.	“ “ “ 1600 “ “	.....	12.00



No. A261 is a lower priced cut-in station than the one shown above. It is equipped with two spring jacks, one plug and cord extending from telephone, bridging ringer, and brass gongs. Inserting the plug in right hand jack connects telephone with right hand line, and extension bell with left hand line, and vice versa if plug is inserted in left hand jack.

Code word—ZACCHO.	1000 ohm ringers.	List Price.....	\$9.70
“ —YOSEMITE.	1600 “ “	.....	10.00

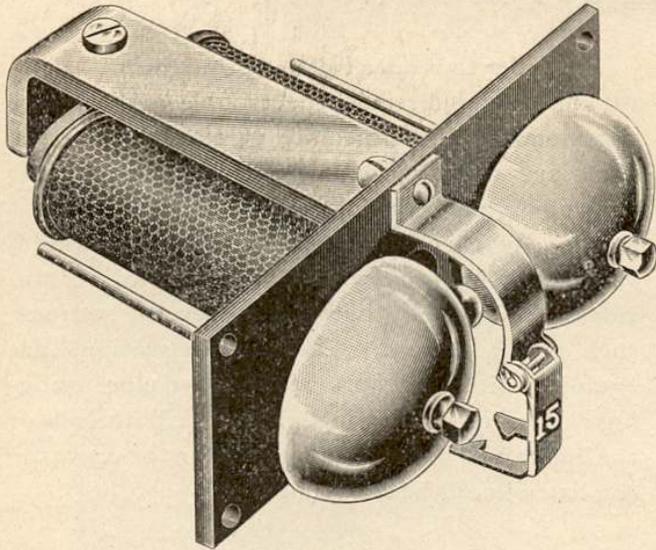
PLUG SWITCH.



This plug switch is especially well adapted for small farmer line switchboards. It is used in connection with extension bells with different sounding gongs or extension bells with indicators. Furnished with any number of lines.

Code word—ZOCCO.	5 lines.	List Price.....	\$3.00
“ —ZOCLE.	10 lines.	“	5.00
“ —YONDER.	Cord and Plug.	List Price.....	1.00

TOLL LINE AND INDICATING BELL.



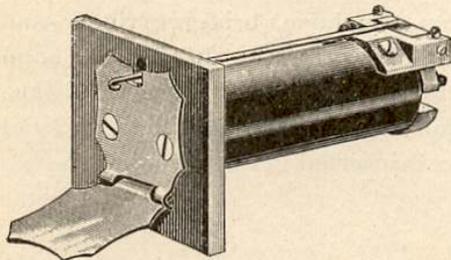
Especially adapted for use on our country party line switchboard No. 220.

Code Word.	List Price
ZAFFER. 1000 ohms.	\$4.80
ZAMBO. 1600 "	5.30
ZANNA. 2000 "	5.80
ZANANA. 2500 "	6.30

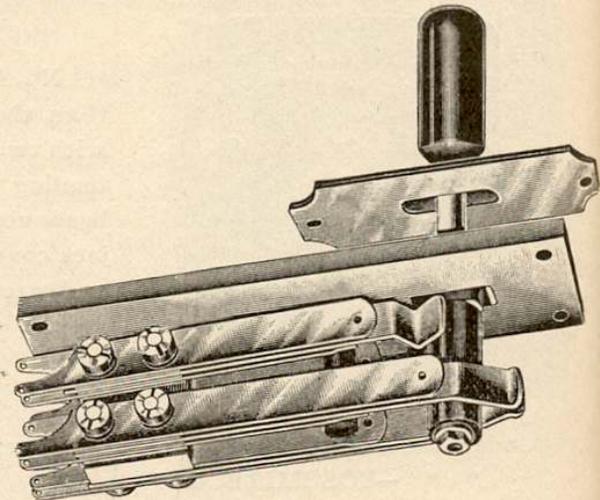
RINGING AND LISTENING KEYS.

Code word—ZENANA.....^{List Price.}\$6.00

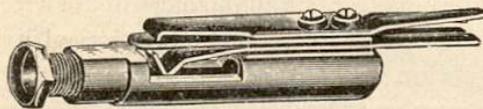
TUBULAR DROPS.



Code Word.	List Price
ZANY. Series	\$2.50
ZANUTH. Bridging	3.00

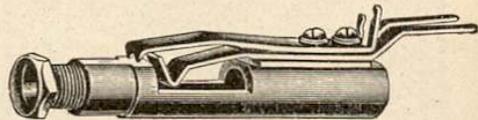


OPERATOR'S JACK AND CUT-OUT.



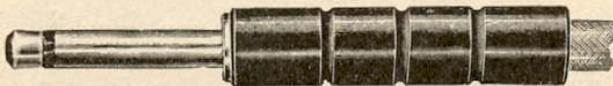
Code word—ZEAL List Price, \$1.50

SPRING JACK.



Code word—ZAX. List Price...\$0.80

PLUG.



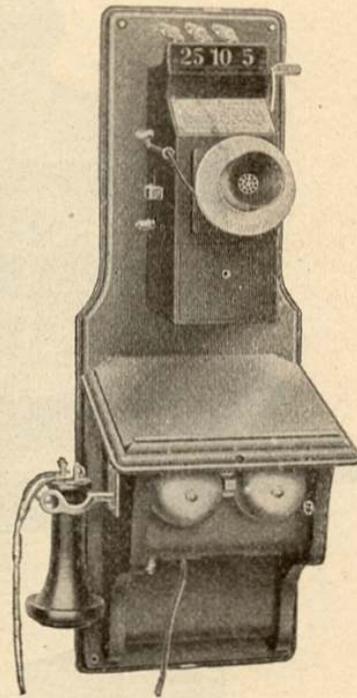
Code Word.	List Price.
ZEALOT	\$1.50

TELEPHONE PAY-STATIONS.

These Pay-Stations

are the highest type of telephone coin collectors on the market and have embodied in them all the latest improvements which skill and ingenuity can suggest.

The use of Pay-stations is an essential feature to profitable public telephone service, as there is no more reason why telephone service should be given gratis than merchandise. The "telephone habit" is one easily cultivated, and by locating pay telephones liberally in populous districts the telephone manager will be



surprised at the fine revenue which each one of them will bring in.
Code word—JARGON. No. 136 Paystation for mounting on front of Central Energy or Magneto telephones as illustrated. List Price each.....\$8.00

No. 13 Paystation shown in accompanying cut can be mounted on the backboards of Magneto or Central Energy Telephones.

As signals are transmitted by vibration all screws should be set up firmly.

Four washers are furnished with each machine to attach to corners of telephone backboard, thus giving the mounting plate clearance and desk wall cabinet pay-stations can also be furnished.

Write for bulletin and prices.

Price List of Pay-Stations.

Code Word.		List Price.
WRESTER.	13 For 5, 10 and 25c.....	\$ 8.00
WREST.	14 For 5, 10, 25 and 50c.....	10.00
WRENCH.	15 For 5, 10, 25, 50c and \$1.00	12.00

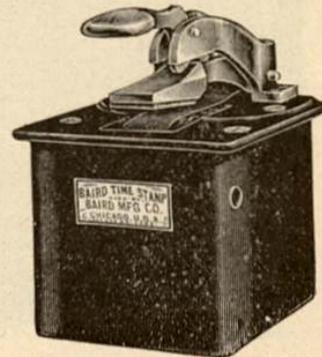


BAIRD TIME STAMPS.

Code Word. List Price each.

AJAR. No. 10 time stamp, printing time and date only.....\$25.00

Code Word. AKEE. No. 28 time stamp, printing time and date only..... 30.00



1900 DRY CELLS.

The 1900 Battery.



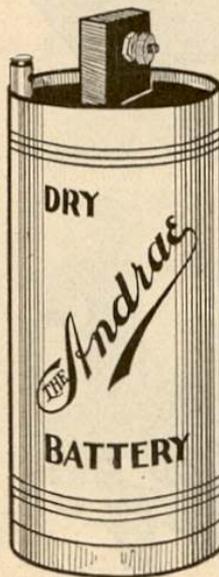
Cat. Nos. 4520,



4521,



4522.



The greatest telephone battery yet produced. This battery is manufactured expressly for telephone service and has successfully overcome the prejudice heretofore existing against 2 x 5, Type C.

dry batteries for this purpose. The "1900" has no equal for strength and durability and must not be classified with the many inferior dry batteries today in the market.

Many batteries are put up to closely resemble the genuine and original "1900," which is sold under a trade mark label. The constant and high E. M. F., 1.5 volt and large current discharge from 16 to 18 amperes insures the most satisfactory exchange service. The "1900" dry battery is sold under the following guarantee: "When used in connection with transmitters having a resistance of from 30 to 35 ohms, the average life of the "1900" will not be less than eighteen months continuous exchange service, and when used in connection with modern constructed transmitters having from 65 to 75 ohms resistance the average life of the "1900" battery will not be less than two years continuous exchange service."

The "1900" dry battery, standard size, 2½ in. diameter by 6 in. high, is made especially for telephone use, and is as good as material and workmanship can make it. The battery is adapted to all kinds of bell work. Electromotive force, 1.5 volts.

List Price, Each.
Standard size, 2½ x 6 in., "1900" dry battery..... \$0.50

Type C—1900. Type C "1900" dry battery, is manufactured expressly for the trade demanding a first-class dry battery of small dimensions. Size 2 in. diameter by 5 in. high. Electromotive force, 1.5 volts.

Type C—"1900." List Price.....each, \$0.45

Type B—1900. Type B, "1900" dry battery is a high grade small battery manufactured for interior telephone systems and other service where small size, and both strength and durability is desired. Size 1¾ in. diameter by 4½ in. high. Electromotive force, 1.5 volts.

Type B, "1900" dry battery. List Price.....each, \$0.40

ANDRAE DRY BATTERY.

For call bells, annunciators, burglar alarms, telephones, medical apparatus, the laboratory and all open circuit work.

Code word—BANYAN. Andrae dry battery. List Price... ..each, \$0.50



COLUMBIA DRY BATTERIES.

This cell is intended for open circuit and intermittent service, and has the highest efficiency and greatest recuperation of any dry cell manufactured.

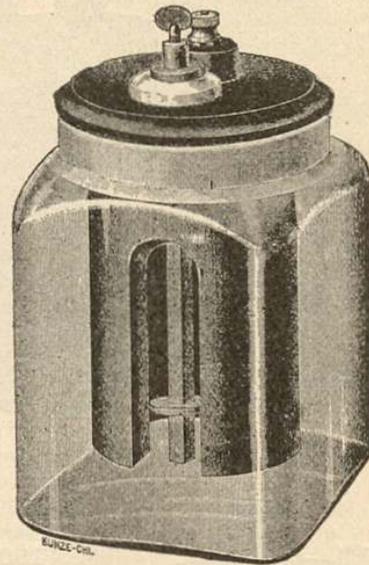
It is absolutely free from deterioration or local action while on open circuit.

Code Word.
BANISH. Standard size, 2½x6 in\$0.60
BANJO. Large size, 3½x8 in..... 1.20

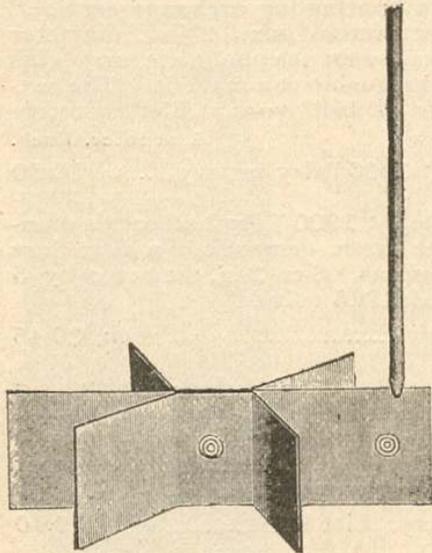
ANDRAE CARBON CYLINDER BATTERY.

The most powerful, efficient and economical, low price, open circuit battery on the market. We use only the very best carbon cylinders and guarantee every battery we send out.

Code Word.		Price Each
BANK.	Battery, complete.....	\$0.44
BANKER.	Carbon cylinder only.....	.30
BANKING.	Glass jar only.....	.10
BANNER.	Zinc, with insulator and soft rubber ring.....	.15
BANNOCK.	Sal Ammoniac, per lb.....	.20
BANNS.	Sal Ammoniac, package.....	.10



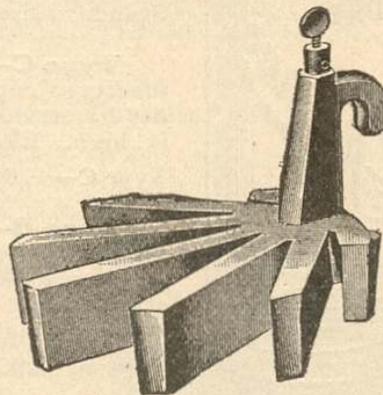
BATTERY COPPER.



Catalogue No. 4588.

Code Word.
BANQUET. 5x7 and 6x8,
 Battery Copper.....\$0.12

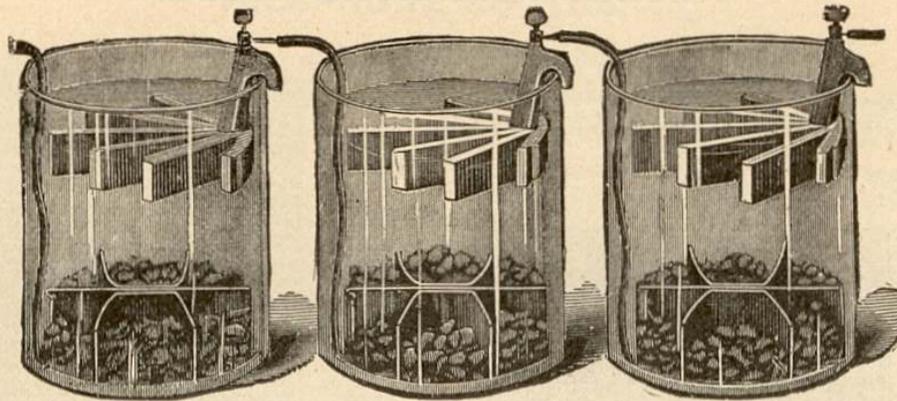
CROWFOOT ZINC.



Catalogue No. 4577.

Code Word.
BANSHEE. 6x8 Crowfoot Zinc,
 weight, 3 lbs.....\$0.60
BENSHIE. 6x8 Crowfoot Zinc,
 weight, 3½ lbs..... .74

"CROW FOOT" GRAVITY BATTERY.



Code Word.	Catalogue No. 4535.	Price Each.
BANTAM.	Crow Foot gravity battery, 6x8 complete.....	\$1.20
BANTER.	" " " " " 5x7 "	1.10
BANTLING.	" " glass jars, 6x8.....	.40
BARBAB.	" " " " 5x7.....	.36
BAPTISM.	Blue Vitriol, per lb.....	.15

NATIONAL No. 2.

This cell consists of a carbon porous cup filled with a depolarizer, a circular zinc, and sal-ammoniac solution. The elements will fit any LeClanche jar with pour out.

Code Word.	Price Each.
BAPTIST.	No. 2 cell, complete.....\$1.10
BAPTIZER.	Carbon cup only..... .60
BARRAGE.	Zinc..... .25
BARRIER.	Sal ammoniac..... .10
BARRISTER.	Glass jar..... .15
BARB.	Large rubber rings, for carbon (2) .10
BARBER.	Small rubber rings, for zinc (1).... .05

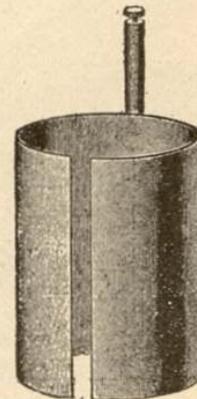


Nos. 14B.

15B.



NATIONAL ZINC.



4562

4563

4564

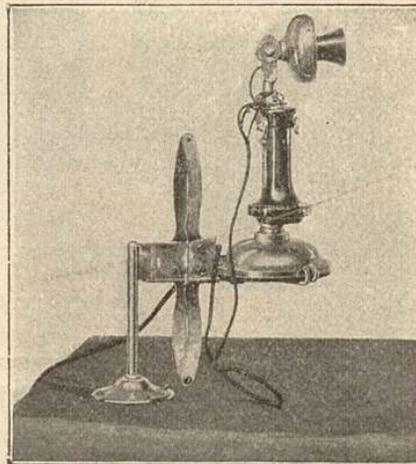
Code Word.	Price.	Code Word.	Price.	Code Word.	Price.
BARBEE.	\$0.04.	BARBEENE.	\$0.04.	BARBET.	\$0.24.

CHICAGO TELEPHONE HOLDER.

Adjustable to practically any position and stays when placed. The most compact folding bracket combining strength, rigidity and good appearance. No slipping or unmanageable joint action. Furnished in nickel finish.



No. 1. In Use.

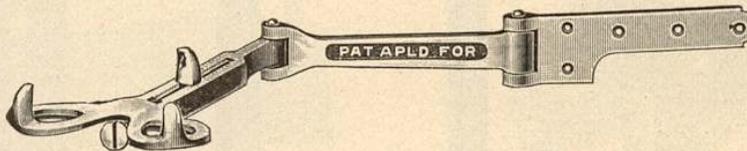


No. 2. For Flat Top Desk.

No. 1 for roll top desk, allows telephone to be extended 18 in. No. 2 for flat top desks, allows for extension 18 in. Nos. 3 and 4 same as 1 and 2, except that they allow for 26 in. extension of telephone and have one additional hinge joint.

Code Word.				List Price.
ANCESTOR.	No. 1, for roll top desks.	18 in.....	each,	\$2.50
ANCESTRAL.	No. 2, for flat	" 18 in.....	"	2.50
ANCESTRY.	No. 3, for roll	" 26 in.....	"	3.25
ANCHOR.	No. 4, for flat	" 26 in.....	"	3.25

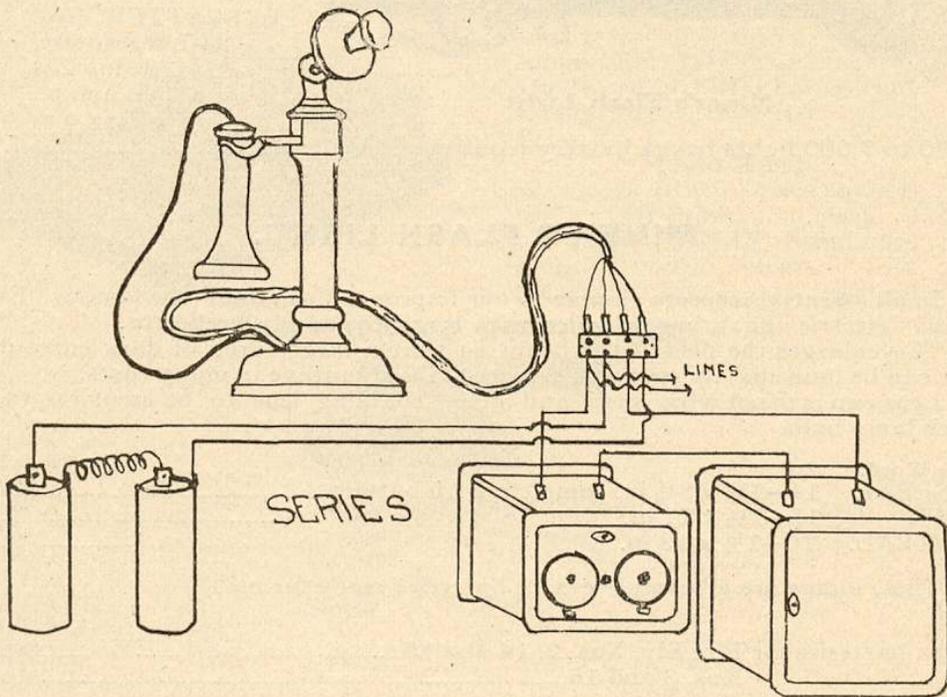
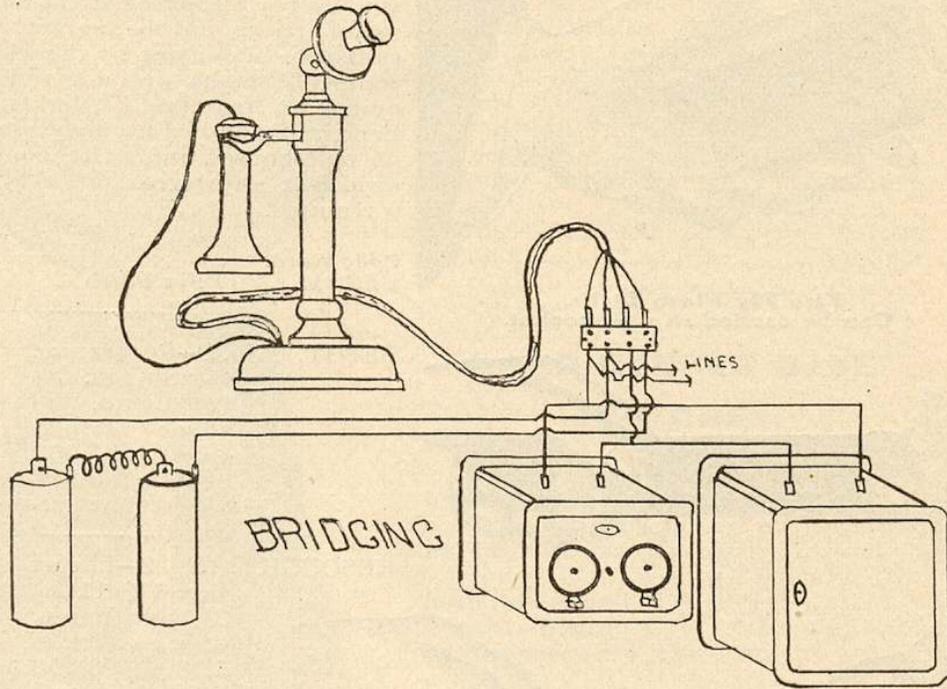
THE W-A TELEPHONE HOLDER.



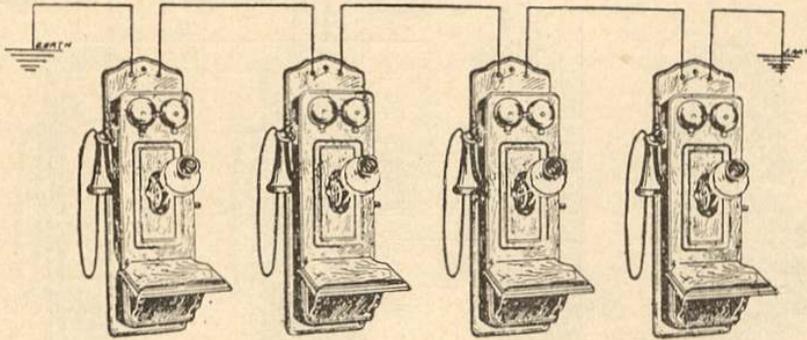
A simple and low-priced form telephone holder. Holds telephone securely and allows for adjustment of 20 in. Oxidized copper finish.

Code Word.		List Price.
ANCHORED.	W-A telephone holder.....	\$1.50

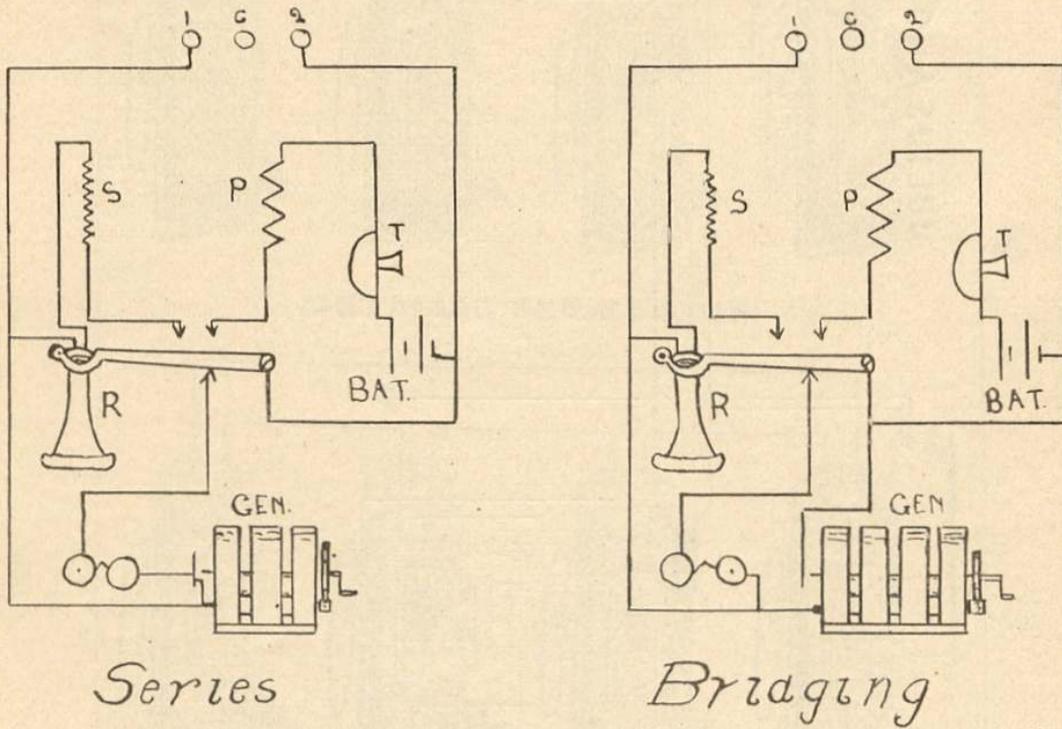
CIRCUITS, SERIES AND BRIDGING DESK SETS.

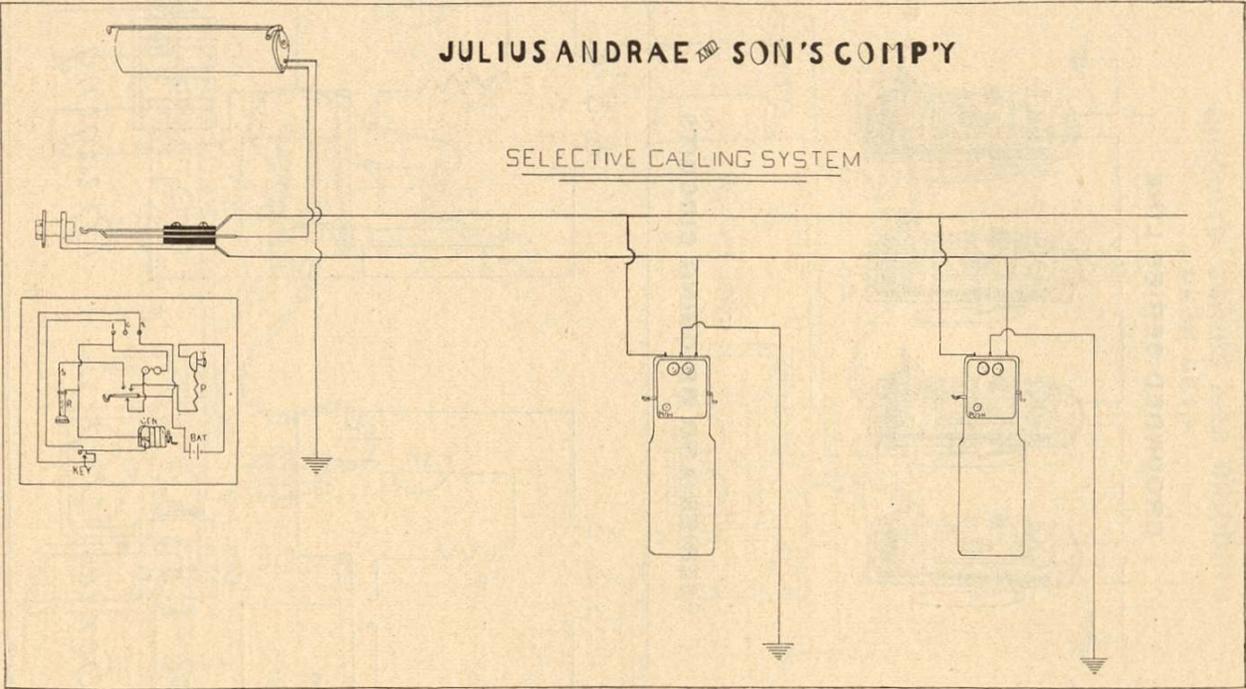


GROUNDING SERIES LINE.

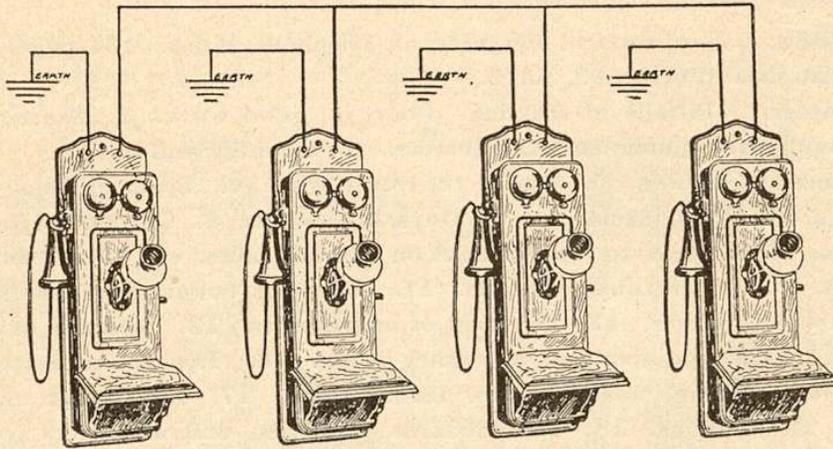


SERIES AND BRIDGING CIRCUITS.

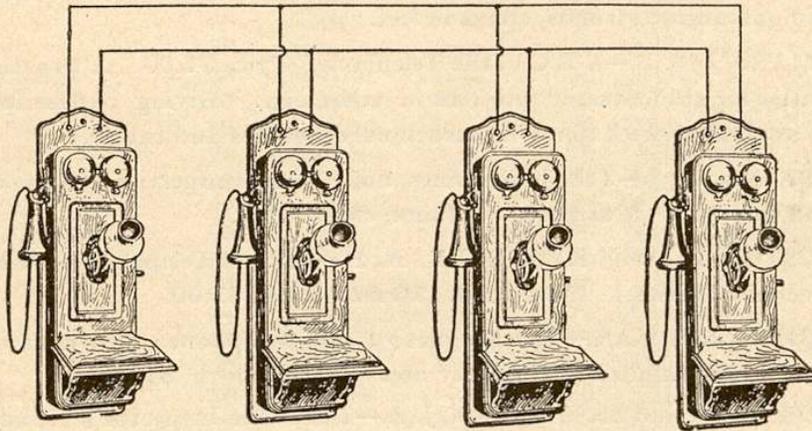




GROUNDED BRIDGING LINE.



METALLIC BRIDGING LINE.



METALLIC SERIES LINE.

