

Western Construction Telephone Company.

MANUFACTURERS OF
SWITCHBOARDS AND
TELEPHONES



250-254
SOUTH
CLINTON
STREET
CHICAGO

ELECTRICAL SUPPLY CO.,
SANFORD, MAINE,
SOLE AGENTS FOR YORK COUNTY.

**WESTERN TELEPHONE
CONSTRUCTION
COMPANY**

...The Largest Manufacturers of Switchboards and Telephone Equipment for Independent Companies of any Firm in the World...

**250-254 SOUTH CLINTON STREET
CHICAGO, ILL.**

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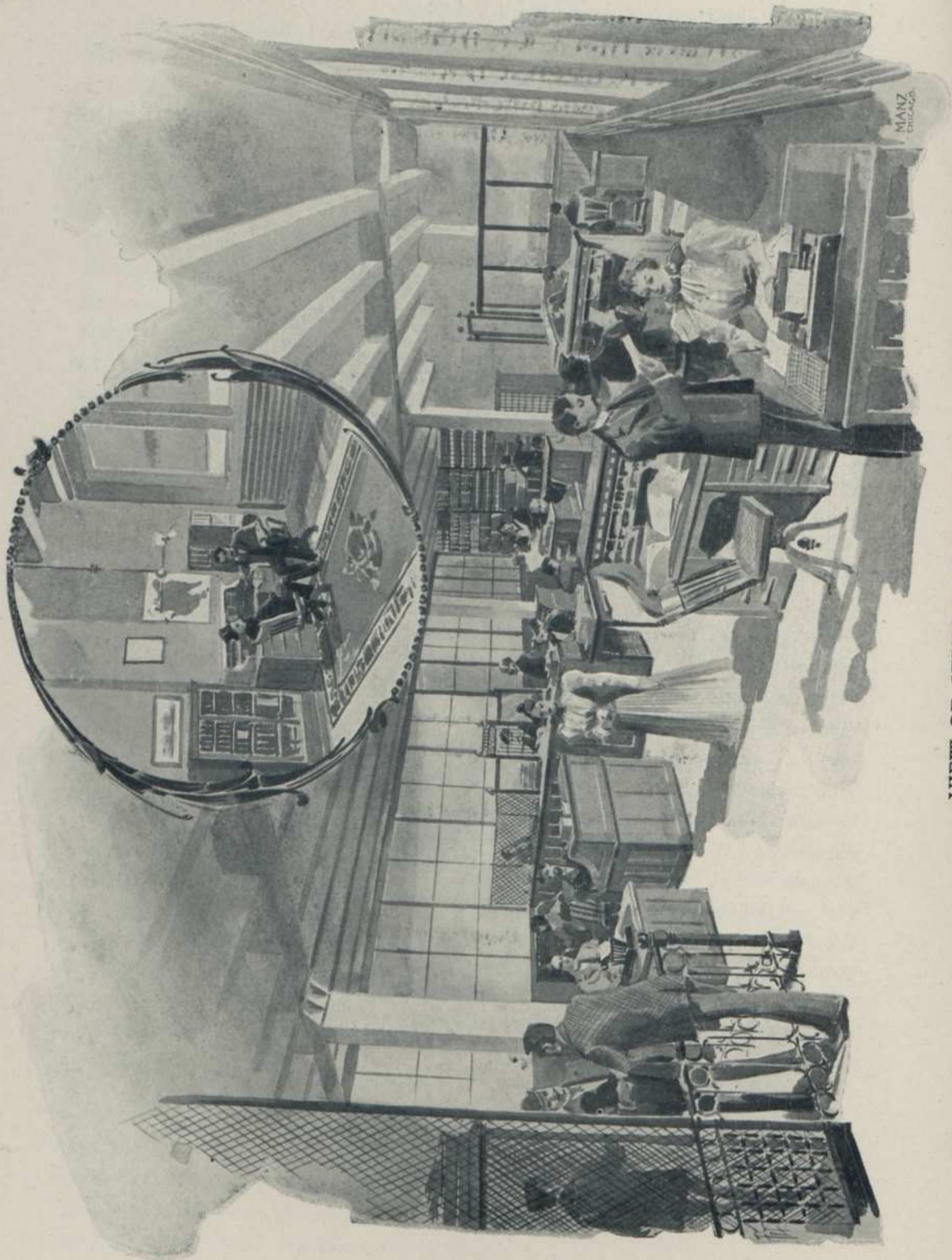
OFFICERS AND HEADS OF DEPARTMENTS

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MANZ
CHICAGO

VIEW OF GENERAL OFFICES

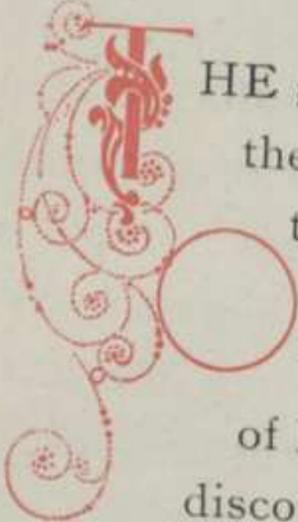
Announcement

N the presentation of this Catalogue we desire to call the attention of the reader to the fact that in all the literature heretofore printed by the manufacturers of apparatus for the Independent Telephone Companies, most of the space has been taken up in describing the telephone and its several parts, while but little has been said about the switchboard, which is the most important part of the equipment of the Central Office Exchange. In this Catalogue it will be seen that we have departed from the usual custom by describing in detail the several types of switchboards for the Central Exchange and toll line equipment of our manufacture.

To those who desire to own and operate a telephone system superior to any, without paying tribute to that grasping monopoly, the Bell Telephone Company, and who are looking for first class, high grade apparatus containing the latest up-to-date improvements and guaranteed to be absolutely free from infringement of patents, we invite a careful perusal of this Catalogue, which contains information never before put in print.

The well known reputation of the Western Telephone Construction Company, who was the first in the field to manufacture and sell telephones and switchboards and all apparatus for the installation and equipment of telephone exchanges for the Independent Telephone Companies, and the wide-spread recognition of the merits of our goods, is sufficient evidence that we shall continue in the future, as in the past, to lead the world in the manufacture and sale of any and all equipment in demand and used by the Independent Companies.

Progress

HE great ambition of the human race is to progress. From the time that noble gift of God, the infant, is born into the world, his life is one continual line of progression; beginning soon, he first commences to creep, then to walk, and within a short time starts in the great battle of life, through which he passes until called to "That undiscovered country from whose bourne no traveler returns."

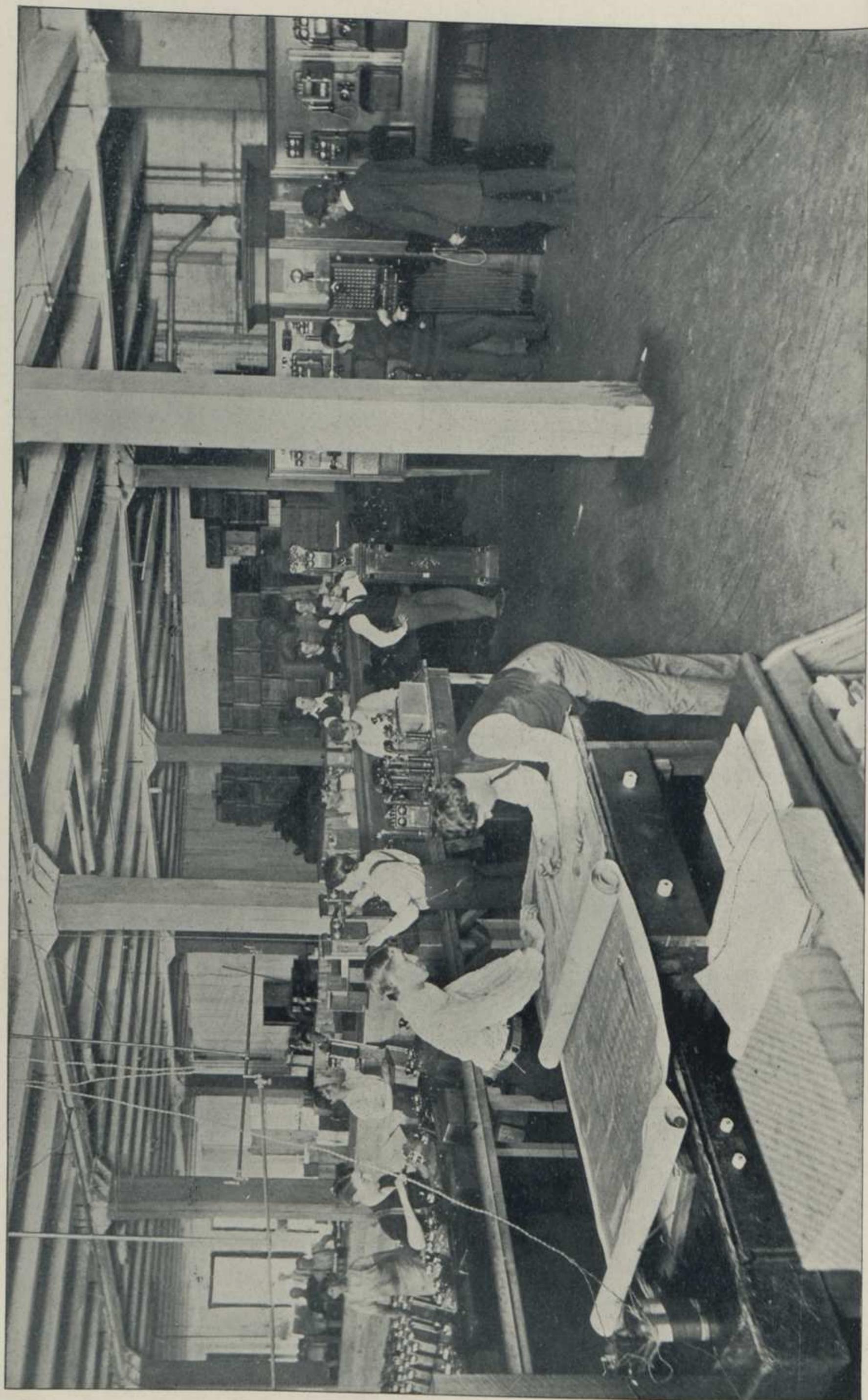
However, after learning to walk, he progresses to manhood and soon discovers that he must have some means of communication to better enable him to pursue that part of his duties to which he is best fitted. In the early days that intelligent animal, the horse, furnished the only means by which we could communicate with those at a distance, but as time advanced, mankind began to realize that a more rapid means of communication was desirable, and some genius invented the steamboat, which enabled the great commercial business of the country to be transacted more rapidly, but the steamboat, which was faster than the horse, soon became too slow. The question then was, how or in what way to improve and save time.

This problem remained unsolved until the early part of the nineteenth century, when that great invention, the locomotive and railroad was brought out and put in use. How successful it has been is a matter of which we are all familiar. However, there soon developed an idea that we were yet far from that state of perfection to which we are fast drifting.

As a more rapid means of communication was uppermost in man's mind, it remained for "Morse" to progress and use the newer force, which "Franklin" taught man to bring from the skies, the telegraph was invented to fill this want. With all the progress and

improvements made in the telegraph, which enables us to communicate in a short space of time with all parts of the world, man was not yet satisfied, and it was his desire to progress still farther, and to obtain some means of communication which would be practically instantaneous. While men were racking their brains and burning the midnight oil, trying to solve the problem, "someone" invented that great time saver, the "Telephone." Who that "someone" was, always has been and always will remain a matter of doubt, but whether it was the invention of Bell, Gray, Riese, or Drawbaugh, it matters not, for we have it, and it is here to stay, and while the horse, the steamboat, the railway, and the telegraph, all play their part in the vast commercial interests of the world, what would we do, or rather, how much less business would be transacted each day if we had no telephone.

After the invention of the telephone, which at first could be so connected that two people could communicate with each other, and later its use was somewhat extended by the aid of the old Western Union switching device, yet one thing more was needed to bring it into general use, and keep up the line of progression. Many devices were made, most of them crude in design, poor in workmanship, and slow to operate. The art, however, continued to progress until some inventor brought out the telephone switchboard, and such has been the advance of the inventive mind of man, that now, with the telephone and its companion, the switchboard, we are enabled to communicate almost instantly with all principal points of the United States. Eventually, however, it will be made possible to still further progress and communicate with all parts of the world with the telephone and its switchboard connections. When that time comes the *Western Telephone Construction Company will have continued to advance in the Independent Telephone field, and will undoubtedly be then as they are now the largest manufacturers of the most modern telephone equipments in the world.*



ENGINEERING AND TESTING DEPARTMENT

To the Independent Telephone Companies

The Western Telephone Construction Company was the first in the field to manufacture and sell first class telephone exchange equipments to the *Independent Telephone Companies*, and are therefore *the pioneers*, hence have had the greatest experience.

The president and executive managers of the Company have been connected with the telephone business from its earliest days, and have acquired a thorough knowledge and training that can only be obtained by years of time and careful study, and *each officer is particularly well fitted to conduct the affairs of the Company theoretically, practically and commercially.* We have watched the growth of the Independent Telephone Companies during the past five years, and in all this time we have been in advance of all other manufacturers in the Independent field, and it goes without saying *that the success of the Independent Telephone business in the United States is very largely due to the aggressive and progressive management of the president and his efficient corps of officers.* This Company has in its employ *mechanical and electrical experts second to none in America*, and by the systematic manner of conducting their business, they today stand at the head of all manufacturers of telephone apparatus in the world.

Various kinds of literature, such as catalogues, circulars and pamphlets, have been printed setting forth the merits of telephones and their various and several parts, but little, if anything, has been said in this literature about the central office switchboard, which is certainly the most important part of the equipment in the installation of a telephone exchange.

As we have been and are now far in advance of any other Companies in the telephone business, we propose to still continue to lead in the manufacture and sale of switchboards, and issue this catalogue which is the only one published up to date, containing a full and complete description of the Central Exchange and Toll Line Switchboards.

There are over four thousand United States patents relating exclusively to the art of telephony. Many of these are owned by the American Bell Telephone Company. A manufacturing company can produce high-class modern telephone apparatus, and by an intelligent study of the patent situation, avoid infringing any valid patent owned by others, therefore keeping clear of the greatest difficulty in the way of the Independent Telephone industry.

The manufacturing company which willfully infringes a valid patent owned by any other company, is committing a triple wrong, one against itself, another against its customers, and another against the owner of the patent infringed. A company pursuing such policy may also be charged with the utmost foolhardiness, for it can only result in its ultimate downfall.

We have recently acquired control of several valuable patents, which, with those owned and used by us during the past five years enables us to supply the latest up-to date switchboards, telephones, and all equipment for the *Independent Telephone trade*. Our patents cover the most valuable features in the telephonic art and have been secured at an expenditure of many thousands of dollars, which is self-evident that parties purchasing goods of us *will get the best, the latest improved and most highly efficient apparatus on the market.*

The Company regularly employs its own patent attorneys and experts, who are men of unquestionable ability and standing in this line of work. They are employed for the sole purpose of steering the course of this company, so as to avoid the many legal rocks which lie hidden in the general sea of ignorance of the patent question.

That a piece of apparatus is manufactured by the *Western Telephone Construction Company* is in itself a sufficient guarantee that it is safe for any person to purchase and use it. *We have taken this stand from the start, and have maintained it with increasing vigor as time advances.*

This Company enters into a written agreement with the purchasers of its apparatus to manage and defend at its own cost, all suits which may be brought against purchasers by virtue of the use of the same, and to assume all responsibility in connection with such suits, and to pay all damage and expense that may accrue.

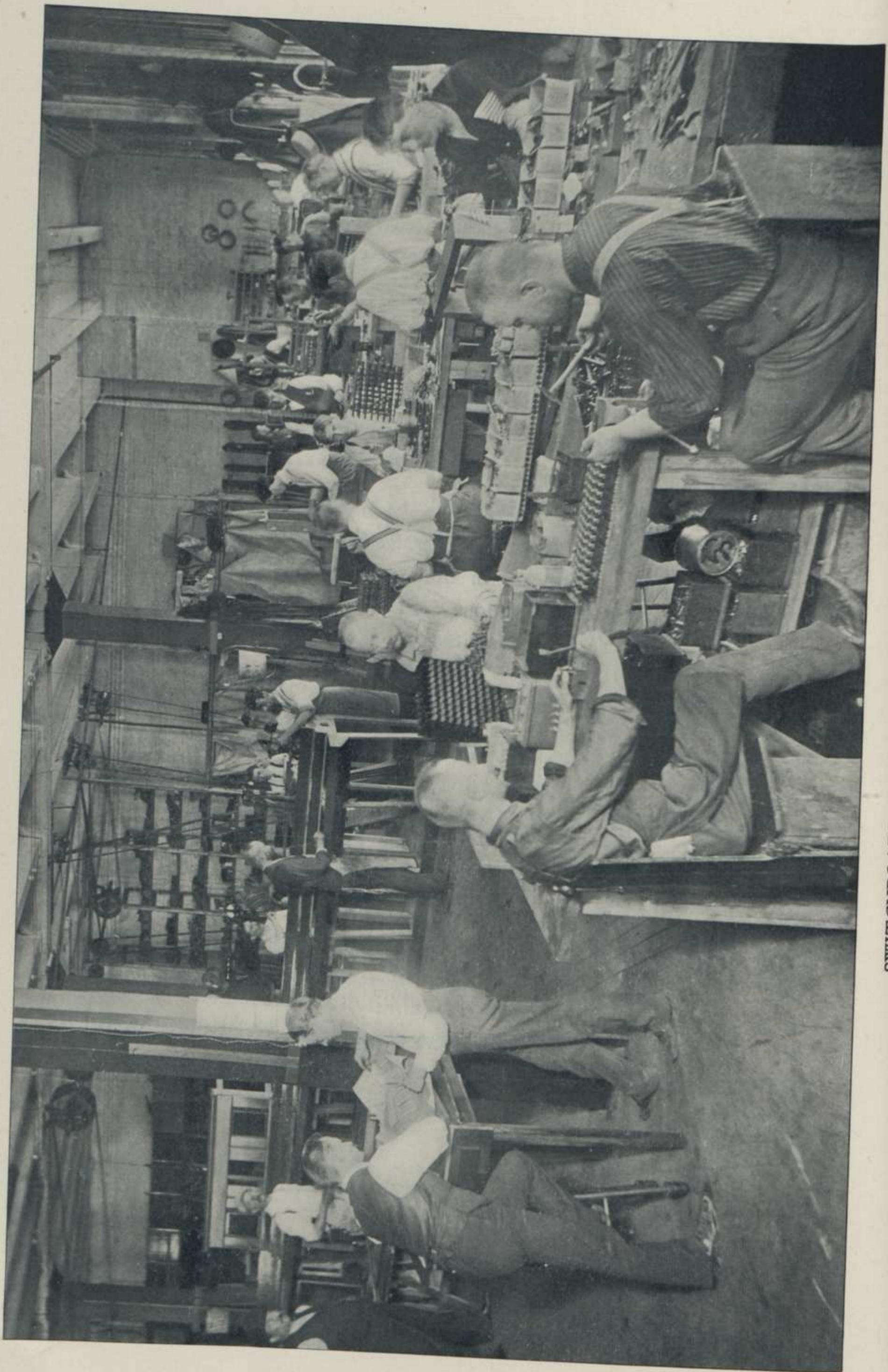
Next to patents and responsibility is quality of apparatus. There are so many ways of constructing telephones and switchboards cheaply and make them appear well, that great care should be employed to prevent deceit. Similar handsomely finished hardwood boxes and cabinets enclose entirely different characters of workmanship, material and electrical design.

The cost of operating a telephone exchange with a cheap equipment is enough more each year to cover the difference in the price of thoroughly first class apparatus. The following are essential things to keep in mind and are found fully provided for in our product: *character of materials, workmanship, electrical and mechanical designs.*

In these we excel, and hence our claim to the most efficient, durable and economical Telephone Exchange apparatus in America. We can prove by many exchanges in operation that our apparatus will pay a dividend where others will show a loss. In making the selection choose the best and it will soon pay for itself.

In this connection it may be well to consider the reliability of the manufacturing company. No matter how good a line of apparatus a company may manufacture, and no matter how much it guarantees to protect the purchaser of its apparatus against patent troubles, such conditions will avail the purchaser nothing, if the company is not of sufficient strength, both from a financial and moral sense, to stand behind its professions. This company has always lived up to its promises, and has been the only Company to meet the Bell Company singlehanded in open battle, and the various victories without a single defeat, have demonstrated to the Company the wisdom of its policy on the patent situation, and also its ability to stand behind its statements. It has alone weathered the storms and vicissitudes of the early days of telephony. It has also demonstrated its ability to manufacture apparatus of the highest efficiency and to live up to its promises.

Western Telephone Construction Company



SWITCHBOARD MANUFACTURING DEPARTMENT

Switchboards for All

We furnish switchboards of several different types, from the smallest to the largest, and invite and solicit correspondence from parties wanting:

SWITCHBOARDS for exchanges now using boards that are unsatisfactory.

SWITCHBOARDS for those who desire to add to their present equipment.

SWITCHBOARDS of any special design to meet the views of parties who wish something different from what we show in this catalogue.

SWITCHBOARDS for those who manufacture telephones.

SWITCHBOARDS for dealers in electrical supplies.

In fact we will furnish switchboards to all parties wanting first-class high grade boards with all improvements and most modern construction, at prices commensurate with good work.

Equipment of New Exchanges

The first thing of consideration when a new exchange is to be equipped should be the switchboards. They are of as great importance as the dynamos in an electric light plant. The switchboard is the soul of the exchange. Good line construction, good telephone instruments, and competent management are of no avail in securing good services when the switchboard is faulty. A poor telephone instrument will annoy only the users of that instrument, a poor switchboard will render the entire exchange unsatisfactory, unreliable or entirely inoperative. Consequently the board should be selected with the greatest care.

During the past five years many exchanges have been put in fitted with cheap and inferior switchboards and telephones, resulting in poor and unsatisfactory service, preventing to a large extent the enlargement of the exchange, with financial results unsatisfactory to the stockholders or owners, while with first-class switchboards and central office apparatus, which are free from all imperfections and up-to-date in all respects, giving first-class, uninterrupted and rapid service, the exchange will increase by the addition of new subscribers, producing results and profits satisfactory to the owners.

The Western Telephone Construction Company manufacture several types of switchboards which meet every objection heretofore raised against the boards manufactured by others. Our boards are a radical departure in design, both mechanically and electrically, and will command approval from every point of consideration. Our aim has been to embody those features in our boards that would result in the highest efficiency for central exchange work.

Usually, parties building new exchanges, while men of standing and integrity in their community, know but little about exchange equipment, and are liable to be imposed upon by agents of unscrup-

ulous manufacturers who wish to make a sale of an apparatus, which, while it may look well on paper, is at best only an untried experiment.

The safest and best way to proceed, is to at once see or correspond with the Western Telephone Construction Company, who are the largest manufacturers in the field for central office equipment for the Independent Companies, and are better fitted in every way to install a large exchange than any other firm in the world. In fact, this Company has installed more plants for Independent Telephone Companies during the past five years than all other firms combined. This alone speaks volumes, and has given us our well known reputation and an experience that can be obtained in no other way.

All parties can, by contracting with us for their exchange equipment, get the benefit of rare judgment and skill in putting in their work, which will save time, money and annoyance.

We have in our employ the very best talent that can be obtained. Our electricians and experts are men of unquestioned ability, they having had years of experience in this class of work, which has particularly fitted them for their respective duties, and they are to-day far in advance in the telephone business.



MACHINE SHOP

Manufacturing Department

We own and operate our own factory, which is fitted with the latest improved machinery, and manufacture everything that goes to make up first-class switchboards and telephone apparatus, and all equipment for installing exchanges complete from the smallest to the largest.

This Company decided long ago that it would be poor policy to manufacture any goods that were not strictly first-class in every respect. The result of this has been that nothing but the very best material and skilled workmanship has entered into the construction of the switchboards and telephones manufactured by us, in fact all apparatus coming from our factory is of the highest standard, and such has been the demand made upon us for our goods that we found our manufacturing facilities, which were much larger than any other parties making telephone apparatus for the Independent Companies to be entirely inadequate.

We, therefore, found it necessary and have again enlarged our factory and offices by adding very greatly to our floor space, putting in new and improved machinery and increasing the working force both in the office and factory. We are now prepared to fill all orders promptly for anything needed for the complete equipment of an exchange from the smallest board for private use to the largest multiple boards for an exchange of any size.

An invitation is extended to all who desire to inspect the most complete factory for the manufacture of telephone and switchboard apparatus in this country.

Special Features

The switchboards manufactured and sold by the Western Telephone Construction Company contain the following features:

First. A multiple switchboard for large exchanges so constructed as to obviate the necessity of the multiple jack system used on other boards. We learned that by using the multiple jack it would become self-interfering after it increased above one thousand telephones. The great number of interconnections we found to be so troublesome that new methods are used by us, which makes this board the best. most compact, more quickly and easily operated than any board on the market.

Second. *The only switchboard on the market absolutely free from cross talk or induction.* This is a very important feature, and is one of the principal points to be considered in the purchase of switchboards. A board full of cross talk is a constant source of annoyance and practically worthless.

Third. The only switchboard where one operator can easily reach and connect any two subscribers in a board containing three hundred drops. This feature means rapid service, and does away with the complaints often reported to the central office by subscribers waiting to be connected.

Fourth. Switchboards that can be wired for metallic circuit, common return or ground, using as many of each system as desired on the same board, without in any manner interfering with each other.

Fifth. A switchboard containing improved combined self-contained removable jacks and drops of the tubular series type, all mounted together on a hard rubber base, which is used in our new Western Express Switchboard.

Sixth. *The only switchboard on the market provided with self-restoring drop that does not infringe patents.* Any parties using self-restoring drops on boards manufactured by other parties, infringe patents owned by

this Company, and are cautioned against the use of boards containing this feature, as we are now prosecuting manufacturers using this device for infringement of our patents.

Seventh. A switchboard containing night bell connections so ingeniously arranged that it prevents all cross talk through its circuit. We guarantee all our boards to be free from cross talk or induction

Eighth. Switchboards in which any jack, drop or coil, can be removed or renewed without disconnecting the wiring or in any way interfering with any other connection in the board.

Ninth. Switchboards containing clearing-out drops with levers or key movement for calling subscribers or listening in. The mechanism used in this board in the circuit-changer is so exceedingly simple and substantial that it cannot get out of order, or in any way interfere in the operation of the board. This feature is not found in other boards using so-called circuit-changers.

Tenth. A switchboard that has no clearing-out drops, levers or circuit-changers. Clearing-out is done through the subscriber's drop. Listening and ringing is done by inserting the plug in jack. This feature makes the operation of this board exceedingly simple and rapid.

Eleventh. A switchboard for large modern central office exchanges whereby any operator can connect with any line in the system with fewer movements than any board on the market. This board contains the only non-infringing transfer or trunking system for independent exchanges that can be used without fear of infringement of patents.

Twelfth. *The only switchboard made using platinum covered contact points in the circuit-changer, which prevents corrosion and insures positive contact at all times, and affords uninterrupted conversation with subscribers over the lines.*

Thirteenth. Switchboards embodying and combining all improvements up to date, and excelling in simplicity, rapidity of operation, occupying the least space, the best made, will last longer and give the best service of any boards in the world.



CABINET MAKING AND EXPERIMENTAL DEPARTMENT

Fourteenth. Owing to recent decisions of the courts, we claim that our multiple system is the only non-infringing device for large exchanges for Independent Companies now in existence and gives us a switchboard absolutely without competition. It is not an untried experiment or a misnomer of a so-called express board, but a switchboard that is an unqualified success, and it stands to-day without a peer.

Fifteenth. *A new type of Western Bridging Magneto, so constructed and wired that purchaser or owner can change a bridging phone to series, or series to bridging phone in a few moments and avoid the necessity of purchasing a new telephone when it is desired to change from bridging to series, or vice versa.*

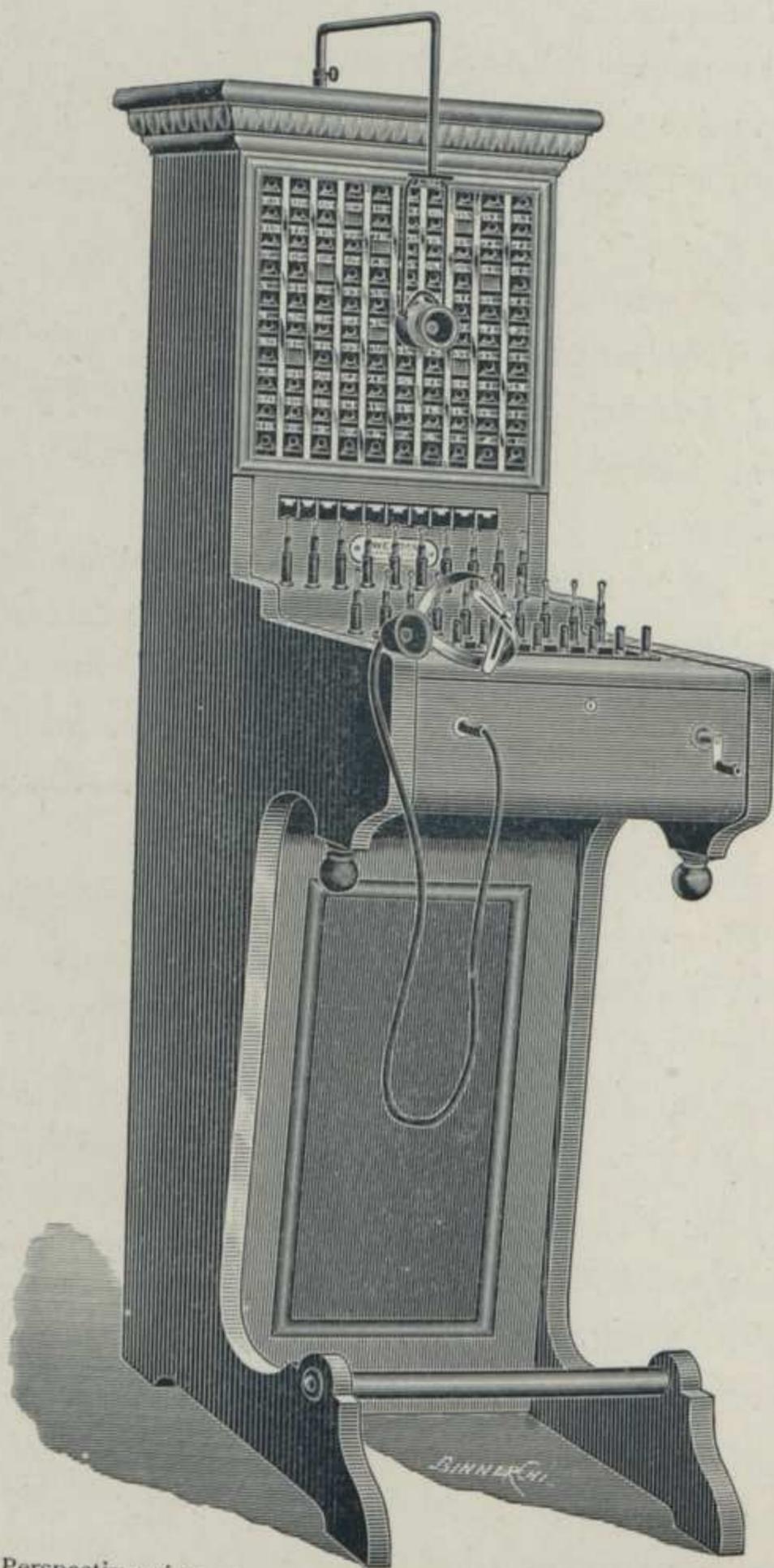
Sixteenth. *A telephone receiver of new and original design encased in a pure hard rubber shell, the receiver cords being attached to the poles inside, no binding posts or anything of a metallic nature being used in its outside construction. It is of the double pole or bi-polar type and the most complete and absolutely safe telephone receiver ever built. See cuts on pages 88 and 90.*

Seventeenth. *A long distance adjustable arm transmitter of the solid back type, with induction coil mounted in the base of same, will not pack or deteriorate after long continued use. For volume of voice transmission and distinctness of articulation it has no equal.*

Eighteenth. *Telephones provided with an automatic switch hook, with springs of the best quality German silver, anti-friction bearings, all contact points being platinum pointed which is an important and special feature not found in others. All binding posts for receiver cord tips and primary and secondary circuits are placed on the outside.*

Nineteenth. *Telephones adapted for all kinds of long distance or local exchange service, containing the latest up-to-date improvements, designed by an expert having had many years of experience in telephone construction.*

Twentieth. *A telephone generator having large compound magnets of the best quality of magnetic steel that will retain its magnetism indefinitely, having an automatic shunt that is acknowledged by experts to be the best on the market.*



Perspective view of our new Western Express Switchboard equipped with one hundred combined, removable jacks, drops and coils. This board contains many new features which, with those of our No. 1, makes it a model of the designers' art.

Western Express Switchboard

EQUIPPED WITH IMPROVED COMBINED SELF-CONTAINED REMOVABLE SPRING JACKS, DROPS AND COILS

This switchboard is *a new star in electrical science* and is the highest and latest production of the designer's art. The aim of our experts who conceived it was to improve upon our famous No. 1 board. That they have succeeded will be seen from the description herewith given.

This switchboard is as near perfect as human ingenuity can devise; no care or expense having been spared in the workmanship, design or selection of material. It is without question the most perfect switchboard in this or any other market, which is equivalent to saying that it is the finest in the world.

We have adhered to our old policy of "sticking to a good thing," and have retained all the general principles of which our No. 1 switchboard has been built since it was first put on the market some years ago. The action is the same, and the arrangement of the coil, jack and shutter as to relative location is the same in all respects. The jack has been modified so as to be even more substantial and easier to get at than heretofore. The main advantage, however, is in the mounting of the jack, coil and drop in such a manner as to render them self-contained.

Each of these combined parts which go to make up the switchboard equipment have individual lines, and are mounted on a hard rubber base in such a manner that the removal of two thumb nuts at the rear of the switchboard, will allow the entire structure belonging to any one line to be withdrawn from the front of the board.

This is done without disturbing the line cables in any way, thereby avoiding much trouble in the use of soldering-irons in taking out and replacing any drop.

The line contacts of the combined drop and jack are carried to the rear and through the back of the switchboard frame, and are fastened by means of two substantial screws which pass through the terminals of the line cables of the switchboard and are then screwed in place by two thumb nuts, which may be adjusted with any degree of tension desired. The spring contact on the terminals effectually prevent any loose contacts being formed between the line cables to the drop and coil by virtue of the shrinkage or thickness of the wood.

The advantages of the entire arrangement are obvious—the drop, jack and coil being firmly mounted on a single base insures permanency of adjustment no matter what the changes of temperature may be to which the board is subjected.

When it is desired to adjust the drop, or replace the coil, or to change the tension of any spring-jack, or to clean the various parts, it can be easily done by removing the thumb nuts and withdrawing it from its place, when the entire jack, drop and coil can be taken out without interfering with, or disconnecting any line or other wires on the board and only interrupting the one that is being repaired. The service on this line need be interrupted but momentarily, because a duplicate drop and jack may be slipped into its place and connected with the line circuit in less than half a minute.

Another feature which is of great advantage is the ease at which the board can be added to it when it is necessary, as many drops and jacks as required may be purchased and installed, one or more at a time, as desired.

During the past few years many exchanges were equipped with switchboards for common return system. Owing to the demand made by subscribers for better service and the rapid growth of the exchange, it became necessary in many places to enlarge and change the plant to metallic circuits. In order to accomplish this purpose, it is obvious that the board must be changed from common return to metallic circuit, which involves large expense and loss of time. Parties can, by contracting with us for our full metallic Western Express Switchboard use them on common return, and when the system is changed to metallic circuit no change will be necessary in the switchboard.

Spring Jack, Drop and Coil of Our Western Express Switchboard

On page 26 we show cut in perspective of jack, drop and magnet coil used in our Western Express Switchboard.

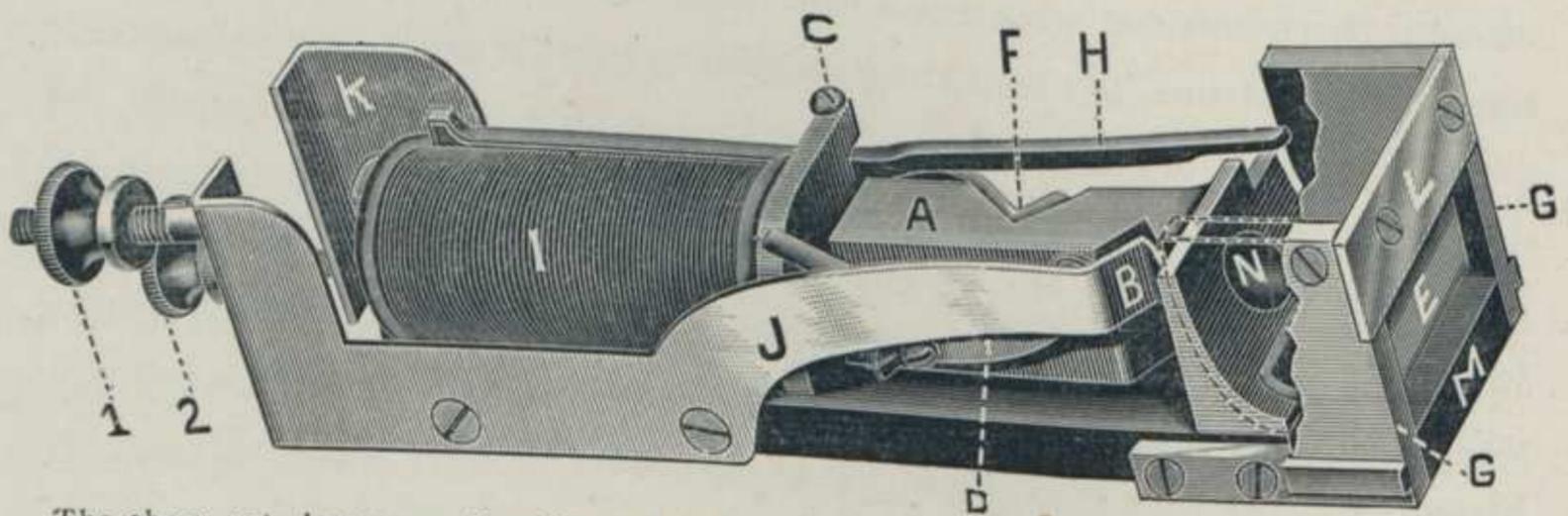
We say without fear of contradiction that this spring jack and drop is the most simple and ingeniously arranged of any heretofore used to perform the same purpose. The drop is mechanically restored with the plug as it enters the jack to make a connection with subscribers and is, with the one used in our No. 1 boards, the only self-restoring drop on any switchboards that can be purchased by the Independent Companies that is *positively free from infringement of patents.* We are sole owners of the patent covering the self-restoring feature of drop or shutter on switchboards.

In this cut the armature shown at H is arranged with an adjustable spring, which will prevent "freezing" or sticking of armature to magnet head or pole and never fails to release drop or shutter when subscriber calls. The night bell connection is made by upper edge of the drop, making contact with two springs directly over the drop which are connected with the night bell circuit, and are placed where they are free from dirt and dust, which insures a positive contact, and are always in working order. This spring jack is the most simple yet devised. It is composed of a solid brass casting A, bored out for plug where shown at N. J and K are line wire conductors and also form the tip spring connection with plug at F and sleeve spring connection with plug at B. The drop shown at E is insulated and hinged to side pieces G-G which are connected with night bell circuit. The cut-out spring shown at D is disconnected from sleeve spring J when plug is inserted in the jack which cuts out the coil. The line terminals are of German silver connected with the jack at the rear of the board. The thumb nuts 1 and 2 secure the jack in position and connect with the line terminals.

The magnet is shown at I, and is mounted on a hard rubber base M and can be removed by simply loosening two screws. The armature swings on a pivot in front magnet head and is secured by a pivot screw C shown in cut. There are only two springs used in connection with the drop and jack. The side pieces C-C are provided with lugs which fit into grooves in vertical strips in front of the board, which holds the jack in position, and relieves it from all strain, as well as expansion and contraction.

From the above description and an examination of the cut, the reader will readily understand *the important feature of mechanical self-restoring drops, which we have mentioned in preceding pages.*

In metallic circuit system one of the circuits in the plugs connects with tip spring and the other with sleeve spring shown in the cut. The construction of this jack is such that there is but little to it, consequently, it is not liable to get out of order, and is free from danger of short circuits. If the reader will examine and compare the arrangements of this jack, drop and coil with those of other manufacture, they will readily understand the simplicity of our boards and *why we are able to place a board of 100 drops in a smaller space than is used by any other board.*



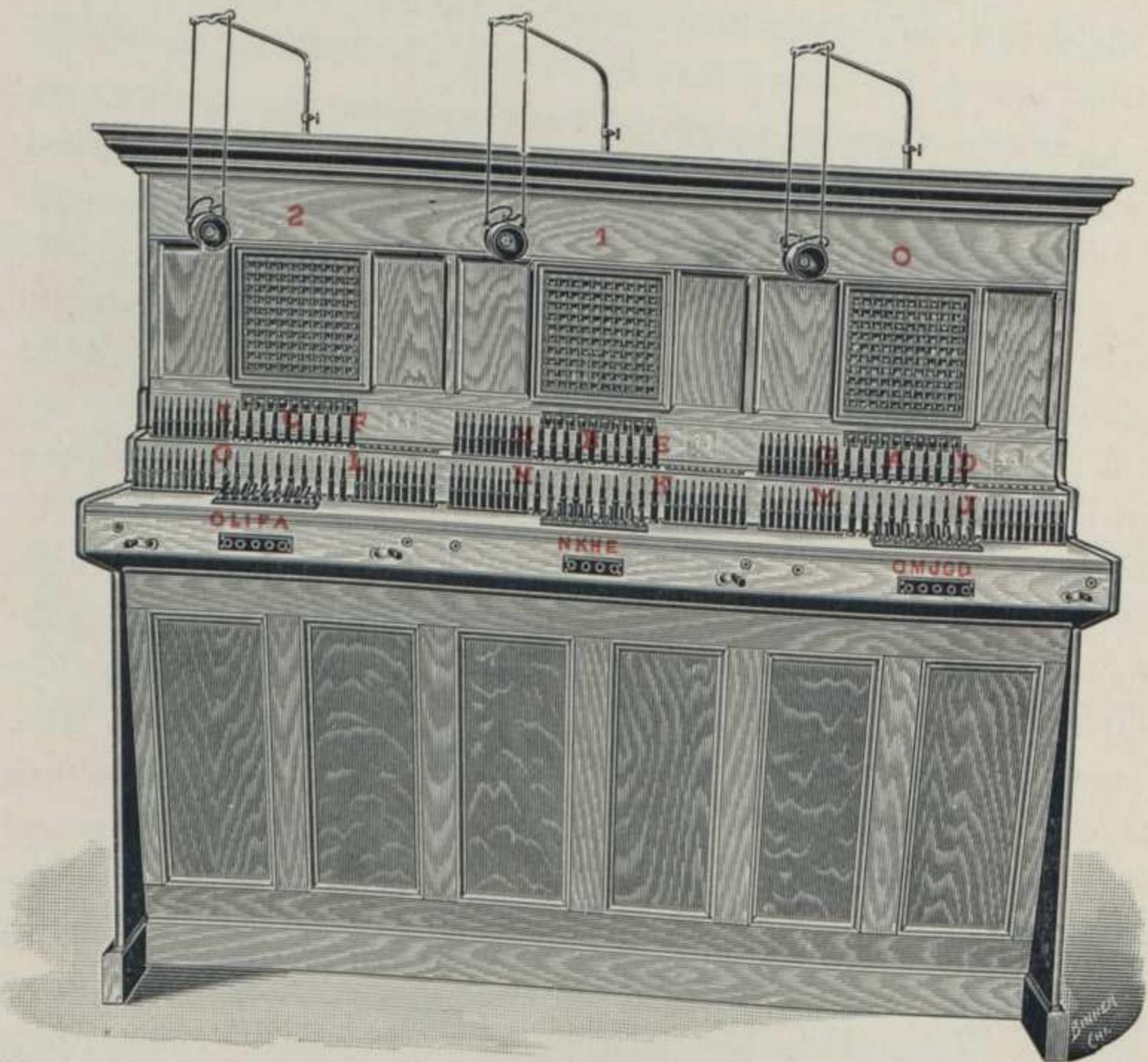
The above cut shows new Combined, Removable Spring Jack, Drop and Coil of our recently designed Western Express Switchboard. Any jack, drop or coil can be easily taken out by removing the two thumb nuts Nos. 1 and 2 in rear, without disconnecting any line or other wires.

Operation of Western Express Switchboard

All boards containing one hundred drops are provided with twenty plugs, divided in ten pairs, each pair having one calling and one answering plug connected with flexible cords, which terminates in the circuit changers in such a manner that enables the operator to call or answer the subscribers by rocking the lever of the circuit changers to or from the board, or depressing the lever for listening in as desired. The calling, answering and listening being accomplished as follows: When a subscriber calls central, the drop (E) of the calling party falls directly in front of jack socket (N), the operator inserts answering plug in that number (at N) and by so doing the shutter is automatically restored with the plug without the aid of restoring coils. Operator then depresses the handle of the lever on one of the circuit-changers which connects her with the listening circuit; having ascertained the number of the party wanted the operator takes the calling plug of the same pair and inserts it into that number and rocks the lever forward, which calls up the party asked for. The two subscribers are then in communication. When through talking they ring off, and the clearing-out drop connected with that circuit falls, which indicates the parties have finished talking; the operator then disconnects both plugs, placing them in their respective sockets and the work is completed. The time required for connecting and disconnecting any two subscribers is but a fraction of a minute. An experienced operator can handle more subscribers within a given time with this board than with any other yet designed. The operator simply plugs in and depresses the lever for one connection and inserts the plug and rocks the lever toward the board for the other, thus completing the connection in four motions.

This, together with the compact form in which the boards are mounted, makes it the quickest operated of any yet devised in this or any other country.

The operation of the No. 1 switchboard for calling, answering and listening in is the same.



Three hundred section of new Western Express Multiple Transfer Switchboard equipped with our combined self-contained removable jacks, drops and coils shown on page 26, which makes it the most complete and perfect switchboard for large exchanges in the world. The cabinet is of quarter sawed oak, or upon special order, of cherry or mahogany.

Western Express Switchboard for Multiple Transfer System

CABINETS—

We show on opposite page a cut of 300-section of our new Western Express Multiple Transfer Switchboard. The Cabinets are divided into sections accommodating three cases containing one hundred jacks, drops and coils in each, and are made of best selected quartered oak, or upon special order, of cherry or mahogany, and all joined together in such a manner that when completed it is as near perfection as can be made.

JACKS—

The jacks are built on a hard rubber base, from the very best German silver springs and cast brass; each jack is mounted between its shutter and the actuating coil belonging to its particular line. The shutters are of German silver, as are also the terminals or line connecting clips for each drop and jack.

One hundred complete drops and jacks are mounted in a case (see cut on page 66), composed of the best quality of hard sheet rubber, so bolted and braced as to effectually prevent warping. Each jack and coil may be removed from its compartment separately and without disturbing any other jacks and coils or disconnecting any line or other wires in the switchboard.

DROPS AND COILS—

The drops are of self-restoring tubular series type, and are so arranged as to fall directly in front of the jack of the line to which that drop belongs. So that when the operator inserts the plug in the jack, the drop is automatically restored by an actual mechanical contact with the plug. The same operation also cuts out the drop which prevents ringing back in the subscriber's ear.

No restoring coils are therefore necessary. The drop coils are wound to about 80 ohms resistance, with No. 31 silk covered copper wire of the best quality obtainable.

The cores and heads of the coils are composed of very soft Swedish iron driven together so as to form practically one piece. All cores are carefully insulated before winding, and the coils tested for continuity, short circuits and grounds after winding.

CLEARING-OUT DROPS—

The clearing-out drops are of the bridged tubular type, one drop being provided with each pair of plugs and cords. The drops are wound to 500 ohms resistance and are so made as to be absolutely non-inductive. No cross talk can be heard from one drop coil to another, even when the two are in actual contact.

CIRCUIT-CHANGERS—

A set of twelve circuit-changing levers is provided for each board. These are so constructed that a downward pressure upon the lever enables the operator to listen in on any cord circuit. When the lever is depressed, a catch holds it in the listening position until the operator releases it.

Rocking the lever towards the operator throws the calling generator on the calling plug, or on one of the transfer plugs, while rocking it in the opposite direction throws the calling generator on the answering plug. In either ringing position the circuit is broken from the plug from which it is not desired to call. The levers are arranged to always automatically return to their normal position when released from either the ringing or listening position.

All the springs in the talking circuit are platinum pointed and rest on platinum pointed anvils, which is one of the most important features yet devised, as it prevents corrosion and obviates difficulties usually found in other boards (Bell boards not excepted), of a break in the circuit which interrupts the conversation, making it difficult at times to understand what is said over the lines. While with platinum pointed contacts we obtain the highest efficiency uninterrupted transmission of conversation and avoid

deterioration after long continued use. The springs are so long as to preclude all possibilities of breaking or becoming weak after they have been in service any length of time.

PLUGS—

All plugs are of metallic circuit type, having two concentric contact pieces accurately fitted and insulated by means of the hard rubber bushing. The two strands of cord are fastened with screw connections and means are provided for securely fastening the body of the cord in the shank of the plug without danger of breaking the conductors of the cord.

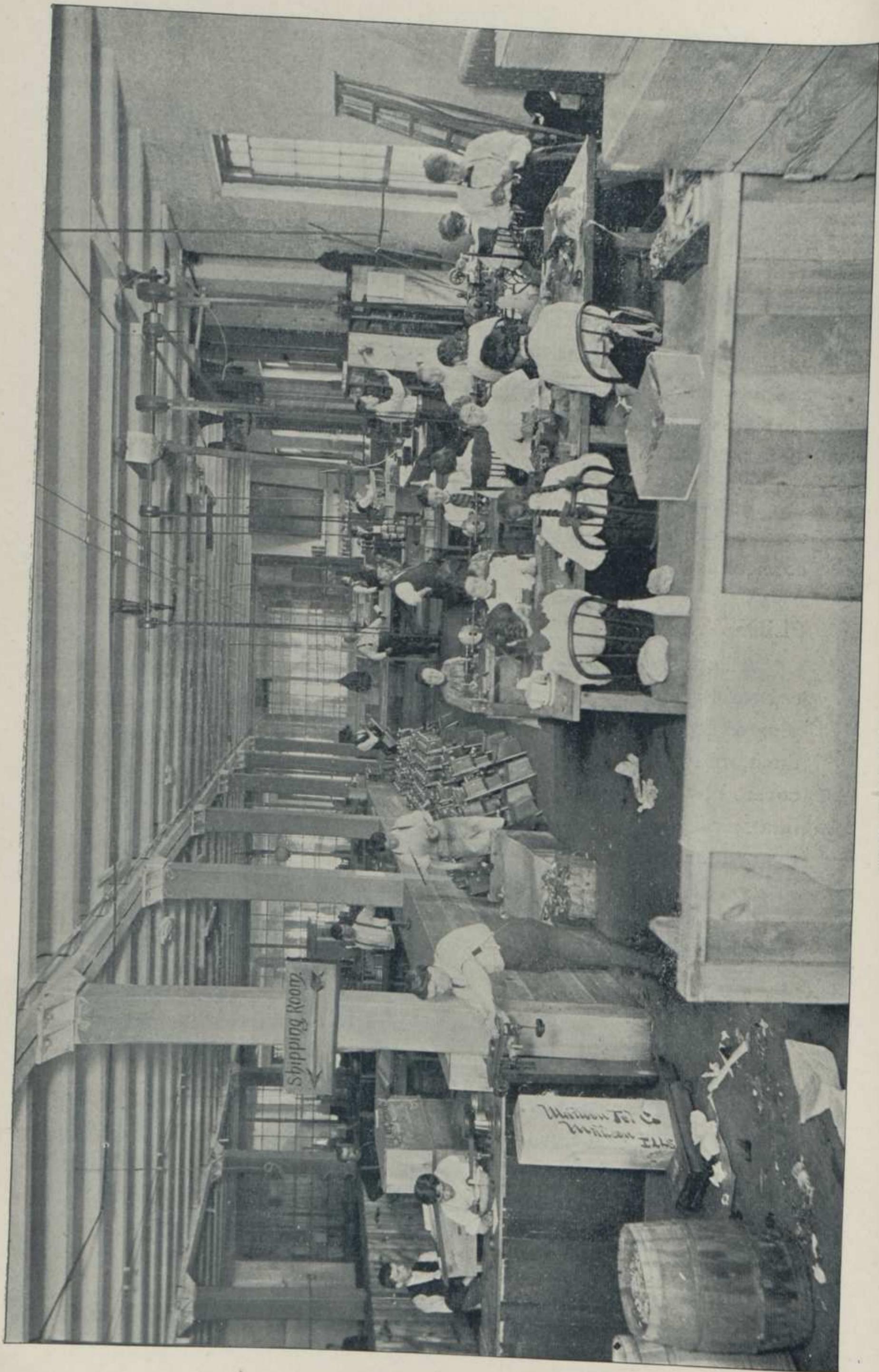
A polished hard rubber sleeve is slipped over the plug after the cord is secured, thus serving as a handle and a protector for the cord connectors.

FLEXIBLE CORDS—

All cords have two conductors. Each conductor is formed of twisted strands of tinsel and copper wire and on each a double wrapping of floss silk is laid. This is then covered by a braiding of white linen, after which the two conductors are laid together and the two covered by a wrapping of silk. The twin conductor is then enclosed in a spiral wrapping of spring brass wire, which forms an armor for the conductors within. Over this wire is a heavy linen braid woven in a single layer over the entire length of the cord, and a double layer for the space of ten inches of the plug end in order to provide re-enforcement against kinking.

TRANSFER SYSTEM—

Each board is provided with a set of twelve answering and calling plugs, with their corresponding cords and circuit changers and clearing-out drops as specified above. With ten of the pairs of plugs and cords at any one board are connected transfer plugs of the same type as those used for answering and calling, which are arranged in sockets located at every third board, beginning with the board at which the particular answering and calling plugs in question are located.



COIL WINDING DEPARTMENT

These transfer plugs are permanently connected to their respective calling and answering plugs and form means whereby connection may be made between the jacks on one end of the board and those at the other. The arrangement is such that two plugs and two only are required to make any connection, no matter how far apart on the switchboard they may be.

In front of each operator is arranged a series of push buttons so connected that a pressure down upon any one of them will connect the operator's telephone set with the receiver of one of the operators with whom it will be necessary for her to communicate in order to establish a transfer. All springs in connection with these push buttons are platinum pointed.

SIGNALING SYSTEM BETWEEN OPERATORS—

Various colored lamp signals are provided at each board for automatically signaling between operators. These signals are each composed of a three candle power miniature incandescent lamp mounted in a tube, the front of which is closed by a prismatic lens of colored glass. The circuits through these lamps are controlled by relays placed in any convenient position. The relays are in turn controlled by circuit closers and circuit breakers in the plug seats on the answering and transfer plugs. These parts are so connected with the circuit as to bring about the following results:

When the connection has been established by means of the insertion of a certain answering plug into the jack and the calling subscriber, and a certain transfer plug at another board into the jack of the called subscriber, and the clearing-out signal is given by one or both of the subscribers so connected, the clearing-out drop will fall, showing the operator at whose board the connection originated that a disconnection is desired; that operator will then withdraw the answering plug and replace it in its socket. The circuit closer in the plug seat corresponding will by this action close the circuit through the battery and its corresponding relay and thus throw the current on the signal lamps, the one at the board where the answering plug was just replaced and the other at the board where the transfer plug is still in the jack of the called subscriber. The lighting of the lamp

at the board at which the transfer plug is situated, will show that operator that a disconnection is desired on the trunk line, while the lighting of the lamp at the first board will show the answering operator that a disconnection at the other board has not yet been made. Both lamps will remain lighted until the operator at the second board replaces the transfer plug in its socket, which will open the circuit breaker in corresponding plug seat, thus breaking the circuit through the relay, which in turn will break the circuit through both of the lamps.

OPERATOR'S SET—

Each operator's set consists of a long distance granular carbon transmitter suspended by flexible cords from an adjustable nickel plated arm and a receiver devoid of exposed metallic contacts of the watch case type with nickel-plated head band.

The receiver cord terminates in the plug which is inserted while in use into a special operator's jack provided for it on the board. This plug and jack enables the operator to disconnect the receiver from service at an instant's notice by simply withdrawing the plug from the jack.

GENERATORS—

Double power generators are provided for furnishing current in calling subscribers. A hand generator is also furnished at each board to be used in case of a breakdown of the power generator service.

BATTERIES—

The entire switchboard system derives its currents for operating signal relays, and also for generators and transmitters from a single storage battery.

WIRING—

The wiring is done with the best grade of insulated wire. Cables are formed from No. 22 tinned copper wire with two wraps of silk and one of cotton for insulation. All battery power circuits are of the best quality of rubber covered wire, of sizes to insure proper carrying capacity on the circuits on which they are to be used.

NO INDUCTION OR CROSS-TALK—

It is a well known fact that cross talk in switchboards has been the cause of more trouble than all others combined. No matter how good the material or workmanship, if there is cross talk in the board it will ruin it. To overcome this troublesome feature has cost us a great deal of money and time, and in designing and building this board we have given this matter special attention, and can positively and absolutely guarantee no cross talk in our Western Express Switchboard.

On page 22 we show a perspective view of this board containing one hundred jacks and drops mounted in a floor cabinet. The style shown in the cut is designed for the smaller exchanges not using the multiple system. The plugs, cords and weights are placed in the back of the lower front panel and are accessible from the rear part of the board.

The generator and induction coil are so placed that when the table is opened upon which the circuit changer is mounted, they are in plain view and easy of access. This is an important feature, as it enables anyone to inspect them and their connections without difficulty.

This board is the most compact, durable and economical in existence. The entire space occupied by one hundred jacks and drops complete is but 13x16 inches, and a one hundred line board can therefore be placed in a smaller space than any other on the market.

We make these boards in any size from ten drops to the largest multiple board without limit.

There is no switchboard made or designed by any manufacturer that is so simple in construction and so easily and quickly operated as this.

We are familiar with all types of boards on the market and while some of them do their work fairly well, most of them are more or less faulty, and at best render poor service. *Our Western Express Switchboard is as near perfect in all its details as human genius can devise. Our price for installing it is no greater than those of inferior make, and it will no doubt come into general use by the Independent Companies.*

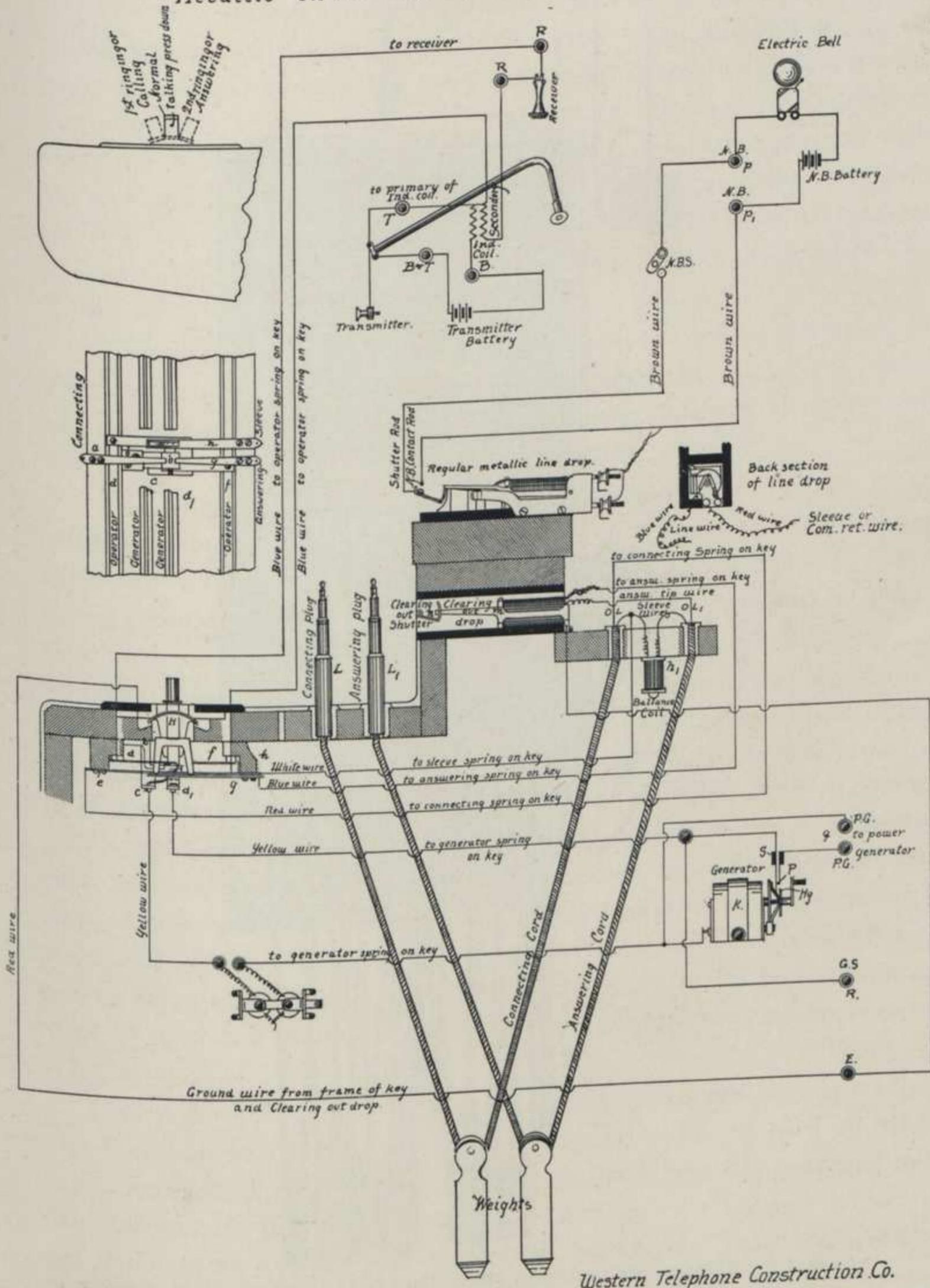
WESTERN TELEPHONE CONSTRUCTION COMPANY

This board is built for full metallic circuit and can also be used for common return or ground, without any change, excepting the line wire connections on the terminal of the jack. The merits of this board need no better recommendation than to say, for a switchboard for universal use it is par-excellence in all its details.

A cordial invitation is extended to all prospective purchasers of telephone apparatus to visit our office and factory and inspect this, the most perfect switchboard on the American market.

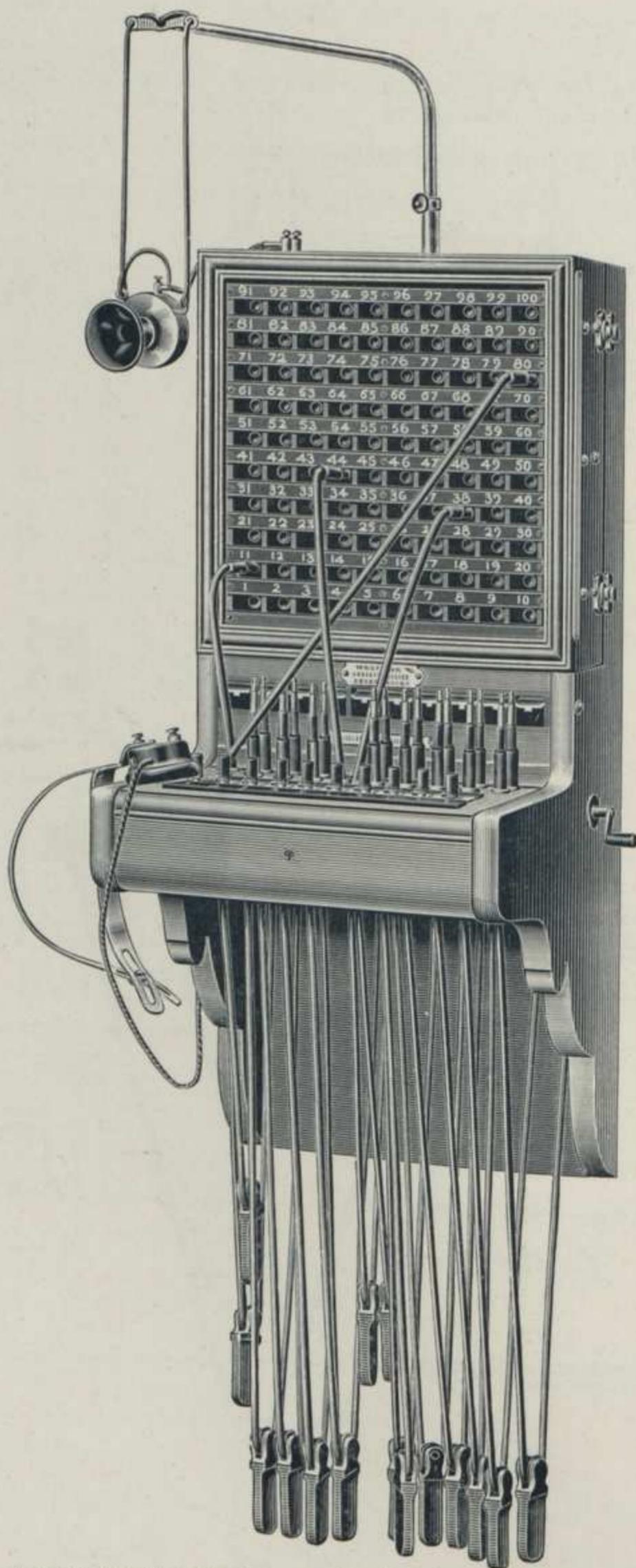
AC-5H

Metallic Circuit Switchboard Connections.



Western Telephone Construction Co.

WESTERN TELEPHONE CONSTRUCTION COMPANY



Improved No. 1 switchboard containing one hundred jacks and drops. There are more of these switchboards in use than any other on the market. This switchboard can be mounted in floor cabinets when desired.

No. 1 Switchboard

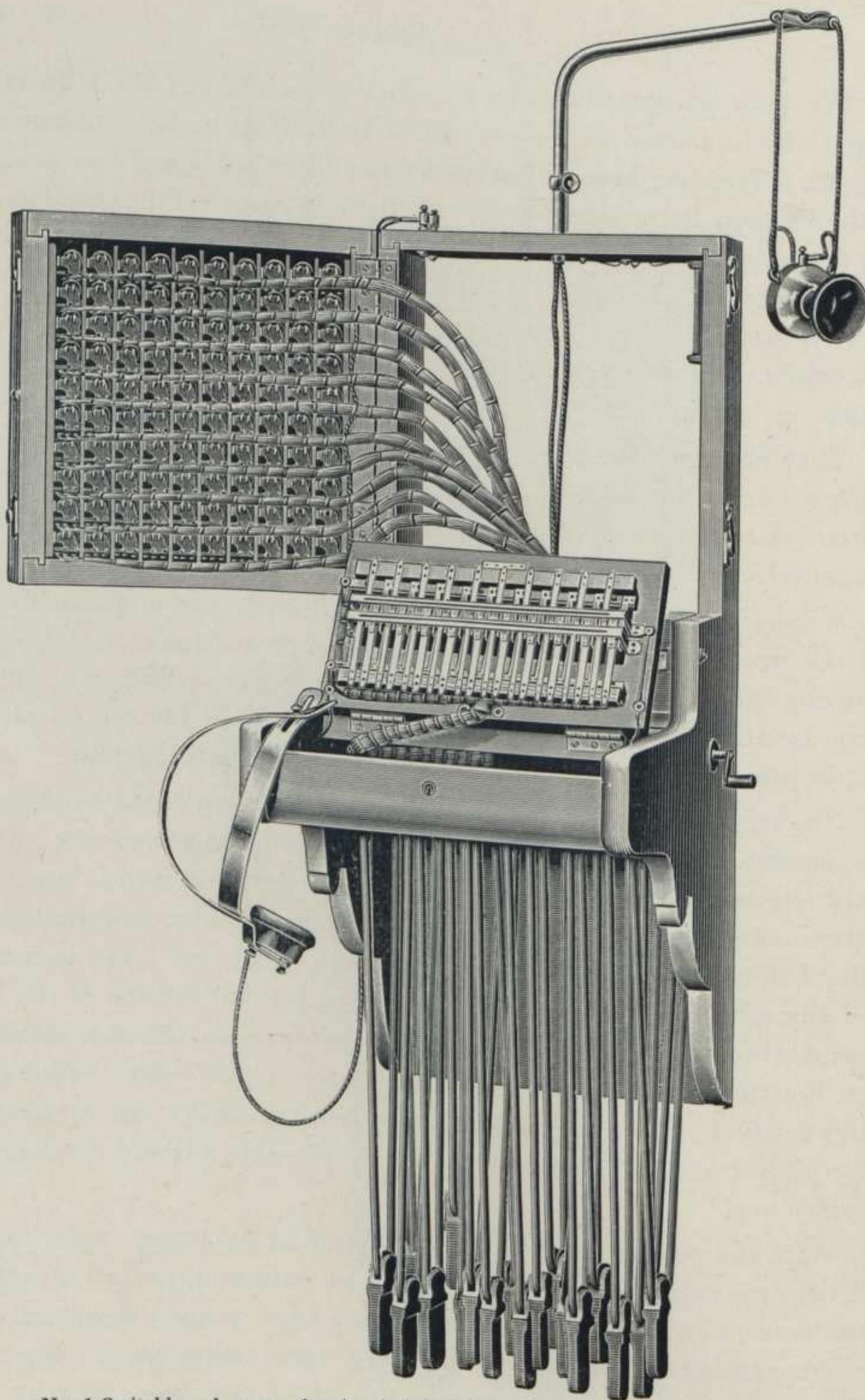
We show on opposite page perspective view of our No. 1 Switchboard, which is fitted with a combined jack, drop and coil shown on page 42. This has been the most successful switchboard ever placed on the market, there being more of them in successful operation at this time than all others offered for sale. They are equipped with our well known No. 1 jack and drop of the self-restoring type and are so designed that we have furnished them for one hundred lines in wall cabinets, as the jacks and drops only occupy a space of 14 x 14 inches

They are provided with our platinum pointed circuit changers, of which we make three styles, and the arrangement of the jack, drop and coil is such that the can be easily removed should there be any necessity for so doing.

A clearing-out drop and coil is used with each pair of plugs, these coils are provided with a special winding in such a manner as to render them non-inductive without decreasing their magnetic efficiency. This in combination with the fact that the line drops are cut out on plugging in precludes the possibility of all cross talk or induction.

The entire wiring of the board is done in a neat and workman-like manner. The cabinet is of handsome quartered-sawed oak. This board has stood the most severe test of any ever built, and is superior to those offered for sale by any other manufacturer, and while our policy has been and still is to stick to that which we know is better than any other, yet the continual advancement and growth of the Independent telephone business makes it necessary to add new features from time to time to meet the demand for a still more rapid and better service. We are constantly studying to make our apparatus more perfect and to simplify it as far as possible without decreasing its efficiency.

With the points of simplicity, economy in operation, more rapid and better service always in view, and to continue to lead all other manufacturers of telephone apparatus, we have recently designed and are now placing on the market for sale a new switchboard which is far superior to any on this continent, which we have named the *Western Express Switchboard*, it being an improvement on our famous No. 1 and is fully described and illustrated on pages 22 to 27 inclusive.



No. 1 Switchboard, open, showing interior view of one hundred lines connected to terminals on jacks, also showing circuit changing device. All boards sold by us are shipped with line wires soldered to jack terminals, as shown in cut.

No. 1 Switchboard, Open

On the preceding page will be found a cut showing the interior of our No. 1 board, and a view of circuit changing device of our Western Express and No. 1 Switchboards.

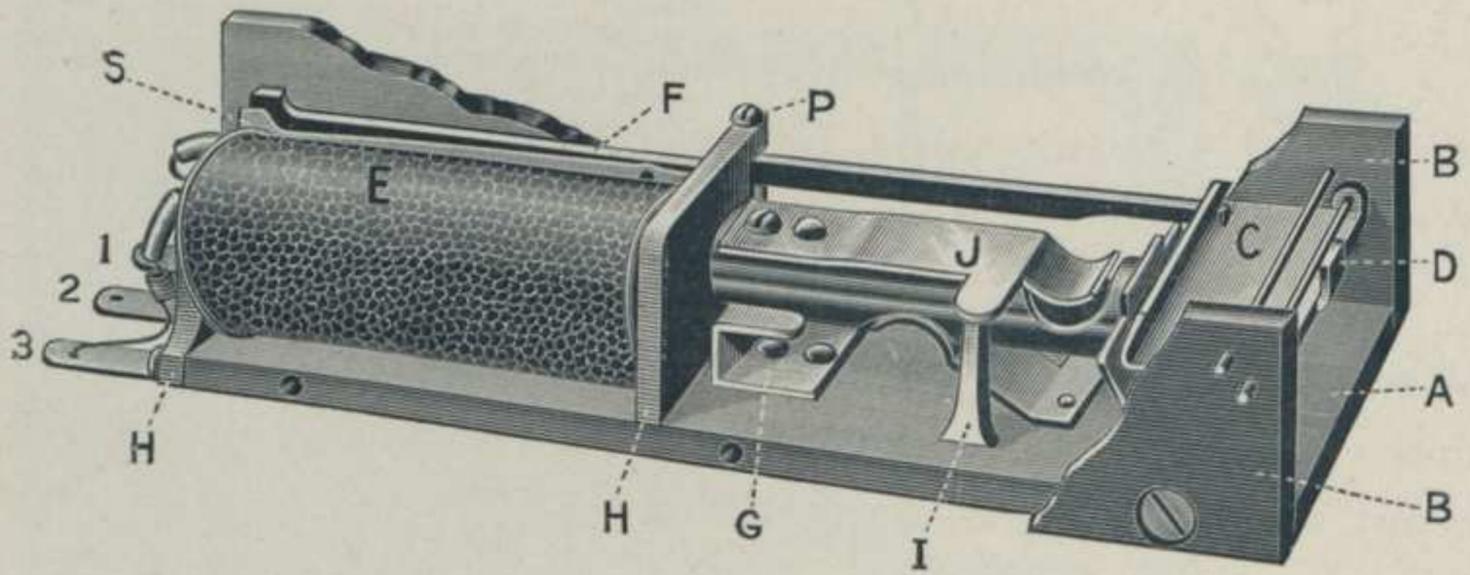
The only difference between the rear view of the No. 1 and Western Express boards is simply the manner in which the jacks and line wires of the Western Express boards are secured to the back board, which is fully explained on preceding pages.

It will be seen that all connections of the board are so easy of access that should any parts need cleaning, adjusting or repairing, it can be done in a few moments' time and without disturbing the connections of any of the lines.

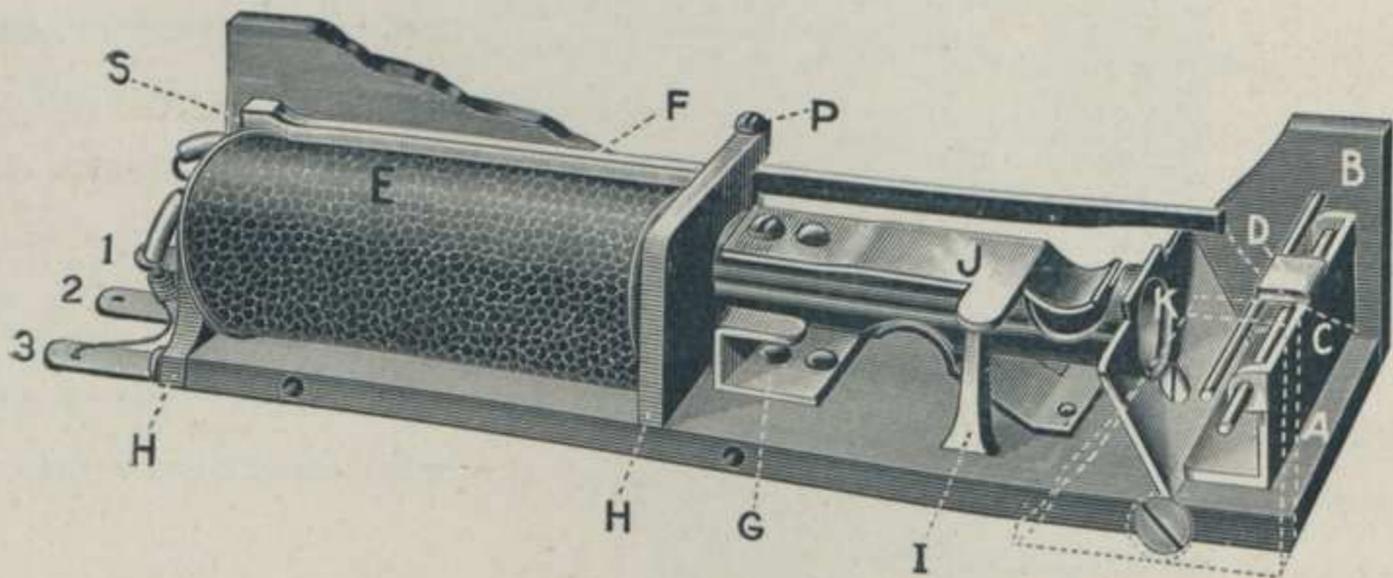
We desire to call attention to our circuit-changers shown in this cut, which embody the most expert mechanical and electrical skill in the perfection of details, with strong, firm, direct spring contacts, no flimsy rubbing contacts being tolerated.

All springs in the talking circuit are platinum pointed and all permanent contacts and connections of line and other wires are soldered, making the only safe, sure and positive electrical contact that should be permitted.

Before shipment we solder to each line terminal on the jack a special insulated tinned copper wire of sufficient length to connect the board with the lightning arrester. These wires are formed in a neat cable, and when the boards arrive at destination it is an easy matter to make the connection and avoid mistakes of wiring.



No. 1

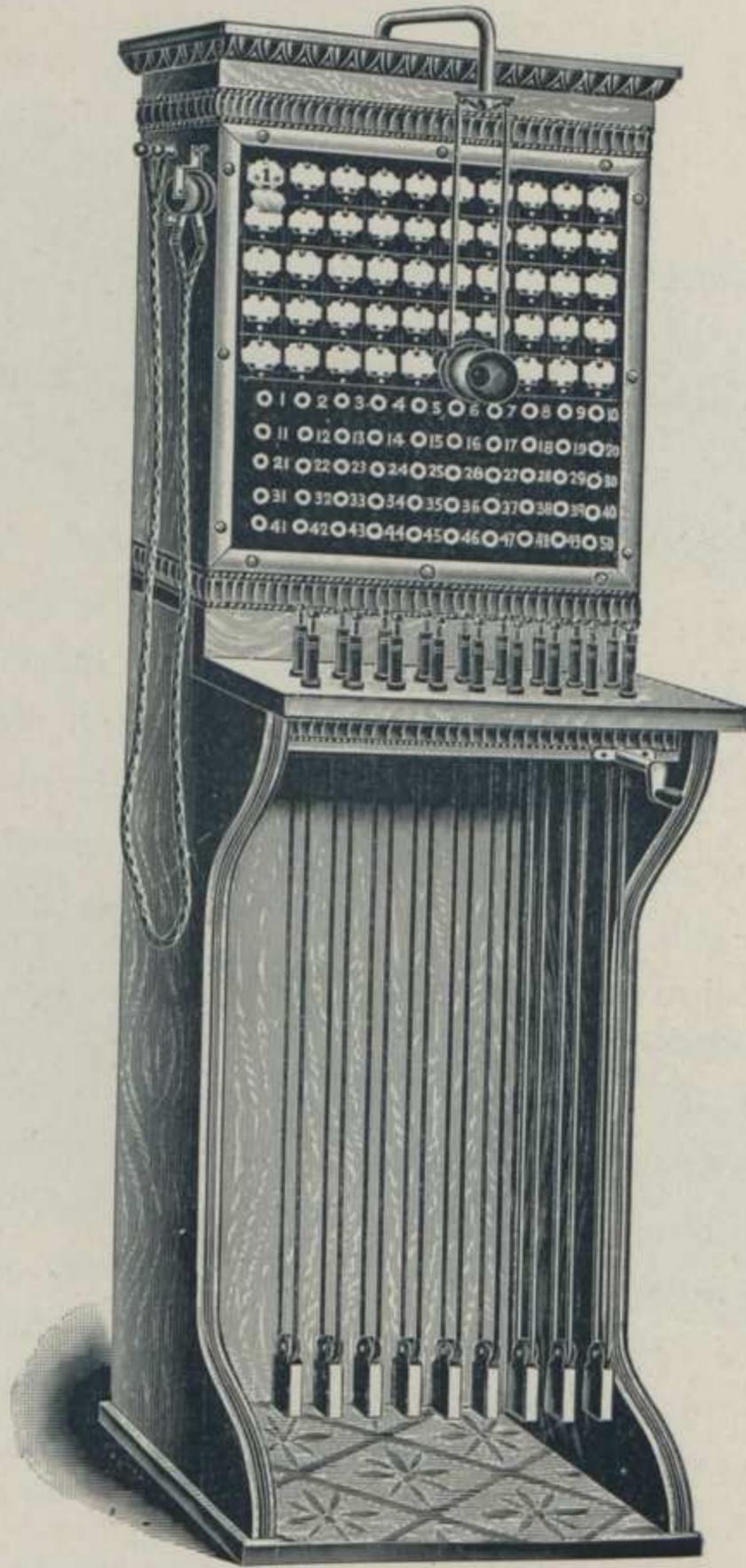


No. 2

We show on this page two cuts of our Combined Jack and Drop and Coil used in our No. 1 boards. Cut No. 1 shows drop in its normal position. When subscriber calls central office the drop falls in front of jack as shown in Cut No. 2.

Jack, Drop and Coil of Our No. 1 Switchboard

On page 42 will be found two cuts of the jack, drop and coil of our No. 1 switchboard. Cut No. 1 shows the drop C in its normal position, while in cut No. 2 the position of the shutter or drop is shown after the subscriber has called up central office. The plug on entering the jack at A, restores the drop C which makes contact by a lip D on upper edge of drop with a rod directly over same, which is connected with night bell circuit. The sleeve spring is shown at J, heel piece at G, magnet coil E is located between the magnet heads H-H, and is mounted on a hard rubber base. B-B are the hard rubber sides forming a compartment for the jack, drop and coil, and to which the shutter is hinged. The armature is shown at F and swings on a pivot in front magnet head H and is secured by pivot pin P. The armature spring is shown at S. The line terminals on the jack are shown at figures 1, 2 and 3. The drop, jack and coil of our No. 1 board described above was the first one placed on the market containing a mechanically self-restoring drop. All others containing the self-restoring feature are infringements on our patents.



No. 4 Switchboard for common return system. Has many points of excellence, it being of simple construction and can be furnished at a medium price.

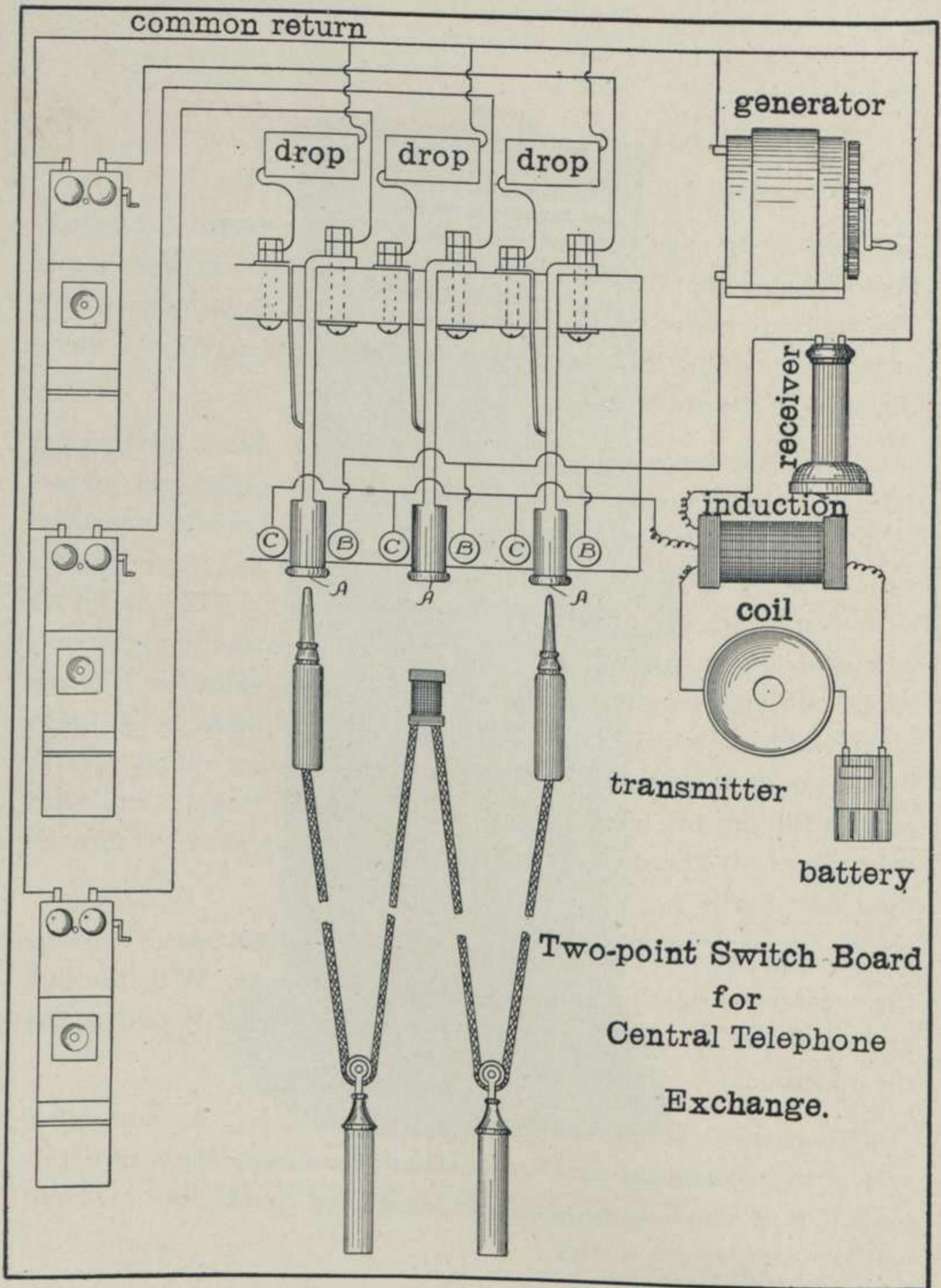
Our No. 4 Switchboard

The cut on page 44 shows perspective view of our No. 4 switchboard fitted with fifty drops for common return or ground circuit. The jacks are placed in the lower part of the board just above shelf or table containing the plugs, the drops and coils are placed above the jacks in the ordinary way.

The operation of this board is as follows: When a subscriber calls central, the operator plugs into the number called and presses to the left which brings the jack, which is made flexible, in contact with the strip in listening circuit. The operator ascertains number desired and with companion plug, inserts it in jack number called for and presses to the right which brings it in contact with ringing circuit, which calls up the party, the two are then in communication. This is a very easy and quickly operated board. No switches, levers, push buttons or clearing-out drops are used. The operator simply presses jack to the left for listening and to the right for ringing, and when subscribers are through talking and ring off they clear-out through their own drops.

On page 46 we show a diagram of circuits of this board, showing the listening strip C, ringing strip B and jack at A. With the diagram and the explanation given the reader will readily understand the operation.

To parties wanting a medium priced board for common return system we recommend our No. 4, which has many points of excellence. It is simple in construction, easily and quickly operated and will give satisfactory service.



VIEW OF CIRCUITS OF OUR No. 4 SWITCHBOARD FOR
COMMON RETURN SYSTEM

Switchboards for Toll Line Service

In all central office exchanges provisions should be made for toll line service, which will result in the addition of many new subscribers who desire to transact business with parties residing in the cities and towns through which the toll lines pass and will insure large returns for the money invested. There are various ways and devices used for connecting toll lines in the local exchange, but all must conform to one general plan in order to get the best and most satisfactory service. It is a well known fact that owing to the nature of the country through which they must run, toll lines are much more exposed to lightning and the elements than the lines connected to the local exchange.

Where two or more toll lines meet at a centrally located point, the necessity arises for providing against the danger to which these lines are exposed and means for interconnecting the different branches; in other words, a toll switchboard must be installed. Viewed from a technical point it is a simple proposition to supply the proper switching appliances for interconnecting toll lines; practically, however, it is found that most toll switchboards must necessarily be operated by inexperienced people who are apt to create confusion and much loss of time when it is required to connect circuits operated on differently designed plans. Therefore, when designing toll switchboards for use by inexperienced operators we drop theory and in its place employ sound judgment gained by a critical observation of apparatus that is being operated under adverse conditions. However, in the well managed toll line systems a direct "talking" connection between any of the lines is imperative. Moreover, it is important that the switchboard be arranged so that any probable combination of circuits may be produced without creating any mutual interference. Another and equally important requirement is, that the toll switchboard must be designed so that it is practically impossible to "hang up" any toll line circuit and produce at the switchboard a condition in the circuits

SPECIAL TOLL STATION APPARATUS.

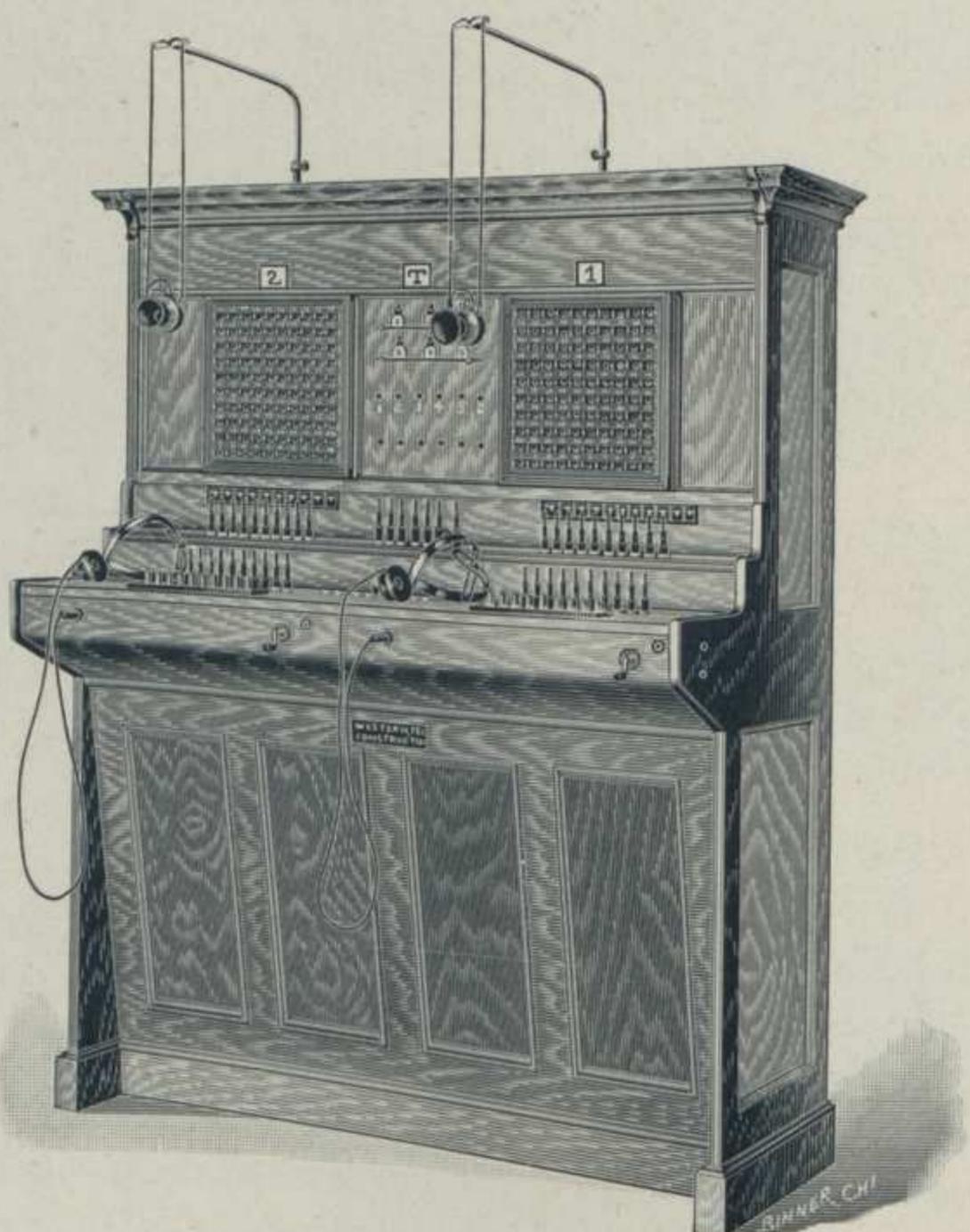
Manufactured by THE WESTERN TELEPHONE CONSTRUCTION COMPANY, Chicago, Ill.
FOR EQUIPMENT OF WISCONSIN VALLEY TELEPHONE CO'S. JUNCTION STATIONS,
CONNECTED BY OVER 2000 MILES OF COPPER METALLIC CIRCUITS. Patented Appliances.



which will prevent the recording of a call originating in any of the outlying toll stations. Quite often, and mainly on account of the difficulties improperly designed switchboards might introduce if placed at the junction point, an oral repetition is preferred; thus when a subscriber at some station on the line desires to communicate with any one on another line, the operator at the junction point is requested to repeat the message. This can be successfully accomplished where our switchboards and plan of construction is used. It is an easy matter to design a switchboard for interconnecting toll lines, but when the designer is obliged to exercise an extreme degree of economy and at the same time produce an apparatus that can be understood by the most inexperienced manager, the problem assumes a more difficult aspect, for every additional connection, appliance or piece of apparatus tends to confuse the mind.

In this connection we desire to call attention to our combination switchboard shown on page 50 and rear view of same board on page 53. The cut represents a 300-drop cabinet fitted with two of our No. 1 boards of one hundred drops each, with a six drop toll line board in center. This arrangement is the most novel, compact and complete of anything yet designed, and for simplicity it has no equal.

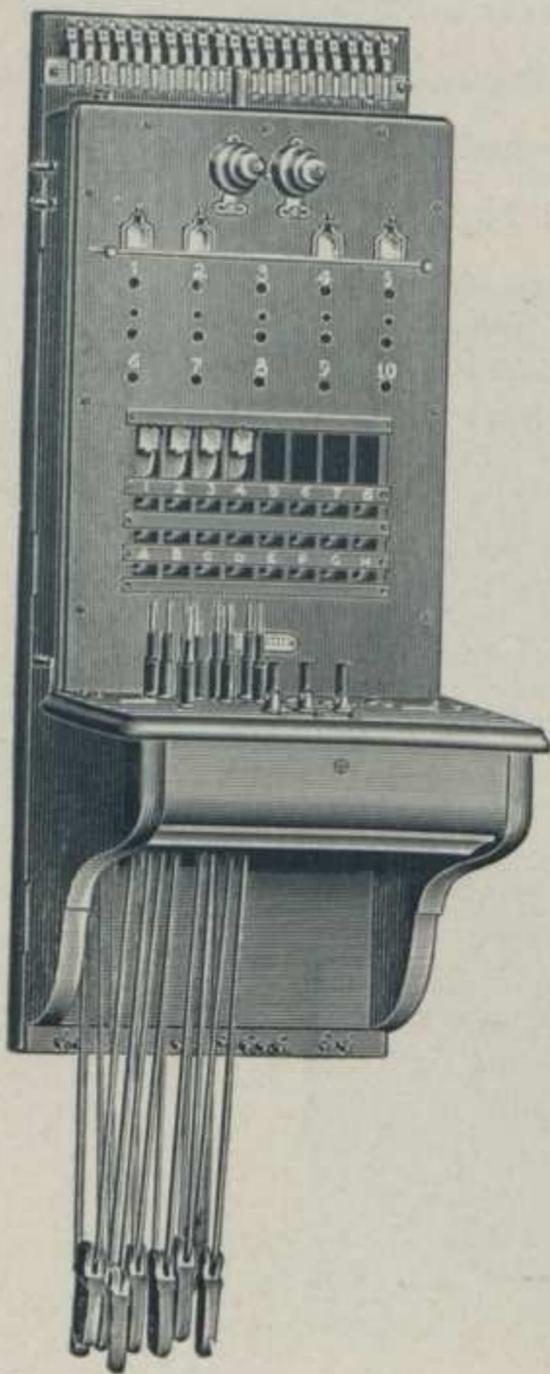
In the larger exchanges there should be a special board for toll line service, arranged in such a manner that connection can be made with any subscriber in the local office. We show on page 52 a toll line switchboard designed for this class of work, which is especially adapted for central offices where a combination board would be impractical. In view of the fact that we have furnished more exchanges with toll line switchboards for the Independent Telephone Companies than all other manufacturers combined, we are especially well prepared to install toll line boards of any size or type to meet the requirements or conditions containing the latest improved and most modern construction; or where it is desired to add a toll line board or to change any board or device now used in a local exchange for toll line service, and where we can design and lay out a new exchange where toll line service is to be furnished, we say without fear of contradiction that we can supply an apparatus that is superior to any in America.



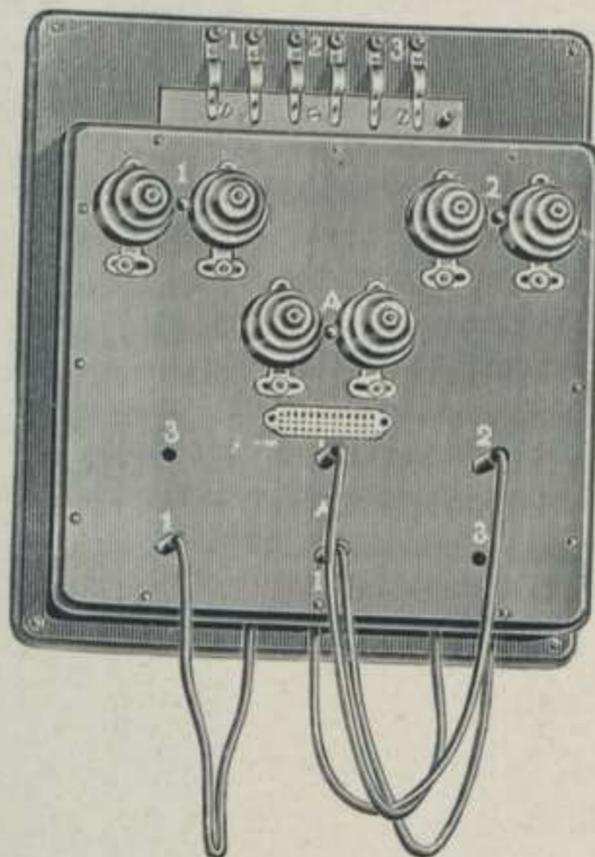
Combined Exchange and Toll Line Switchboard.

We show on page 48 a photographic view of a group of toll line boards now in service at the junction stations of the Wisconsin Valley Telephone Company. The boards shown in the lower row are combination toll line and central office boards, while those in the upper row are for exclusive toll line use and are connected with over two thousand miles of copper metallic circuits. These boards contain all improvements in the art of toll line switchboard construction, each one being different from the other, and are adapted for use in a particular place, as each junction point contains conditions different from another. It will be seen that in some cases the lightning arresters are mounted on the top of the backboard while others are connected with the lightning arresters placed in any convenient place near the board. While we show fourteen different styles of toll line boards, they differ mostly in the number of lines to be used, also length of same and the number of telephones to be used on each line.

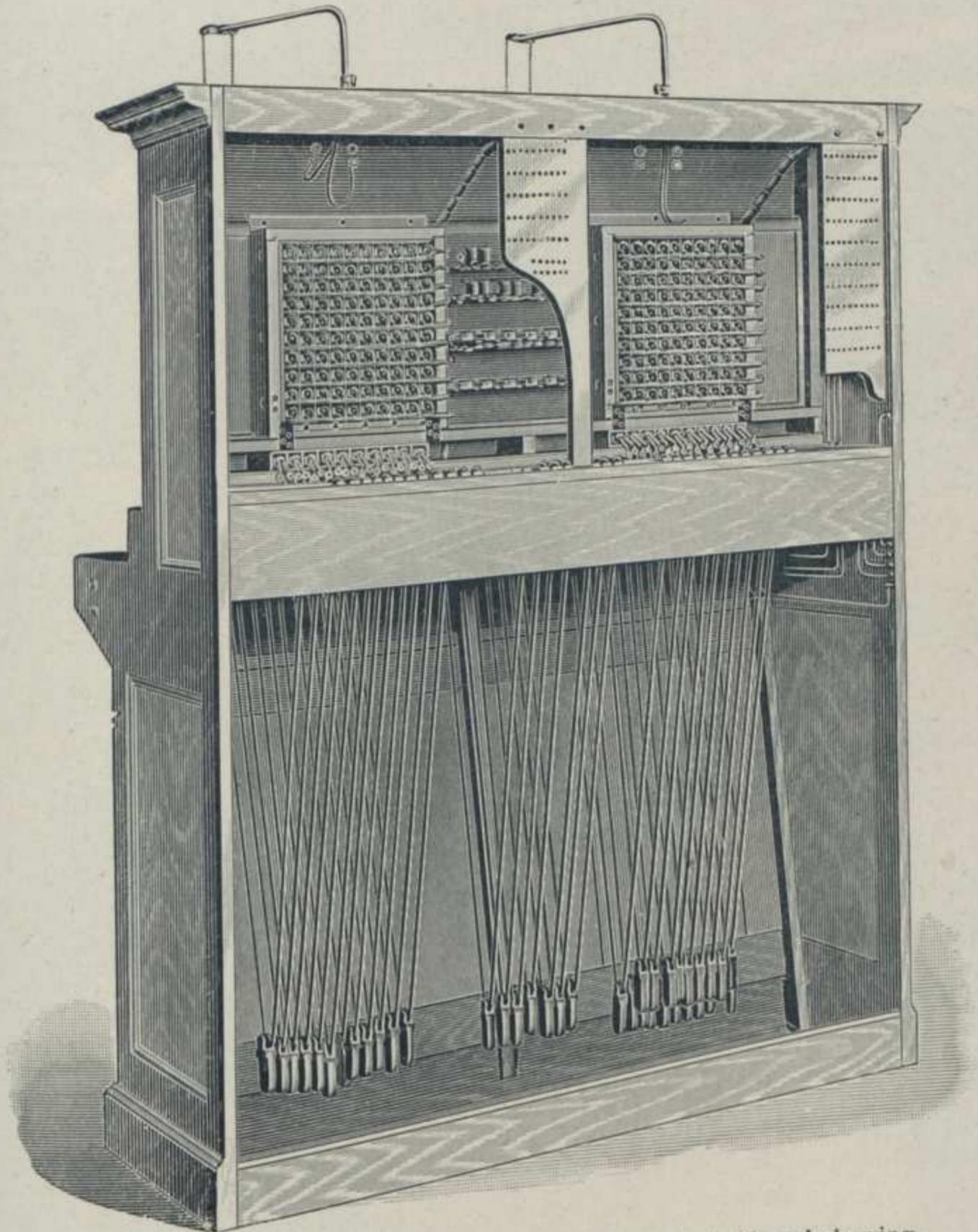
We wish to again repeat and impress upon the minds of those using toll lines that it is poor economy and a mistake to connect toll lines with any device or switching apparatus which is not designed or adapted for the particular place in which it is to be used, as it is poor policy to connect toll lines with boards intended only for central office use.



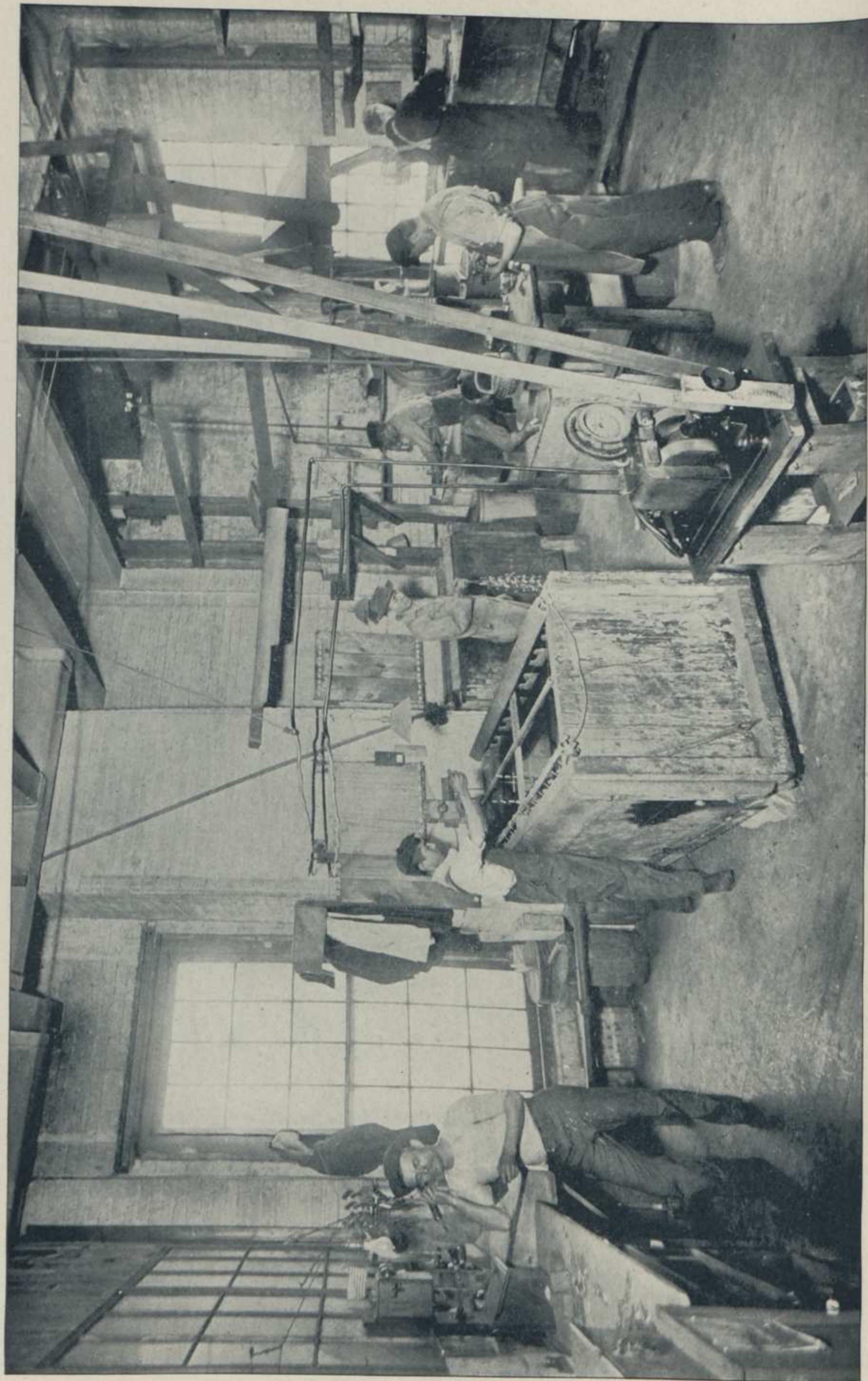
The above cut shows a Combination Switchboard for local exchange and toll lines for junction points. See cut on page 48 showing several types of this construction.



Exclusive toll line boards which we make in several styles to meet any requirement desired.



Rear view of Combined Toll Line and Central Office Switchboard showing line wires connected to terminals.



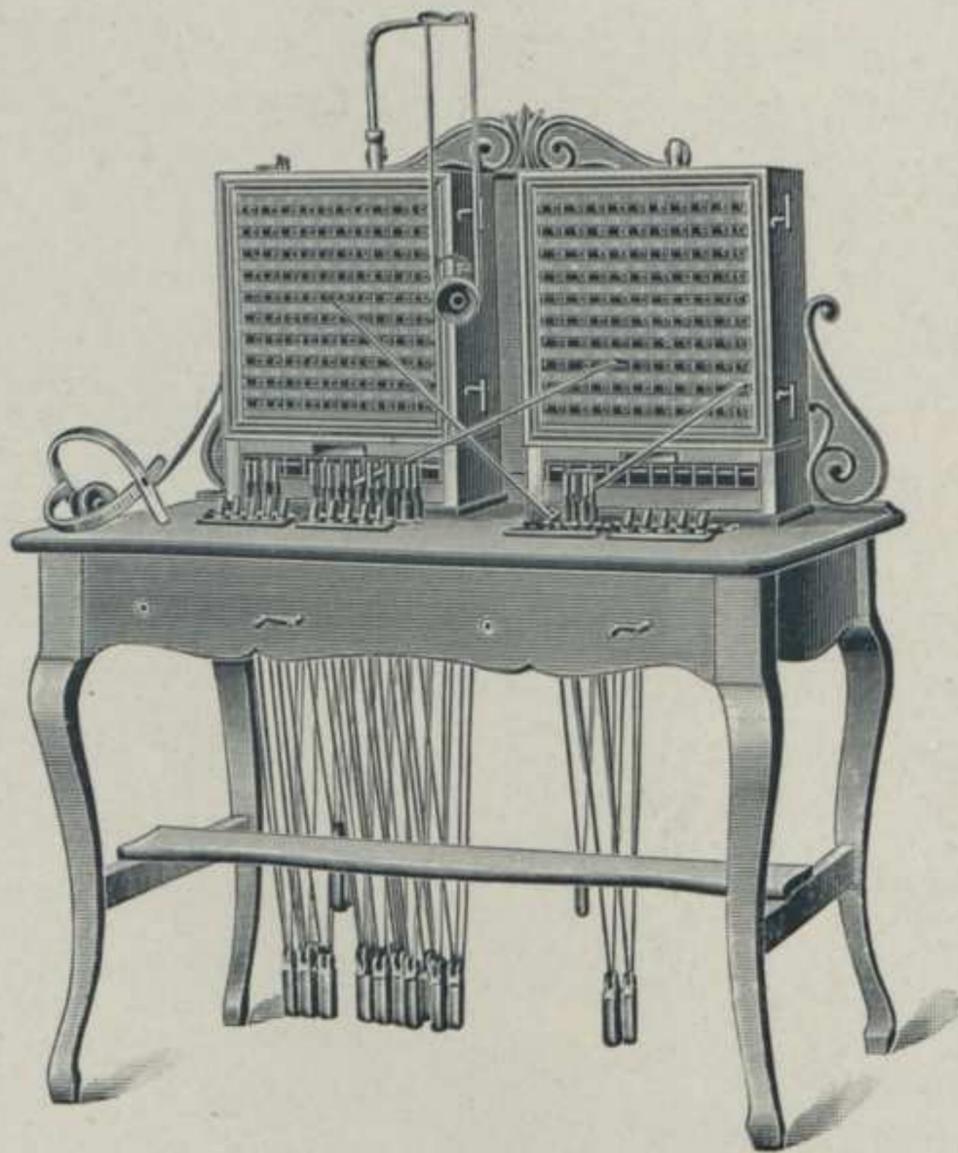
PLATING DEPARTMENT

Switchboards for Small Exchanges

With our several types of switchboards we are particularly well prepared to furnish the best equipment for exchanges in the smaller cities and towns.

In the equipment of a new exchange in the smaller places, it frequently happens that they only provide a board to accommodate a limited number of subscribers, and as more patrons are added it becomes necessary to put in a larger board, involving an expense that could have been avoided in first instance. We have often been called upon where these conditions exist to advise parties what is best to be done under the circumstances, with the usual result of taking out the first board installed and substituting a larger one.

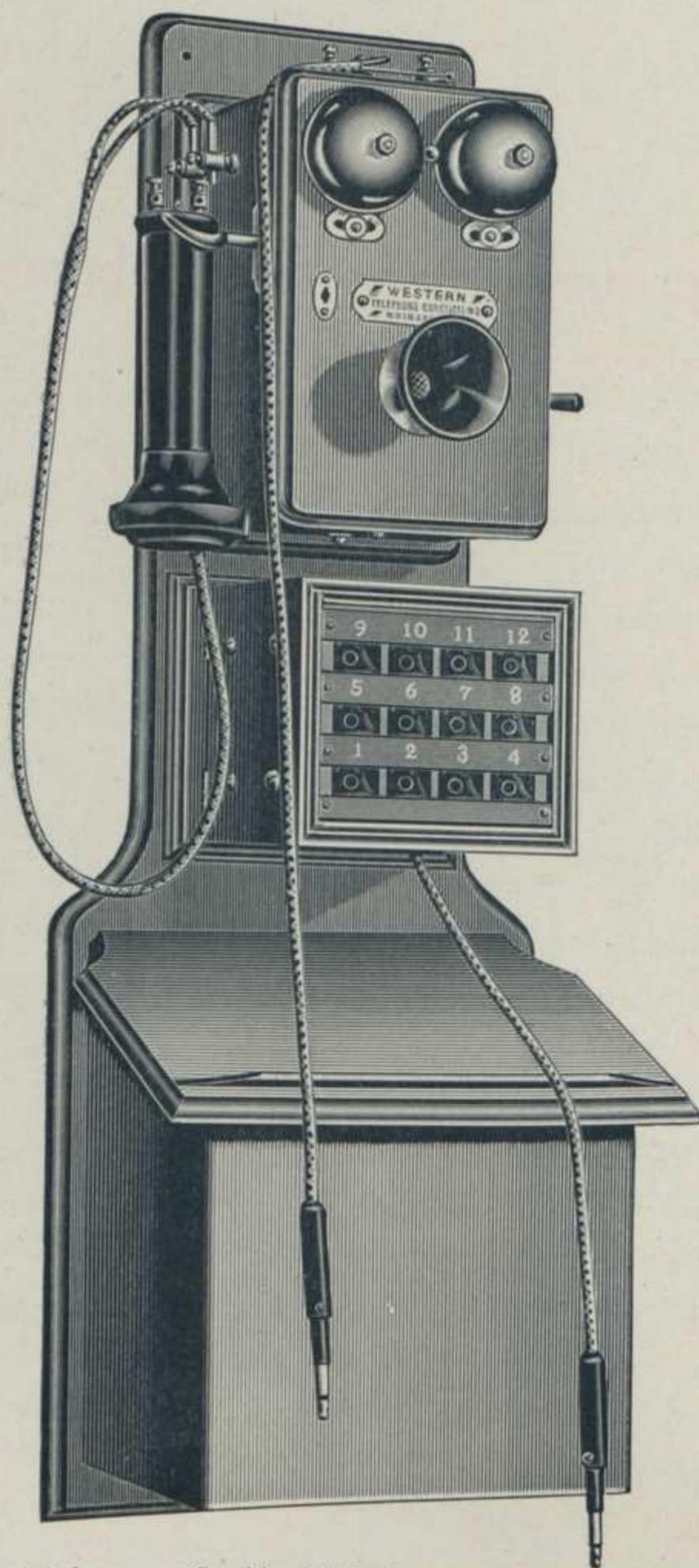
Our experience has demonstrated that in order to avoid delay and extra expense when first board is purchased, that the cabinet should be of sufficient size to accommodate the number of jacks and drops that may be needed for some time to come, putting in a sufficient number to accommodate the immediate demand. More can be easily added as occasion may require. Our boards are so designed and constructed as to meet the demand of these requirements at the least expense and in the shortest time, and has been the means of placing them in a greater number of small exchanges than any others on the market



Improved Table Switchboard mounted with two cases containing one hundred jacks and drops each. This makes a very handsome equipment which we can furnish with any number of jacks and drops desired.

Improved Table Switchboard

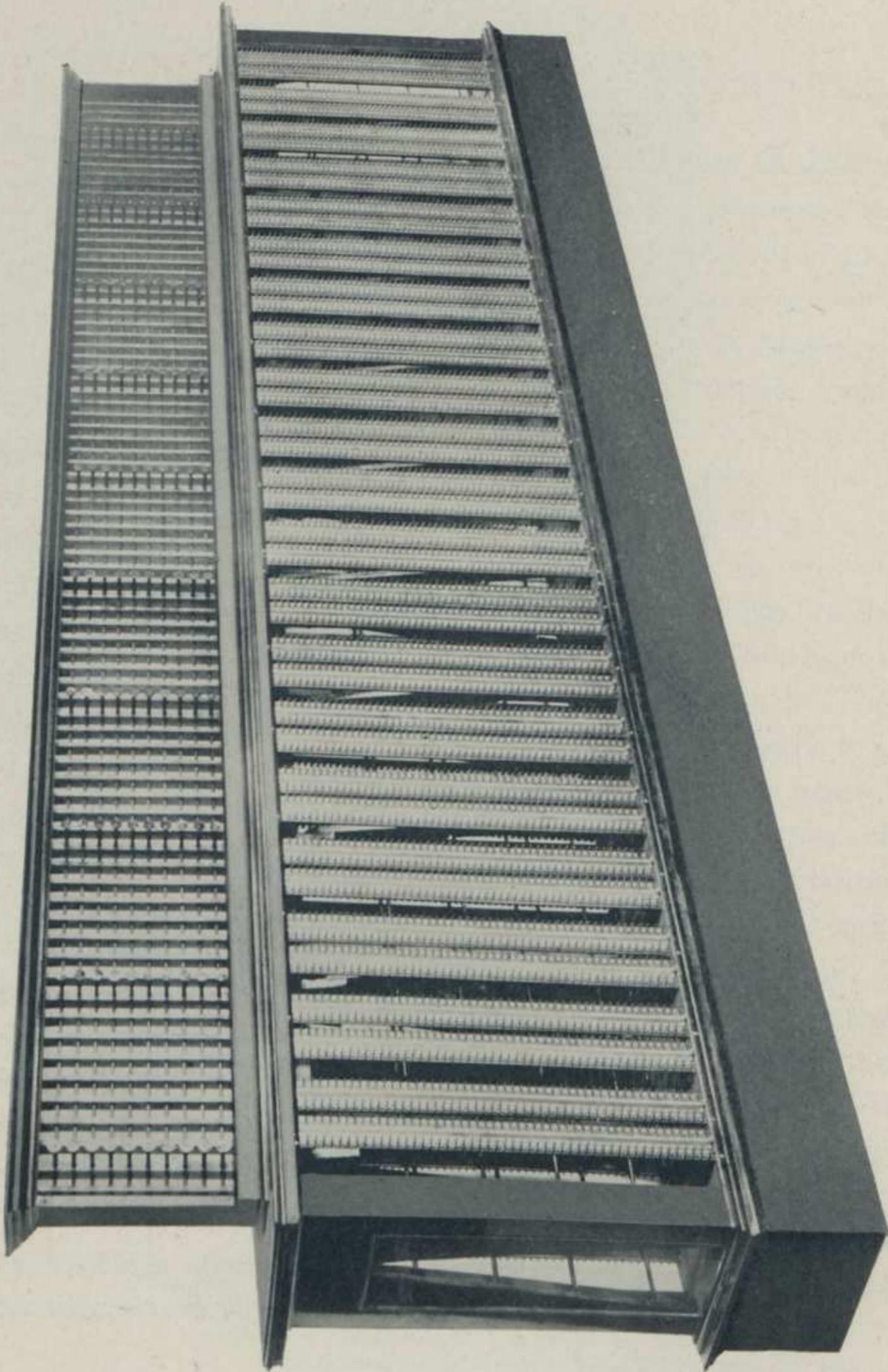
On page 56 we show a cut of our improved No. 1 switchboard fitted with two cases of 100 drops each mounted on a table. This is a very complete, convenient and modern arrangement and can be used to good advantage with smaller boards if desired. During the past two years many manufacturing firms have equipped their factories and offices with a private switchboard and telephone system. This plan is also being adopted by the owners of large office buildings and stores. We can also furnish our new Western Express Switchboard mounted on a table. With our superior facilities for furnishing this class of work, we are prepared to submit estimates for switchboards and a full equipment for all such places. The improved table switchboard plan has many advantages for private exchanges and can be purchased and operated without paying tribute to the avaricious monopoly, the Bell Telephone Company. We also call attention to the fact that with the several types and sizes of switchboards that we manufacture, that we can design and supply an equipment that will accommodate the most convenient space and place to locate the same. All parties contemplating putting in work of this character should consult us before placing their order, as there is no company in this country as well fitted to install private plants as the Western Telephone Construction Company.



The above cut shows our Combined Telephone and Switchboard designed for intercommunicating system and small exchanges. The switchboard, which is mounted under generator box, contains twelve jacks and drops and occupies a much smaller space than any other board of same number.

Combined Telephone and Switchboard

We show on opposite page cut of a telephone and switchboard combined containing 12 drops. The switchboard is placed in a case directly under the generator box. This is especially designed for offices where a few telephones are to be used, but the number can be quite largely increased by using the party-line system—that is, putting in two or more telephones on the same line or circuit. This makes a very neat, compact and inexpensive equipment for factories and office use and will no doubt become popular. In fact, it can be used to good advantage in a great many places, such as a small exchange in a country town or village, or in agricultural districts. The arrangement is neat, novel and unique, and on account of the moderate expense it needs only to be seen to be appreciated. This combination telephone and switchboard can be sent out and set up without the expense of an expert to install the plant, and is the only device on the market where as many drops can be put in so small a space. We can make this combination from four up to twelve drops. The different combinations that we can make with this and other boards are so varied that they cannot well be shown in detail without confusing the reader. *Suffice it to say that any parties wanting anything in the switchboard line for any particular place or for any special use not shown in this catalogue, if they will communicate to us their ideas or views we can design and construct any special apparatus desired to meet the wants of the many, whether it be for a small board or for the largest exchange. In fact, we desire to say that there is nothing in the art of switchboard designing that has been made before, or is being made now, nor that is in the mind of man that we are not prepared to manufacture and supply, making it entirely unnecessary for anyone to look elsewhere for switchboards that will fill any and all requirements.*



Combined Lightning Arrester, Distributing and Change Board for one thousand drop metallic circuit switchboard. Superior to anything of the kind ever made.

Combined Lightning Arrester, Distributing and Test Board

No telephone exchange of any size whatever should be without some sort of a distributing and test board, and we have every confidence that in placing this board on the market we are furnishing a piece of apparatus which is superior to any heretofore used, either by the Independent or Bell Companies.

We show on page 60 a cut of this board for one thousand lines, which has been recently designed and improved by the Western Telephone Construction Company. It is the most complete and at the same time the most compact and easily handled piece of apparatus of its kind ever constructed. It affords a means for protecting all lines from the damaging influence of lightning, trolley or other currents of a dangerous nature. A means of testing out any line, either by bridging a telephone instrument across the circuit of the line, or by breaking a line and testing it in either the switchboard or the outside line direction, and a means for distributing the various lines as they enter the exchange to the various points on the switchboard with which it desired to connect them.

The side of the board shown in the cut represents the line side of the distributing board—that is, the side to which the line wires from the cable heads are carried.

Each of the vertical strips seen in the lower section of the structure contains lightning arresters for 25 metallic circuit lines or for 50 common return or ground lines. These are our well known type of fusible lightning arresters, and embody a feature whereby a high potential current can find passage to the ground, either with or without operating the fusible cut-out.

The line cables leading directly from the outside line wires or from the cable heads, which should always be used in exchanges of considerable size, are brought by suitable means to the cable box or trough, which forms a base for the general structure as shown in the

cut. These cables are then brought up through suitable holes, just behind the strips of lightning arrester clips, and are spread or fanned out, the individual line wires being soldered to their respective terminals on the lightning arrester clips. These terminals correspond in numbers to the numbers of their wires on the cable heads. This brings the circuit of the line wires to the lightning arresters mounted on the strips. The other side of the lightning arrester is provided with suitable clips for attaching the terminals of the jumper or distributing wires and is provided with strips and clips somewhat similar in their nature, and in these clips terminate the individual wires leading in cables from the switchboard jacks and drops. The numbers of these clips correspond to the respective numbers to which they are connected on the switchboard.

Having traced the circuit of the various line wires to the lightning arrester clip, and the circuits from the switchboard, drops and jacks, to the testing clips located on the opposite side of the distributing board, evidently some means must be provided for connecting the individual line wires to the individual wires leading to the switchboard drops. This is done by means of jumper wires, which are preferably of No. 22 tinned copper wires, rubber insulated. If the wires are metallic circuit, these jumper wires should be arranged in twisted pairs. We arrange the wiring in such manner that the two ends of the twisted pair of jumper wires are soldered to their respective terminals on the pair of clips on the lightning arrester side. This pair is then placed under one of the horizontal rods which will be seen in the interior of the structure, and then is turned upward and through a hole to the rack above, inasmuch as the wire is to go on a certain terminal on the switchboard, it passes through its corresponding row of pins from the top of the structure, and thence along in a horizontal channel formed by the outwardly projecting pins until it is opposite the terminal to which it belongs on the testing side of the board. Here the pair again passes through the vertical rack and down through a small opening and under one of the horizontal rods below, and is soldered to the proper pair of terminals. This completes the connection between the subscriber's outside line and what may be termed his inside line.

It will be evident from the description so far given that when the jumper wires are all in place there can be no possibility of a tangle among them. They lie in a parallel channel and are all well defined in their location. When a change is made in the number of the subscriber's line the jumper wire may readily be pulled out and a new connection established in a moment's time. All work is open and readily accessible and the difficulty in tracing out any trouble is greatly minimized.

The test clips are so arranged that when the tip of the test plug is inserted it brings the circuit of the testing operator's telephone across the circuits of the line, if so desired, without breaking the continuity of the circuit from the subscriber to the switchboard. This will enable the testing operator to listen in on any circuit while the conversation is going on. Should there be a case of trouble on that wire, it can be tested out, first on the line side of the circuit, at the same time breaking the circuit leading to the switchboard. This is done by inserting the plug its full length under the test clip. If it is found that this portion of the circuit is all right, the plug may be replaced, and thus cut off the line side of the circuit in order to test out the switchboard side.

It will be seen that a complete and unfailing means is given for testing out and locate trouble on any line.

The general frame work of this board is of handsomely finished wood, the cabinet work being constructed in a neat workmanlike manner. The test clips are of strong spring German silver, and are so arranged that an imperfect contact between them is almost out of the bounds of possibility. The lightning arrester clips are of polished brass, and ample means are afforded for making a secure and permanent ground connection. This board should be preferably made up for the capacity of the exchange for which it is eventually to be used, but if a small board is desired at first, it is easily added to by sections.

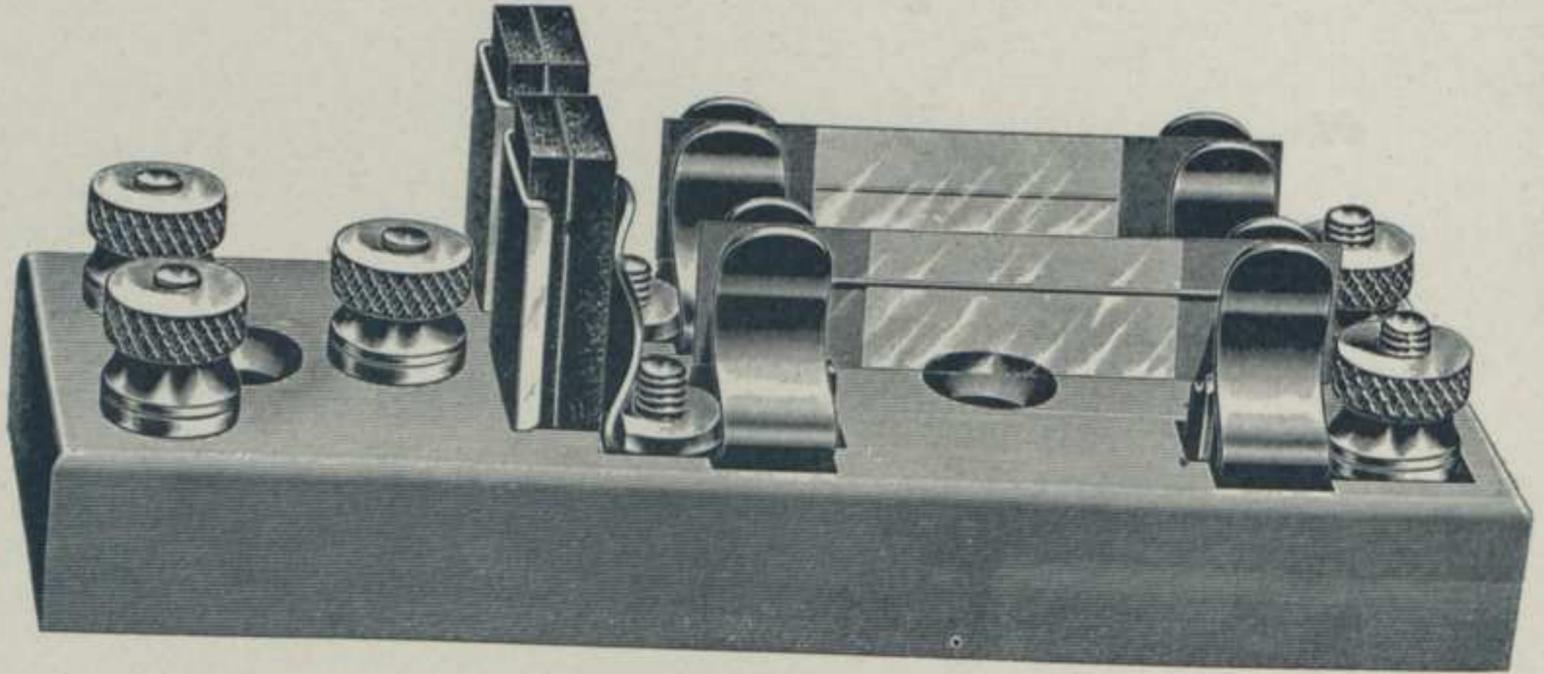


POLISHING DEPARTMENT

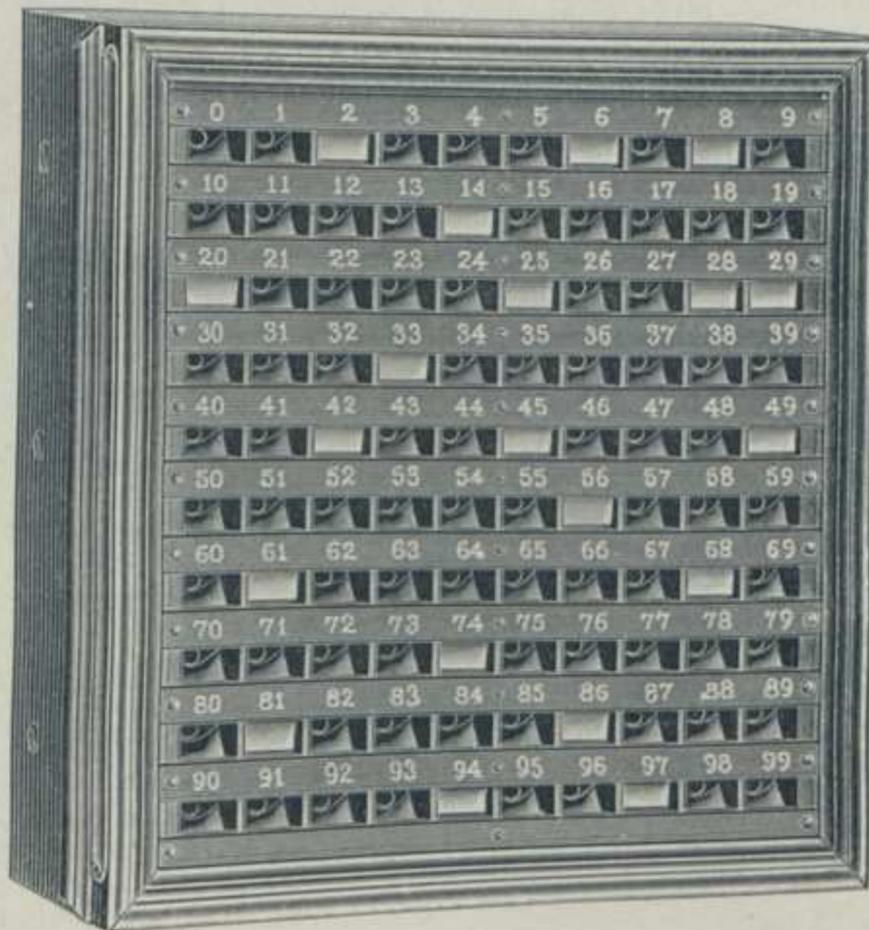
Adjustment and Repairs

In purchasing switchboards the question of repairs and adjustment should be carefully considered, as it is a very essential point. There are many switchboards in the market so faulty in design and construction that it is almost impossible to make repairs, or adjust them without taking them apart and throwing many lines out of service, which takes time and entails no little expense, and requires the services of a skilled mechanic most of the time to keep them in order. To guard against the trials and tribulations of those unfortunate enough to possess inferior boards, the Western Telephone Construction Company advise and suggest that parties before contracting for switchboards, carefully consider the merits of those manufactured by us, which are so designed and constructed and easy to operate, that they are subject to much less wear than any other boards made, consequently they must be more durable and require the least adjustment. The jacks, drops and coils are so assembled and the details of the circuit-changers and all other parts so ingeniously devised and easily accessible, that should any part get out of order by accident or otherwise, it can be easily reached and adjusted, or the injured part removed in a few moment's time without the services of an electrician or one skilled in the art. We claim to have the only switchboards on the market that will require so little attention, either for repairs or adjustment after they are installed ready for use.

WESTERN TELEPHONE CONSTRUCTION COMPANY



The H. C. D. Combined Carbon and Fuse Lightning Arrester.



Rubber Case containing one hundred jacks, drops and coils. This case is our regular No. 1 type and is also used in our Western Express and Multiple Switchboards.

Carbon Lightning Arrester

We show on opposite page our new H. C. D. combined carbon lightning arrester.

This arrester is the most efficient of any on the market, and affords perfect protection to telephones and switchboards. It is built upon lines practically and theoretically correct.

It will protect telephones and switchboards from damage by lightning discharges, and also from heavier currents which escape from electric light and power circuits. It is the most compact and perfect arrester made. Is the only combined fuse and carbon arrester with binding posts properly arranged for convenient connection both to terminals of line and instruments and to earth, whether used singly for protection of telephones or mounted on strips for use in connection with the switchboards, or for use in connection with combined lightning arrester, distributing and change board.

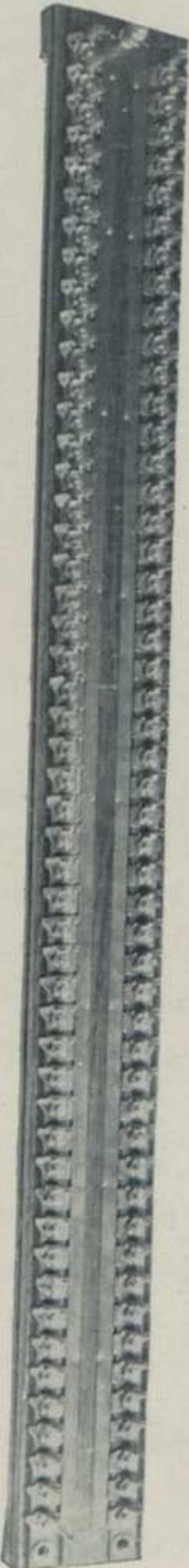
There are various types of carbon arresters, also fuse arresters, on the market; also a combined carbon fuse lightning arrester *but no combination of the two heretofore made is of proper electrical and mechanical design.* The fuse links are held in position by metallic clips and can be easily and quickly removed and replaced. Spark gap carbons are placed at right angles to the base, thus conserving space, are held firmly in fixed position and cannot slide out of place so as to make connection producing short circuit; and are readily removable for examination.

The arrangement of insulation between the plates is such that dust and dirt cannot form short circuit. The metal parts are mounted on a substantial porcelain base, all parts are indestructible, with the exception of the fuse links, and the cost of replacing these when burnt out is merely nominal.

The carbon lightning arrester used alone does not afford proper protection to telephones or switchboards from damage by electric currents; neither does a fuse arrester used alone. The combination of these two types must be employed to secure such immunity.

We are prepared to furnish these arresters in any quantity and solicit correspondence.

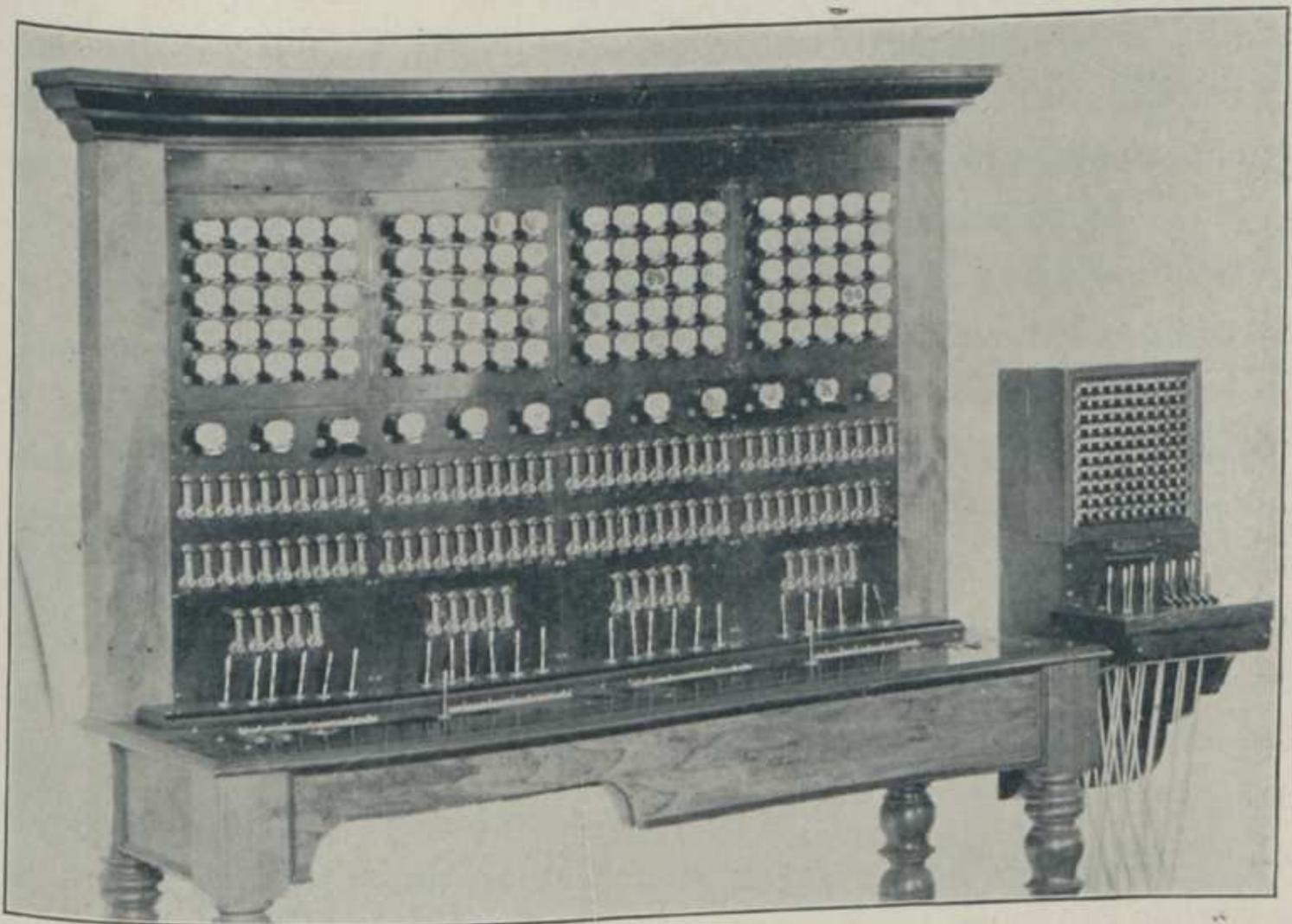
Lightning Arresters



We show on this page two styles of lightning arresters that we have used in the past which we still furnish where desired. In the construction of the one at the left we use the same strips, with lightning arresters and test clips that are used with the large combined board and as a matter of course the line wire connections are made in the same manner. These strips can be mounted on a frame work and arranged in a convenient form to accommodate the number of wires used in the exchange.

The one on the right is our old style lightning arrester and fusible cut-out which we can furnish to those who still prefer the binding post with screw connections; either style is provided with terminals for fifty lines, mounted on a single strip or board. Where a greater number is required these strips can be duplicated. We can also furnish these strips in any desired shorter length.





Two 100-drop Switchboards—our No. 1 to the right. The above cut shows our No. 1 and the "next best" Switchboard side by side. Ours occupies only about one-twelfth the space.

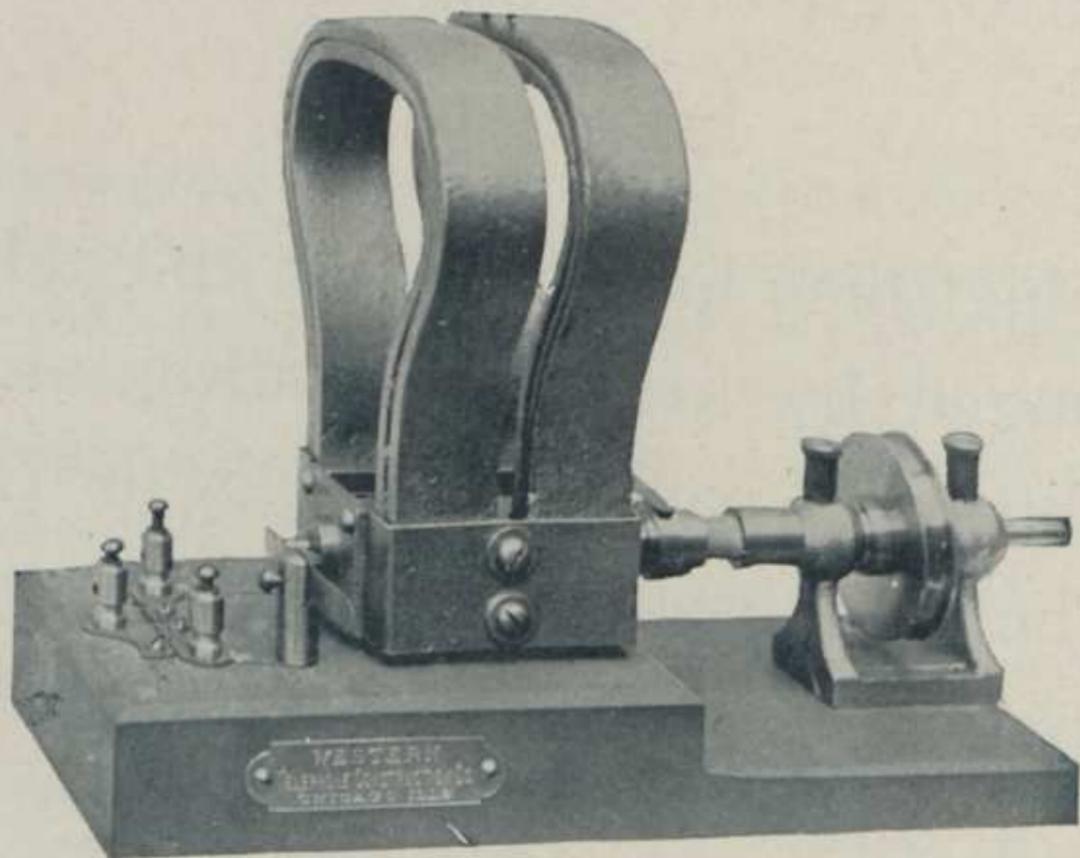
Comparisons

We show on page 69 cut of a switchboard of 100 drops, which is a fair sample of the boards made by some manufacturers. It will be seen that this board is cumbersome, and takes up a large amount of room. At the right of this board we show our No. 1 improved, which occupies only about one-twelfth the space. By a glance at this cut the reader, after having read the preceding pages, will readily understand the reason for the great popularity of our boards and also the claims made on page 18, that in a board containing 300 drops, the operator sitting at the middle section can easily reach the boards at her right or left and connect subscribers on any of the three boards. This is a feature not found in any other type on the market, and is only another proof of the fact that our boards are much more rapid and easy to operate than any other known. We have in our ware-rooms several boards manufactured by others that were found to be so unsatisfactory and unreliable and gave such poor service that it became necessary for the owners to have something better. After a full and fair investigation by them of all boards on the market, they contracted with us for a new equipment at prices in excess of those of other manufacturers, they realizing that an unsatisfactory board at any price is a poor investment. It is a universal rule of the owners of telephone exchanges that if they first put in a board because it is cheap and from which they usually get poor service, they will not make the same mistake a second time, and in contracting with us they appreciate the fact that they are getting boards that are superior in every respect to anything now known in the switchboard line.

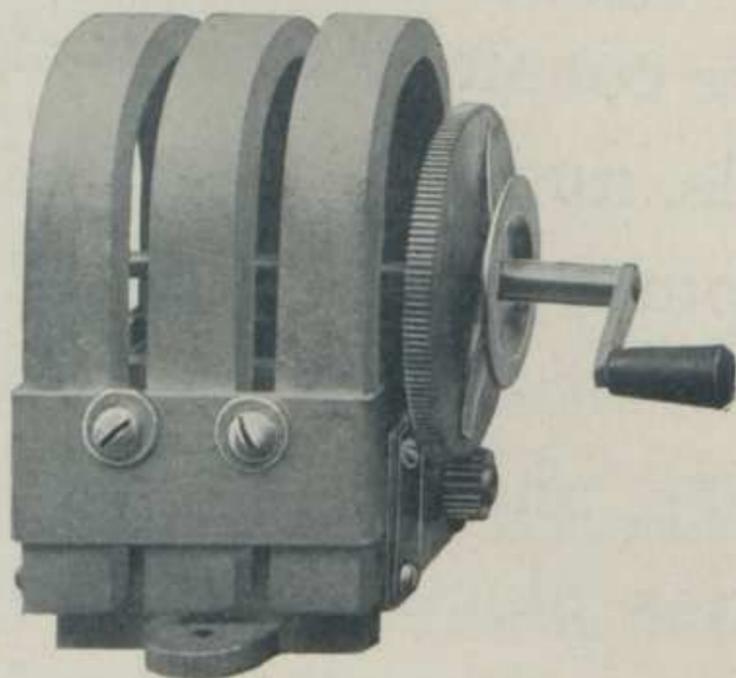
We invite all in want of switchboards to visit us and inspect these boards, together with those of our manufacture and draw their own conclusions in making comparisons.

Loss of Switchboards by Fire or Lightning

It sometimes happens that an exchange is damaged by fire or lightning and the switchboard is partly or wholly destroyed, it is then necessary to purchase a new equipment in whole or part, and it becomes a question of the shortest time for putting in new switchboards. To all those who meet with this misfortune, we desire to say that with our enlarged capacity and our superior manufacturing facilities, we have constantly in stock complete switchboards, and can furnish and install a new equipment on a rush order in the shortest time of any manufacturer in the United States, and at our regular prices. To all parties placing orders with us for quick delivery, we promise immediate attention and satisfactory results.



Power Generators for Switchboards, mounted on a slate base.



Bridging Generator—New Type.

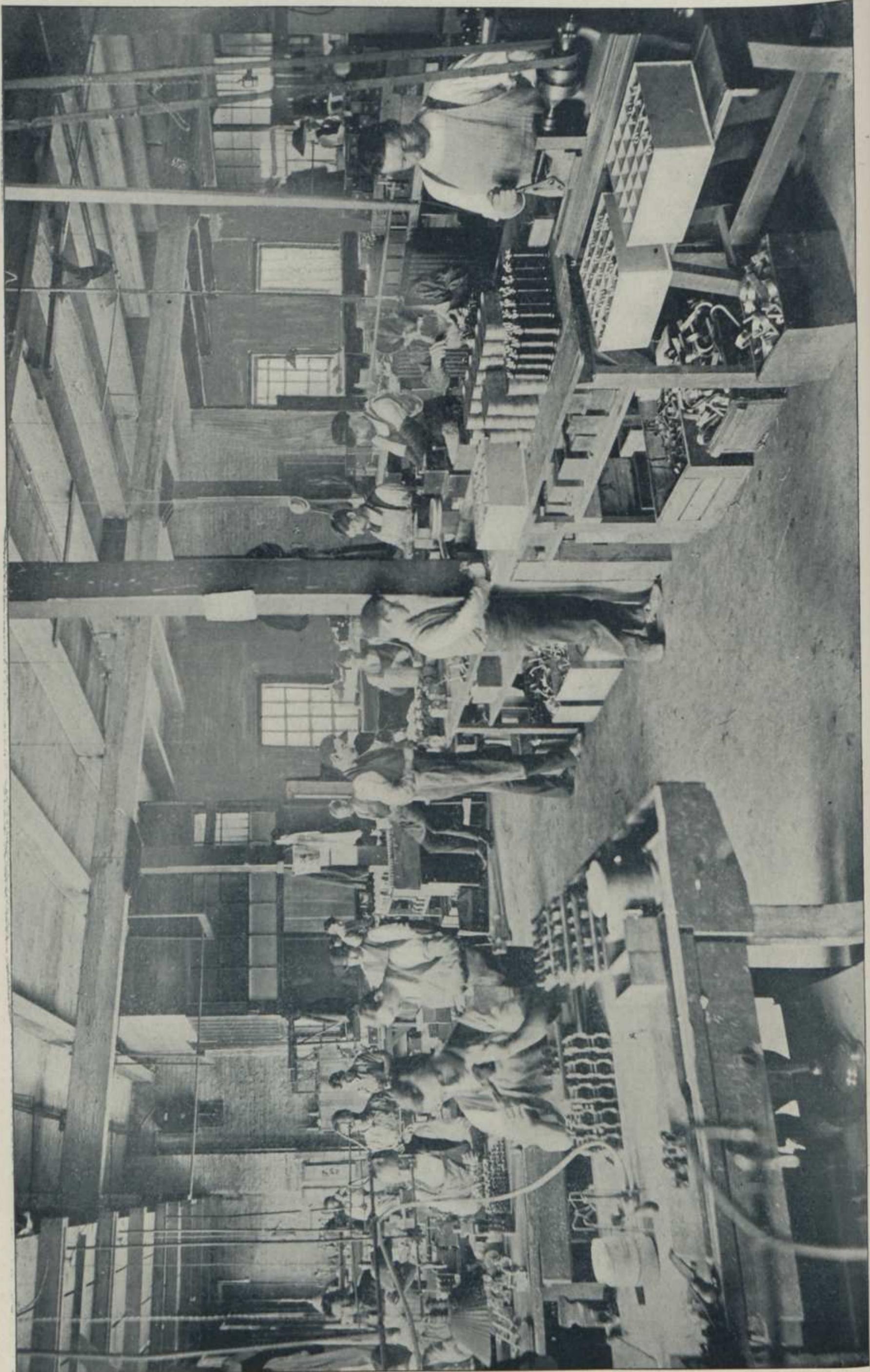
Power Generators

The cut on the opposite page shows our power generator, designed especially for central office switchboard work. This generator is mounted on a slate base, together with all necessary circuit terminals. It is provided with a pulley for receiving power by belt from some motor. The pulley shaft is connected to the armature shaft by a flexible coupling in such a manner that all undue jar and strain is taken off the latter, allowing the armature to run perfectly true and smooth and minimizing the wear to a large extent. Suitable oil cups are provided which greatly reduce the amount of attention required. These generators may be run by any source of power available. They are often put in the power station of some mill or electric plant and driven directly from the machinery there, the generator wires being led from that point to the telephone central station. Where electric power is available, however, a small electric motor in the telephone station is the most convenient means for running these generators. Where this is not available a water motor forms a very satisfactory source of power.

Hand Generators

We also show on opposite page a cut of our hand generator for switchboards and telephones. They have large compound magnets of best quality of magnetic steel, and will retain their magnetism indefinitely. The pole pieces and armature are of the softest grade of iron. The armatures are of large size, wound with ample amount of wire necessary to assure positive results. The automatic shunt is positive in action. Its operation requires no pushing of crank, and perfectly breaks the shunt circuit around the generator whenever crank is turned, and this insures certainty of operation of clearing-out drop when subscribers on lines connected ring off. This shunt is acknowledged to be by far the best in general use by experts who are thoroughly familiar with the various shunts now on the market.

Heavy cut gears are provided which run smoothly and will last a life time.



TELEPHONE MANUFACTURING DEPARTMENT

Telephones

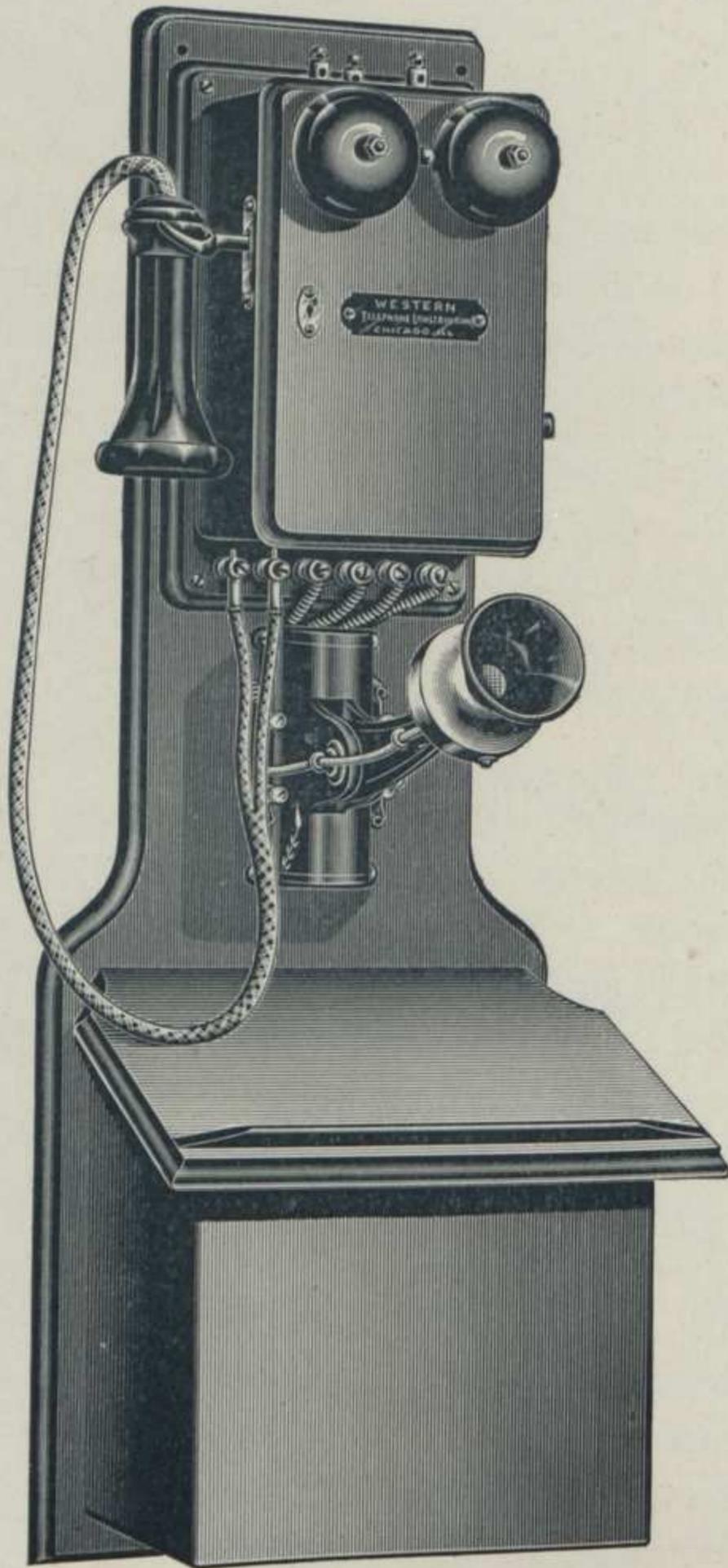
In the preceding pages we have described and shown in detail the switchboard for various kinds of service, together with lightning arresters, distributing and cross connecting boards, hand and power generators.

We now desire to call the attention of the reader to our telephones, with their several parts, which are described on the following pages. We manufacture everything shown and described in this catalogue, consequently are able to make prices as low as goods of our high grade and standard will permit.

It will be seen that we have added many new features to our telephones that make them today far superior to any others offered. *Our long experience in the business has taught us that the invention of today may become obsolete tomorrow by reason of something new, and it is a well known fact that the Western Telephone Construction Company is constantly on the alert and far in advance of any other company in adding new features of their own and purchasing improved devices of others when in their judgment they find anything that will make their apparatus more perfect.*

We manufacture many telephone specialties not shown or described in this catalogue, and should the reader desire to purchase anything in the line of telephone apparatus not found in these pages, we shall be pleased if they will communicate with us and make known their wishes, for we can furnish them with anything they want in this line whether it is shown in this catalogue or not.

To all those interested in the success of the independent telephone movement we wish to say that a review of the history of the anti-Bell telephone business in this country shows that new and improved devices have been provided by the independent telephone manufacturers in rapid succession since the inauguration of the movement, and that the most perfect appliances procurable for use by the



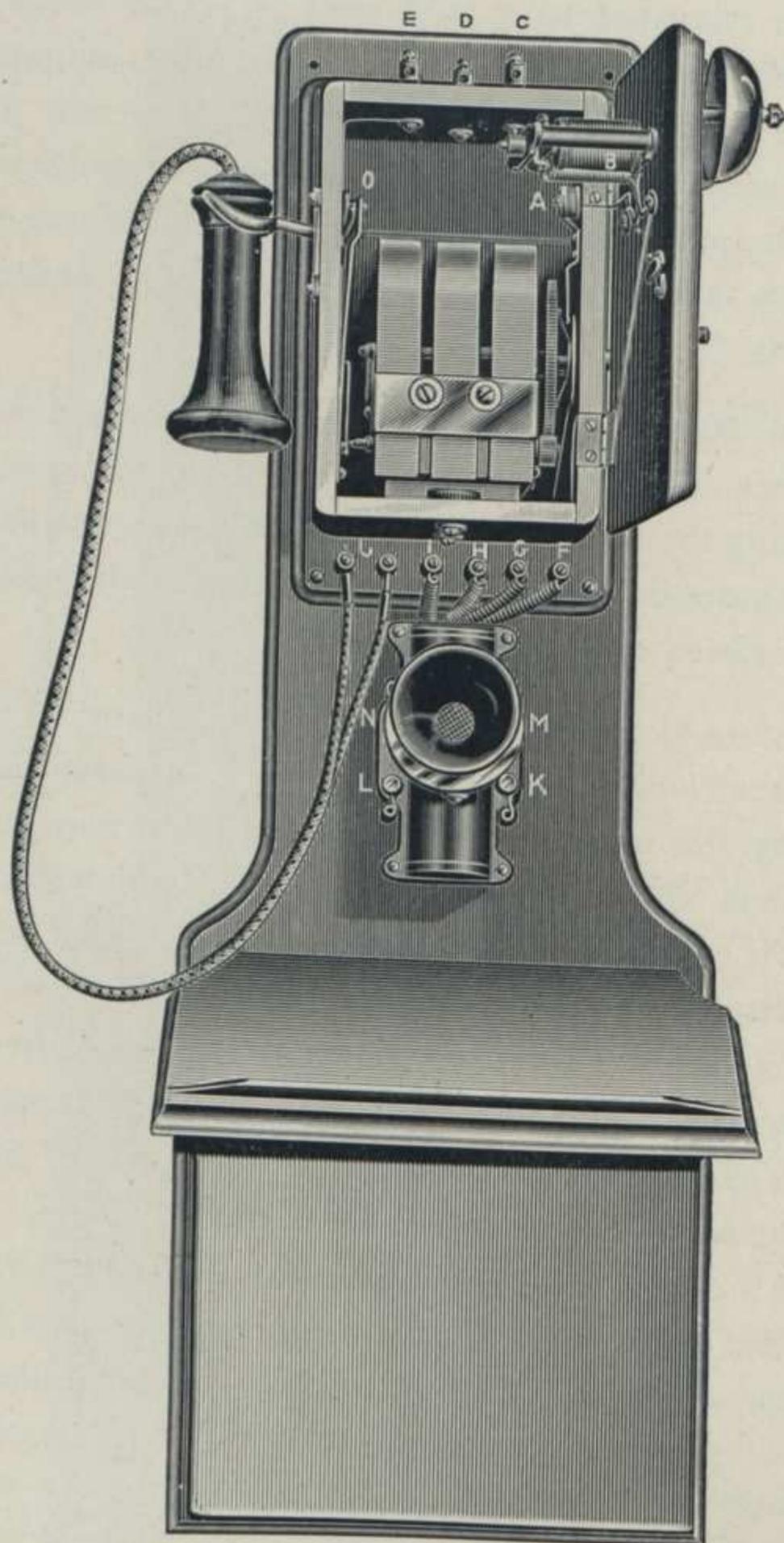
This cut shows our new No. 2 Western Express Long Distance Telephone with bridging magneto bell, fitted with our No. 7 adjustable arm transmitter of solid back type, with induction coil mounted in base of same, and our new "Keelyn" Receiver devoid of exposed metallic contacts and binding posts. (See pages 88 to 93 for description of transmitter and receiver.) Has outside binding posts for receiver cord tips, and primary and secondary circuits. Is guaranteed to ring well through 15,000 ohms resistance and can be furnished to ring through any resistance desired.

independent exchange companies at any period in the past have been, as a rule, soon relegated to a back seat by those better adapted to meet requirements of perfect service, until now, apparatus manufactured by these companies is of such efficiency and perfection of electrical and mechanical details that the service rendered, owing to the use of such appliances, enables them to compete successfully with the best service that the American Bell Company's licensees can afford to their patrons.

The development of new devices has been so rapid that buyers at the present time must, in justice to themselves, endeavor to become posted regarding the latest and most desirable types, before adopting certain of the more important devices, upon which largely depend the successful operation of their plants.

In the future it will be the constant endeavor of the Western Telephone Construction Company to evolve, arrange and construct for its patrons the most commercially desirable apparatus, and to provide for them appliances, the adoption of which will insure the success of their enterprises, as it has been in the past, and as an example of what may be expected in this line, *we have only to call attention to the fact that we have furnished equipment for a far larger number of successful independent exchange systems and long distance and territorial lines generally, than any of our competitors, and have equipped the greatest number of comparatively large central offices, and provided the latter with a class of high grade apparatus, including multiple switchboards, combined lightning arresters, distributing and change boards, monitor's boards and all the auxiliaries for a model up-to-date central office, in the supplying of which equipment we have today no real competitor in the field.* It naturally follows that the concern having the best facilities for turning out perfect goods will place the best line of goods on the market. This company certainly has the most superior facilities for accomplishing such results, being equipped in all departments with the latest improved machinery, with each department under the supervision of the most competent heads, whose endeavor it is to make improvements, eliminate defects and add to efficiency, durability and other desirable qualities of their product, to the greatest extent.

WESTERN TELEPHONE CONSTRUCTION COMPANY



Cut shows our new No. 2 Western Express Long Distance Telephone with magneto bell box open, showing shunt coil at A, which, with high wound ringer coils shown at B, is used for bridging system. By removing this coil and replacing it with one wound to eighty ohms resistance makes a telephone for series system. This is the only telephone on the market that can be changed from bridging to series, or vice versa, thus avoiding the purchase of a new telephone when it is desired to change to either bridging or series. The ringer coils in the telephone shown in the cut are wound to 1,200 ohms which we have found to be the most practical resistance for winding of bridging ringers for general use.

We can furnish these telephones, for either bridging or series, wound to any resistance desired. This is the most complete and perfect telephone ever designed. Patents granted and applied for by us for making a telephone for bridging or series from one instrument secures to us the only one containing this important feature ever built.

Something New in Telephones

THE MOST PERFECT EVER DESIGNED

We desire to call special attention to our new *Western "Express" No. 2 Long Distance Telephone, for bridging or series.*

We show on opposite page a cut of our Western Express No. 2 Long Distance Telephone, with magneto bell box open, showing ringer coils generator, switch and shunt coil A and its connections. The cut on page 76 shows perspective view of same phone with magneto bell box closed, showing our new "Keelyn" receiver and our Western No. 7 Long Distance Adjustable Arm Transmitter mounted thereon.

The cut on page 82 shows our No. 1 Western Express Telephone equipped with the same transmitter, receiver, generator and switch with ringer coils wound for series.

We can furnish the Western Express Telephone for series with or without outside binding posts as desired.

These telephones when wired for bridging are the only ones ever built that can be changed from bridging to series in a few moments without purchasing a new telephone.

In changing, for instance, from bridging to series, all that is necessary to do is to remove shunt coil "A" and change ringer coils shown at "B" from high wound to the low wound or series style; in changing from series to bridging, to substitute for the series coils, high wound coils and to introduce the shunt coil "A" together with its connecting spring contact representing one terminal of same and connect the other terminal to binding-post "C."

Special Features

Quadripolar Ringer Magnets; our Celebrated Western No. 7 Adjustable Arm Transmitter; New Type of Generator; the most efficient Armature and Shunt ever used; Wide Cut Gears; Platinum Contact Hook Switch; Special Long Distance Type Induction Coil; High-Grade Batteries; New Style Adjustable Bi-Polar Receiver, devoid of exposed metal parts; Cabinet Work of Finest Finish; can be changed from series to bridged, or from bridged to series type in a few minutes.

The series and bridging instruments are similar in general appearance. The wiring circuits are the same in both types and arrangement of parts is identical with the exception that a resistance coil shown at "A" in cut on page 78 is provided in the bridging telephone. In both instruments the generator is shunted out of the line circuit when not in operation.

In the series telephone the regular "Watson" wiring is employed. In the bridging telephone the "Watson" wiring is also employed, the high wound ringers being bridged in the usual manner of all bridging bell telephones (between binding-posts "E" and "C") when receiver is resting on switch hook and generator is not in operation. Thus, the connections, when signal is received, are, of course, practically the same as those of all other bridging bell telephones. However, in the bridging instruments, the coil "A" ordinarily wound to resistance of 100 ohms is introduced, one terminal of this coil connected with binding-post "C" and the other terminal to a spring contact open except when generator is in operation. When generator is operated the shunt circuit through same is broken; one pole is brought in contact with spring connected with coil "A;" the other pole of generator being connected with binding-post "E" and the

bridging ringer magnets being bridged between binding-posts "C" and "E," the ringer magnets "B" and coil "A" are in parallel. Owing to the arrangement of circuits as above described, and connecting of said resistance coil in parallel with ringer magnets, ninety-five per cent of the efficiency of the generator passing out onto line is utilized in ringing bells of distant stations, five per cent only taking a path through the bridging ringers, this amount, however, being sufficient to ring the local bells when signaling. This arrangement is something new in telephone construction and ninety-five per cent of the current generated is utilized for ringing bells of distant stations, whereas with all other types of bridging bell telephones in use, heretofore devised, a loss of approximately thirty per cent of generator power, and hence, only about seventy per cent of the output of generator is utilized in ringing bells at outlying stations, the loss of thirty per cent being due to the fact that this proportion takes the path or circuit through the local ringer magnets, thus reducing the effective output of the generator to this extent.

These are the only telephones ever built that can be changed from bridging to series, or *vice versa* in a few minutes. The desirability of accomplishing this result will be appreciated by users generally.

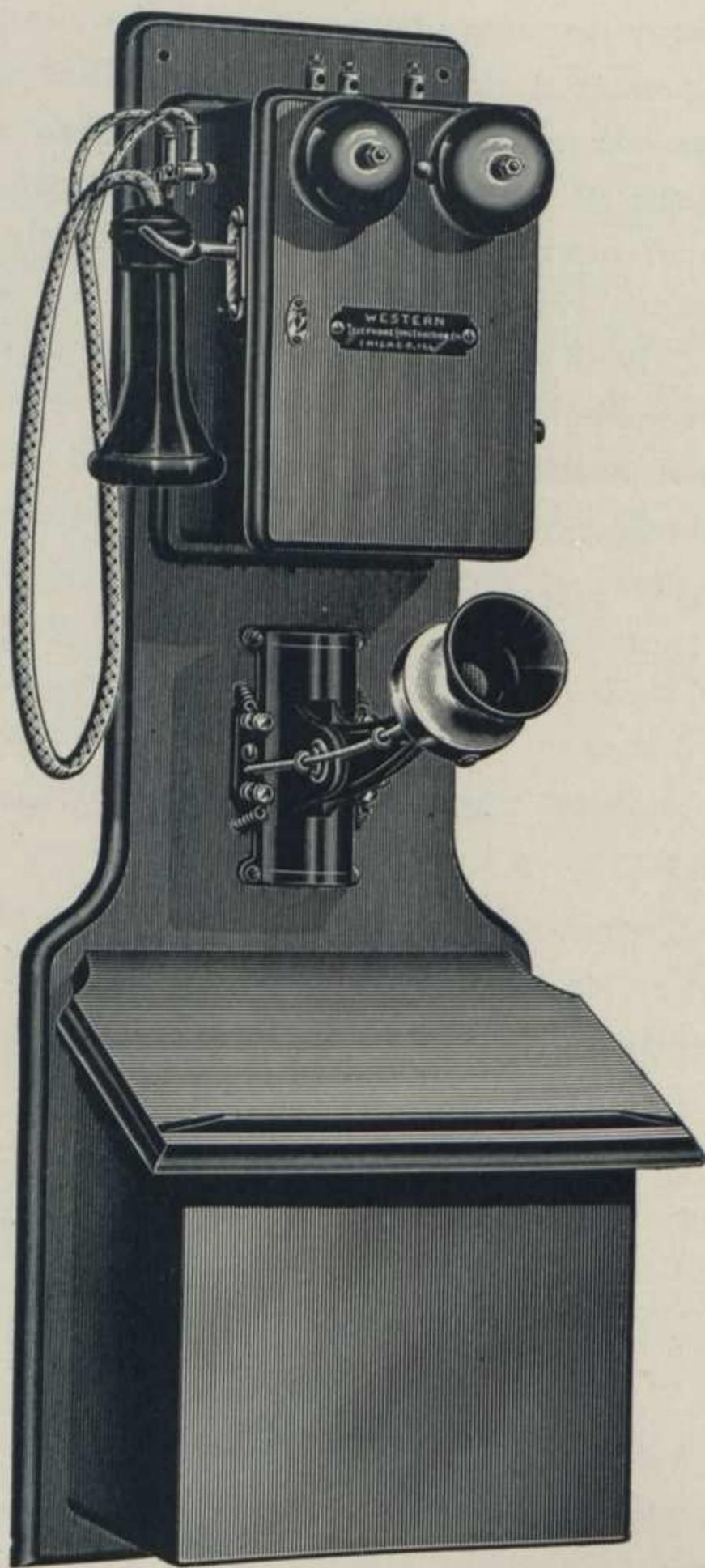
For series service, armature wound for use with series or low resistance ringers must be employed, and for bridging work, armature wound for use in connection with bridging bells must be used. The length of the bridging ringer magnets exceeds those of the series type, but the bell boxes admit of the use of either type at will.

The following is a general description of details of construction of our Express telephones :

GENERATORS—

The generators have large three-bar magnets of best quality of magnet steel; new type of armature with ample wire space, wound with a sufficient amount of wire to assure proper results. The series generator is wound to ring through approximately 15,000 ohms resistance operated at moderate speed and has proper quantity output. The bridging generator has very heavy quantity output and high

WESTERN TELEPHONE CONSTRUCTION COMPANY



The above cut shows our new No. 1 Western Express Telephone with series magneto bell. This telephone is fitted with the same generator, transmitter and receiver that is used on our bridging bell telephones. This can be changed to a bridging telephone by the owner by using a higher wound ringer coils and putting in a shunt coil shown at A in cut on page 78. We can furnish these telephones with or without outside binding posts as desired. We guarantee them to ring through 15,000 ohms and can furnish them of special winding to ring through any resistance wanted.

pressure, as well, adapting it to ring a maximum number of bridging bells on long and high resistance lines. The automatic shunt is positive in action, requiring no push in of crank, and perfectly breaks the shunt circuit around generator whenever crank is turned. This shunt is acknowledged by far the best in general use. Heavy cut gears are provided which run smoothly and will last indefinitely.

CALL BELLS—

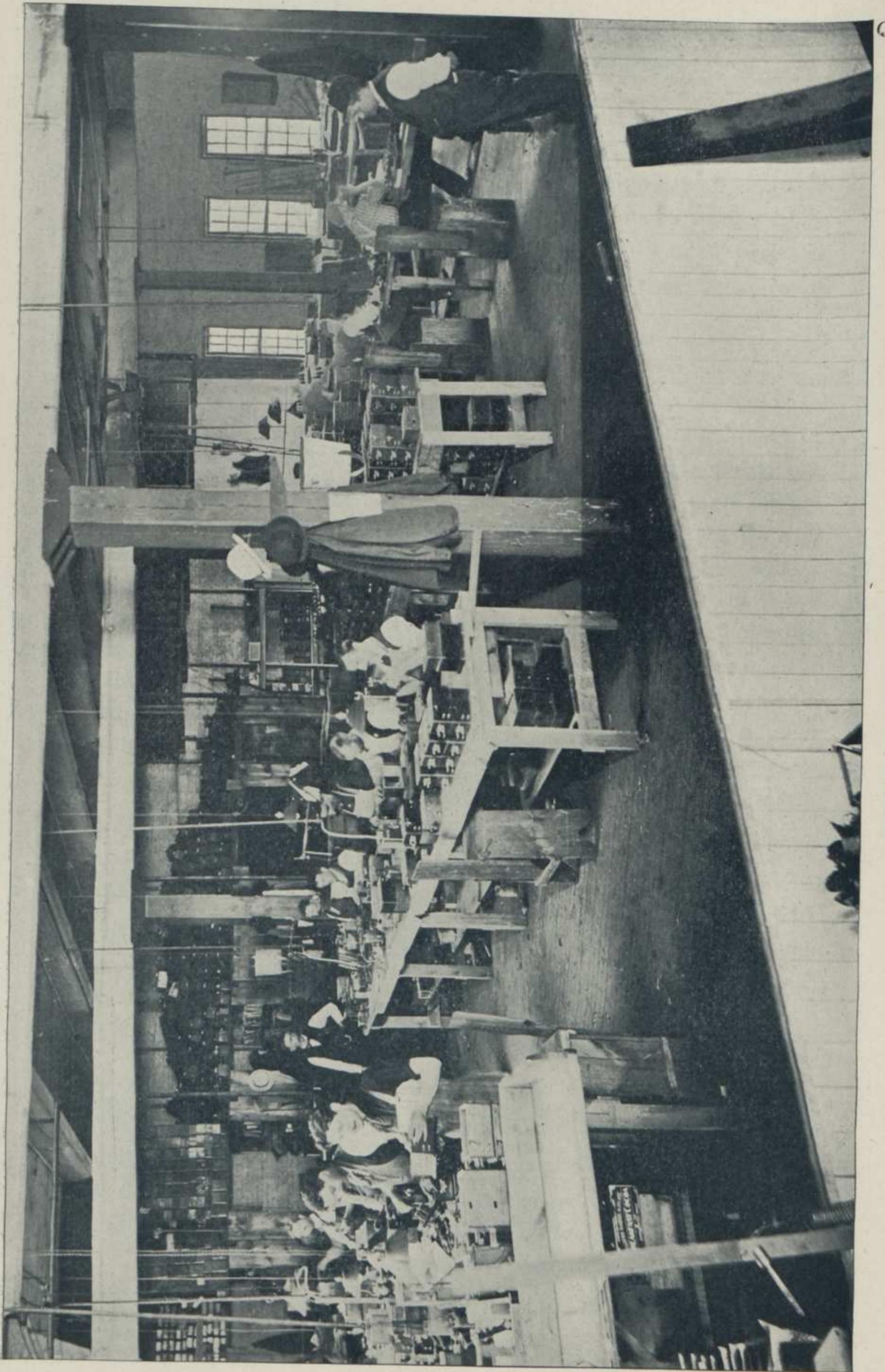
These have quadripolar ringer magnets, the action of which is such that the permanent magnetic plane is co-incident with the electromagnetic plane of the bobbins and in its operation it tends to strengthen the permanent magnet. The permanent magnets are of special style and very powerful. These ringers have highest coefficient of self induction of any on the market by a considerable margin; are sensitively and reliably pivoted and represent the highest type of telephone ringers devised up to the present time. The series ringers are wound to a resistance of 80 ohms, and the bridging ringers to a resistance of 1,200 ohms, the most practical winding for general use. The cores are of best annealed Swedish iron, and the permanent magnets of the best magnetic steel. The trunion screws for the armature are provided with locking nuts to prevent their working loose, and the armature is so arranged as to prevent its sticking against the pole piece.

HOOK SWITCH—

The automatic hook switch is provided with long flexible springs, platinum contact points, and anti-friction shoe is provided for the prevention of sticking between the hook arm and the main spring. The main spring is of the finest quality of spring brass, and the circuit springs of best German silver. All springs are of sufficient length to insure them against breaking or weakening after long use.

The bell box is provided with outside binding-posts for connection of primary and secondary transmitter circuits and receiver cord tips.

The wiring and slotting of the bells is much the neatest of any on the market, as no wires extend through the back of the bell box and battery box as well, and as bell box is fastened to back-board from the outside, it is readily removable.



ASSEMBLING DEPARTMENT

RECEIVER AND TRANSMITTER—

See pages 88 to 93 for description of receiver and transmitter.

INDUCTION COIL—

The induction coil is of the new long distance type, having both primary and secondary windings of the best silk insulated wire. The core is of the best annealed Swedish iron wire, and the spool is made of fibre throughout. The secondary coil is wound with two parallel silk-insulated wires to a resistance which best adapts them to working successfully with the Western Giant Long Distance Transmitter.

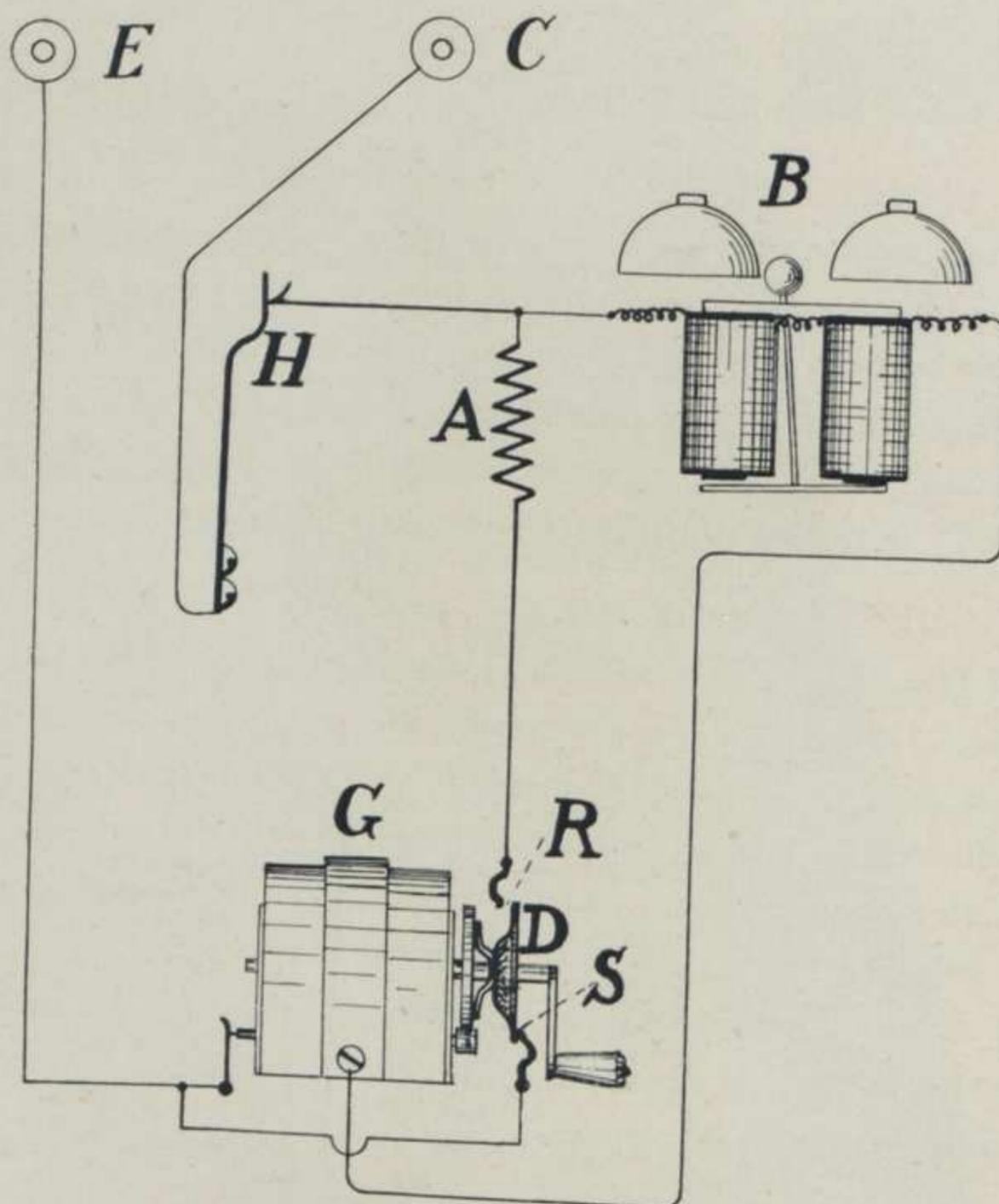
BATTERIES—

The two cells of battery are of the regular Western Giant type, consisting of a carbon cylinder containing powdered carbon and manganese in proper proportions to serve as an efficient depolizer. The zinc element is cylindrical in form and surrounds the carbon element, but it is so arranged that a short-circuit between the two is impossible. A solution of sal ammoniac forms the electrolite. The glass jars are of the best glass, and the whole cell when assembled is so arranged as to prevent creeping of the salts and reduce evaporation to a minimum.

CABINET WORK—

Stock telephones are carried in woodwork of walnut and quartered oak of finest French finish. However, we are prepared to furnish the instruments in birdseye maple, cherry, sycamore, birch or mahogany.

The battery boxes are made in one solid piece of substantial construction and will not warp. A neat iron shelf is provided for supporting the batteries.



WESTERN EXPRESS No. 2 BRIDGING BELL TELEPHONE

Above we show a diagram of the circuits of our No. 2 Western Express Bridging Bell Telephone shown on pages 76 and 78.

This telephone can be changed from bridging to series, and vice versa, as follows: In changing from bridging to series, remove the shunt coil A and change the ringer coils B, substituting the low wound series coils. For series service, armature wound for use with series or low resistance bells to be employed; for bridging work, armature wound for use in connection with bridging bells to be used.

OPERATION—

Note Diagram of Connections: When generator is operated, the disk D automatically breaks the shunt circuit at S and makes contact with the spring R, thus causing the electric current to flow through the coil A, contact H and to line through the binding post C. The disk D and generator G are in electrical connection; therefore, while operating the generator, the coil A and ringer magnets B each conduct a certain amount of the current. In practice the coil A conducts about ninety-five per cent and the ringer magnets B five per cent, which latter quantity is just enough to gently sound the local bells.

It is well known that with the ordinary style of multiple bell construction, about thirty per cent of the current generated is wasted through the local bell magnets. We waste but five per cent for sounding the local bells; therefore, our form of connection gives us a clear gain of twenty-five per cent efficiency over any other make of Bridging Bell telephones on the market, ninety-five per cent of the current generated being utilized in ringing bells at distant stations. This telephone is free from infringements of patents on Bridging Bell telephones controlled by the American Bell Company or others.

It is covered by patents, issued and applied for, owned by us.



The Induction Coil is made of the new long distance type, having both primary and secondary windings of the best silk insulated wire. The core is of the best annealed Swedish iron wires and the spool is made of fibre throughout. The secondary coil is wound with two parallel silk-insulated wires to a resistance which best adapts them to work successfully with the Western Giant Long Distance Transmitter.



Above cut shows our new "Keelyn" Receiver, full size.

“Keelyn” System Telephone Receiver

On pages 88 and 90 we show a perspective and sectional view of the “Keelyn” System Telephone Receiver, which is undoubtedly the most perfect receiver ever placed on the market.

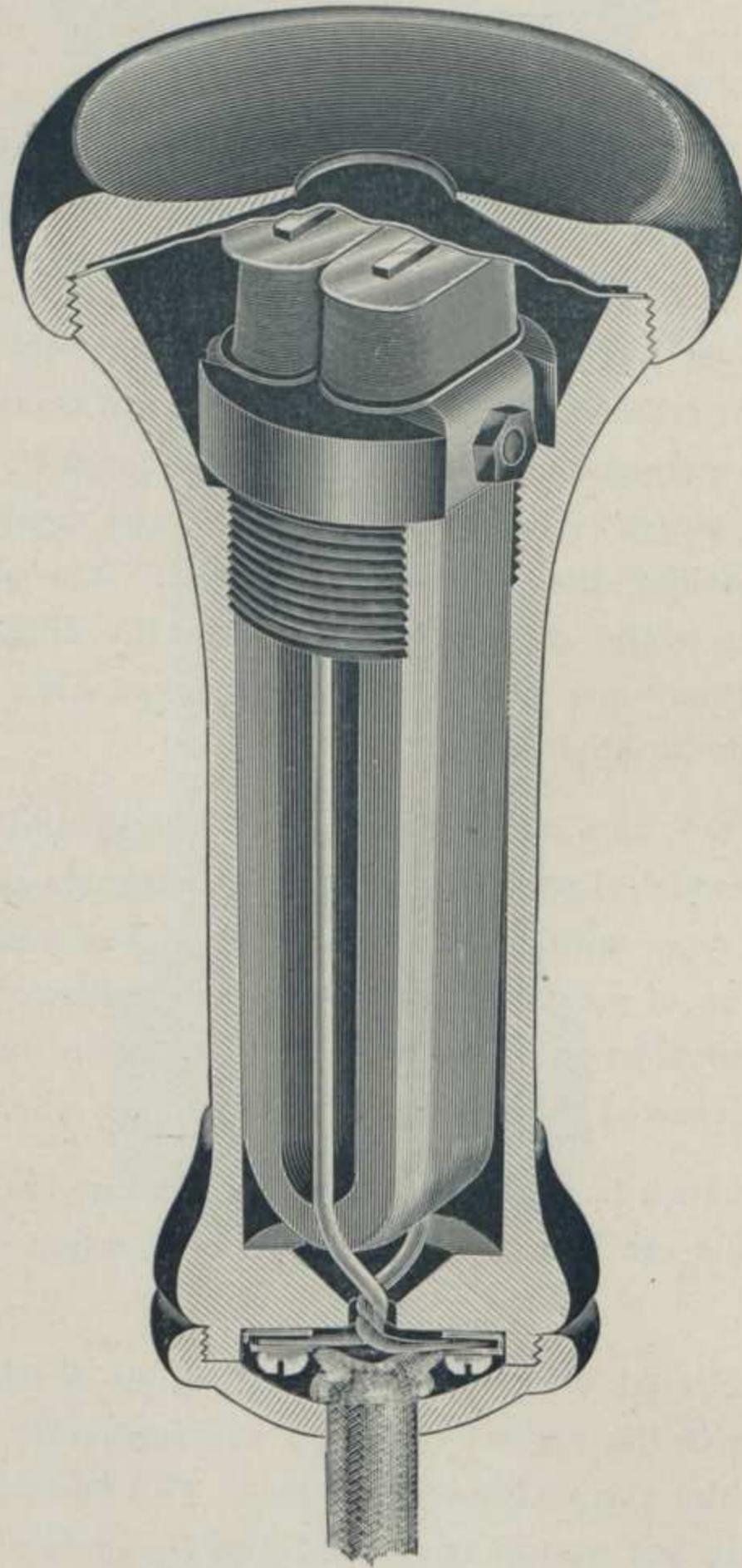
This receiver has compound permanent magnets built up from the finest imported magnetic steel. The coils are wound with silk insulated wire to a resistance of 100 ohms. The magnets are adjustable longitudinally toward or from the diaphragm, and means are provided for positively locking them when once adjusted. The point of support of the magnets in the shell is made close to the diaphragm, in order that the adjustment may not be affected by expansion or contraction of the shell, due to heat or cold.

It is but five and one-half inches in length and its whole construction is a model of workmanship. The magnets are of the horse shoe bi-polar type, with coils mounted at end of each pole and enclosed in a case of *pure hard rubber—no composition of any kind being used in the construction of the shell.* The cap on the receiving end is threaded and screwed to the shell in the ordinary way.

As will be seen from the cut there are no outside binding posts for attaching the receiver cords, the cord connection being made on the inside.

In the sectional view will be seen leading-in wires connecting magnet coils with the screws to which the receiver cord is fastened, which render the connections complete. The fine wires with which the magnet coils are wound are soldered to the ends of the leading-in wires.

It is often found that in telephone receivers of the ordinary type much trouble is experienced in keeping the adjustment permanent. This is due to the fact that the magnet is rigidly secured to the



Interior view of our new "Keelyn" Receiver showing inside construction.

receiver shell at a point at considerable distance from the diaphragm. As steel and hard rubber differ very widely as to their co-efficiency of expansion under change of temperature it follows that with such changes the distance between the diaphragm and pole pieces is altered, owing to the unequal expansion or contraction of steel and hard rubber. A sudden change in temperature will thus often make an instrument inoperative.

In the receiver shown in cut this trouble is entirely obviated, as the point at which the magnet is secured to the shell is so close to the diaphragm that the difference in expansion between the shell and the magnet can not be noticed.

There is nothing metallic on the outside of the receiver, all metal of every kind being enclosed in the rubber shell, consequently, there is absolutely no possibility of receiving a shock in handling this receiver.

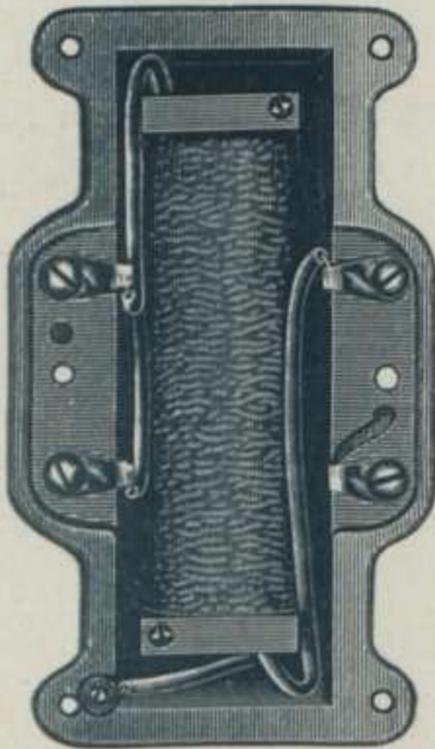
This is the only telephone receiver on the market that can be purchased by the Independent Companies that is devoid of all metal and metallic contacts on the outside. The magnets are provided with segmental block, which is screw-threaded so as to engage a thread on the inner surface of the shell, which holds it in adjustment, and is so constructed that it keeps the magnets from turning and secures them in a permanent position. The whole construction, while simple, is the most complete of anything of its kind ever offered for sale.

Taken as a whole, it is the most complete and absolutely the best telephone receiver that can be purchased.

We will quote special prices on any quantity.



Cut shows No. 7 Western Adjustable Arm Transmitter.



Cut shows Induction Coil mounted in base of No. 7 Transmitter Arm.

Solid back type. Simplest and best construction. The most perfect combined long distance and exchange Transmitter on the market by a wide margin.

Western No. 7 Adjustable Arm Transmitter

On opposite page we show cuts of our Western No. 7 Adjustable Long Distance Arm Transmitter, showing induction coil mounted in the base of the transmitter arm. The transmitter movement is of the solid back type, mounted in a fine cast nickeled box with hard rubber back; will not pack or deteriorate after long term of use. It is of the most improved granular carbon type, having a carbon diaphragm, carbon back-block and granules of polished carbon.

The diaphragm, back-blocks and granules are carefully selected to mutually combine to form a transmitter of the greatest efficiency. The rocker arm is of iron, polished, and then handsomely enameled and decorated in gilt. Each coat of enamel is thoroughly baked on so as to form a finish that is not only handsome but thoroughly durable. A hinge connection is provided between the arm and base, which allows a practical adjustment of the transmitter to accommodate it for persons of various heights.

We are placing these on the market as the most highly efficient long distance adjustable arm transmitter in use, combining simplicity, durability, ease of access for the purpose of inspection and repairs and perfection in details.

For volume of voice transmission and *distinctness of articulation*, it has no equal.

The induction coil, which is of special winding, is mounted in base of adjustable arm in a thorough workmanlike manner. Screw and washer terminals are provided and soldered connections.

Four insulated binding posts are mounted in base of arm for attachment of primary and secondary circuits. The construction of the

coil is such that used in combination with the transmitter the greatest volume and sensitiveness is secured with a minimum amount of battery power.

The length of the base of the arm is $5\frac{1}{4}$ inches, allowing its being mounted in any back board between *magneto bell and battery box*.

In appearance the instrument is the handsomest, neatest and most symmetrical of any made.

The above claims are made in the light of exhaustive experiments and after comparative tests of the best transmitters and coils now in general use.

We are placing the No. 7 transmitter on the market strictly on its merits; are making the price low in view of its high grade construction in order to enable exchange companies and operators of toll lines to adopt same and discard inferior makes.

To all who desire to increase the efficiency of their service, add to the earning capacity, popularity and value of their plant, we recommend the adoption of this outfit, the use of which will enable every user to transmit over long high resistance lines in a highly satisfactory manner.

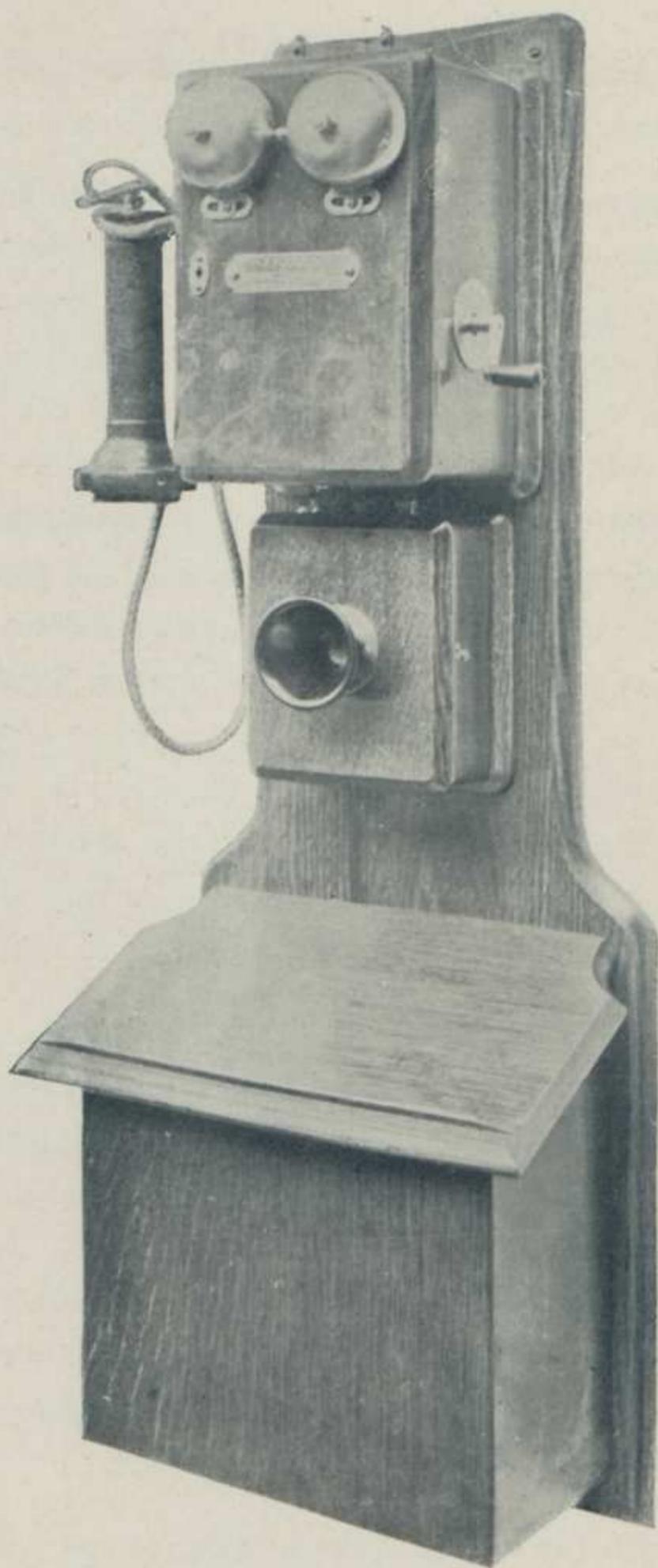
We guarantee the instrument as represented the most efficient of any made and invite comparison. Prices quoted on any quantities upon application.

Western "Giant A" Telephone

Our "Western Giant A," shown on page 96, is a fine exchange instrument for all-around service. It is an instrument we highly recommend for long or short distance work. It has been proven by actual tests to operate with entire satisfaction on the circuits between Philadelphia and Chicago. The generator is of the most approved type, and is provided with an automatic device which closes a shunt or path of no resistance around the armature when at rest. On turning the crank, this shunt is automatically broken, thus allowing the generator current to pass to line. This device is a fair example of the improvements in detail we are incorporating into our apparatus, and so great is its perfection that we have yet to hear of any single case where any trouble has been directly traced to it. To those who are acquainted with the shunt breaking apparatus generally placed on the market by other concerns, this fact should be very significant. The call bells are of such simple construction as to render their adjustment easy and permanent.

The hook switch on this instrument has been recently remodeled by us and is platinum-pointed at every contact, thus insuring perfect immunity from cut-outs. This feature is of special importance where the instrument is to be used in damp localities. The receiver is of our bi-polar type, which has proved by long use to be the most efficient and economic form on the American market. It is so designed that it does not have to be readjusted with every change of temperature. One needs but to see it to appreciate its merits.

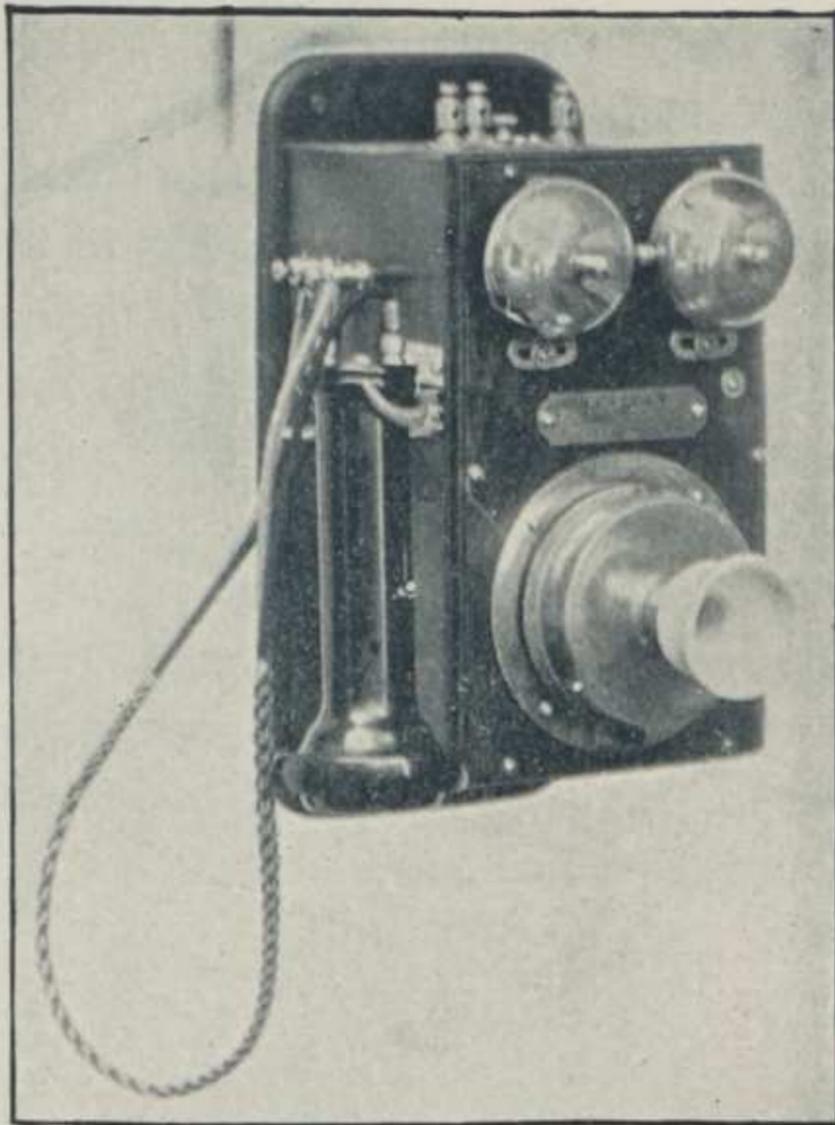
The transmitter is of our Western Giant type. Carbon granules held between carbon disks in a unique manner to prevent deterioration or trouble, form the electrodes of the microphone. These parts are held in a cast shell, fitted with a threaded projection, which passes through the lid of the box, and to which is screwed a handsome



WESTERN GIANT A.

mouthpiece, so that it can be used as an agitator, thus keeping the granules in a free state. Its parts are all of the simplest character consistent with high efficiency and durability.

With this instrument two cells of Western Giant battery are provided. The battery box is of recent design and its lid does not work loose. The entire cabinet of the instrument is handsome in design and is furnished in selected oak or walnut with nickel-plated trimmings. This instrument and the Western Express, Nos. 1 and 2, are the most efficient type of telephones known. They are constructed with the highest grade of materials, and are thoroughly first class mechanically and electrically. The many hundreds of public exchanges where these have been installed have given such improved results as to drive the Bell system out of competition. They have come out victorious in every instance.



NO. 1 DYNAMIC TELEPHONE



WESTERN GIANT B.

Our "Western Giant B" is specially designed for those who desire a first-class instrument at a lower figure than that charged for our Western Express Telephones. As is shown, all the working parts of the instrument are contained in the generator box, the battery being kept in a closet or on a shelf near the instrument. This instrument is first-class in all its details, and for factory use where but a limited space is available, it cannot be surpassed.

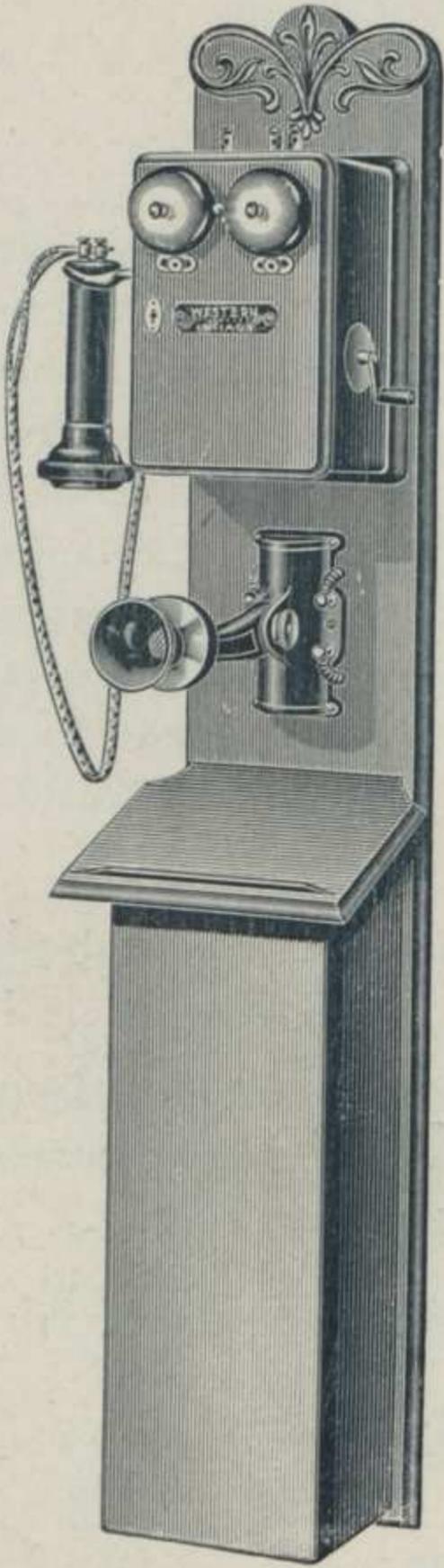
Dynamic Telephones

In the last few years battery telephones have largely superseded this form of instrument on account of their greater power in overcoming long distances. In view of these improvements in the battery telephone, we no longer recommend the dynamic for use on long lines, or on lines having more than two instruments; but for short distance private work it will give good satisfaction. There is not a poor point in its construction, either mechanically or electrically. From the standpoint of convenience it is unsurpassed, there being no battery, no primary and secondary coils, no carbon contacts or other variable resistance to get out of order and make expense, trouble and annoyance for the user.

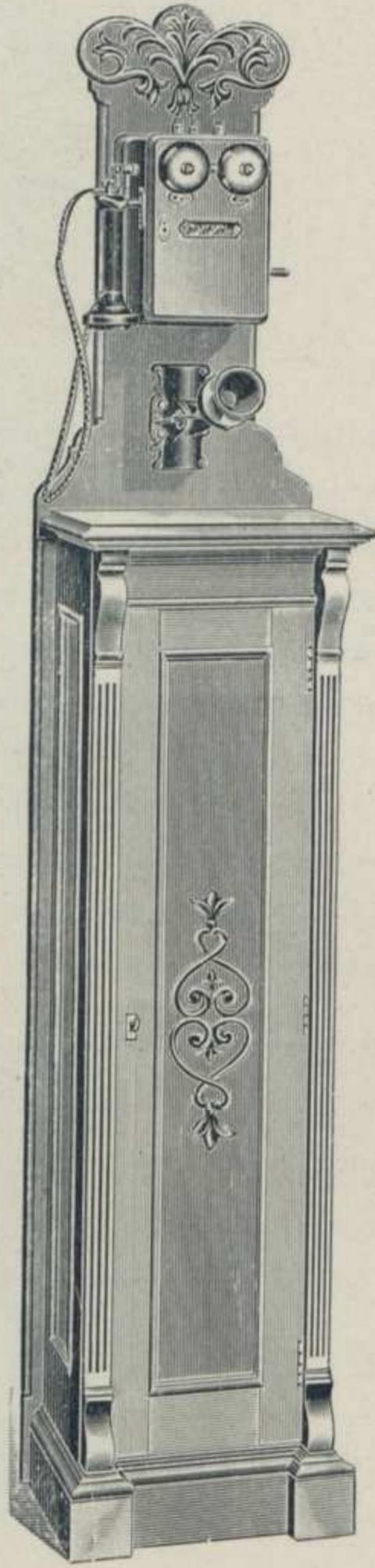
Our No. 1 Dynamic telephone is made under several patents owned or controlled by this company.

This outfit includes: Magneto generator, call bell, lightning arrester, switch, magneto transmitter, magneto receiver, connecting cord, polished hardwood case and nickel-plated trimmings.

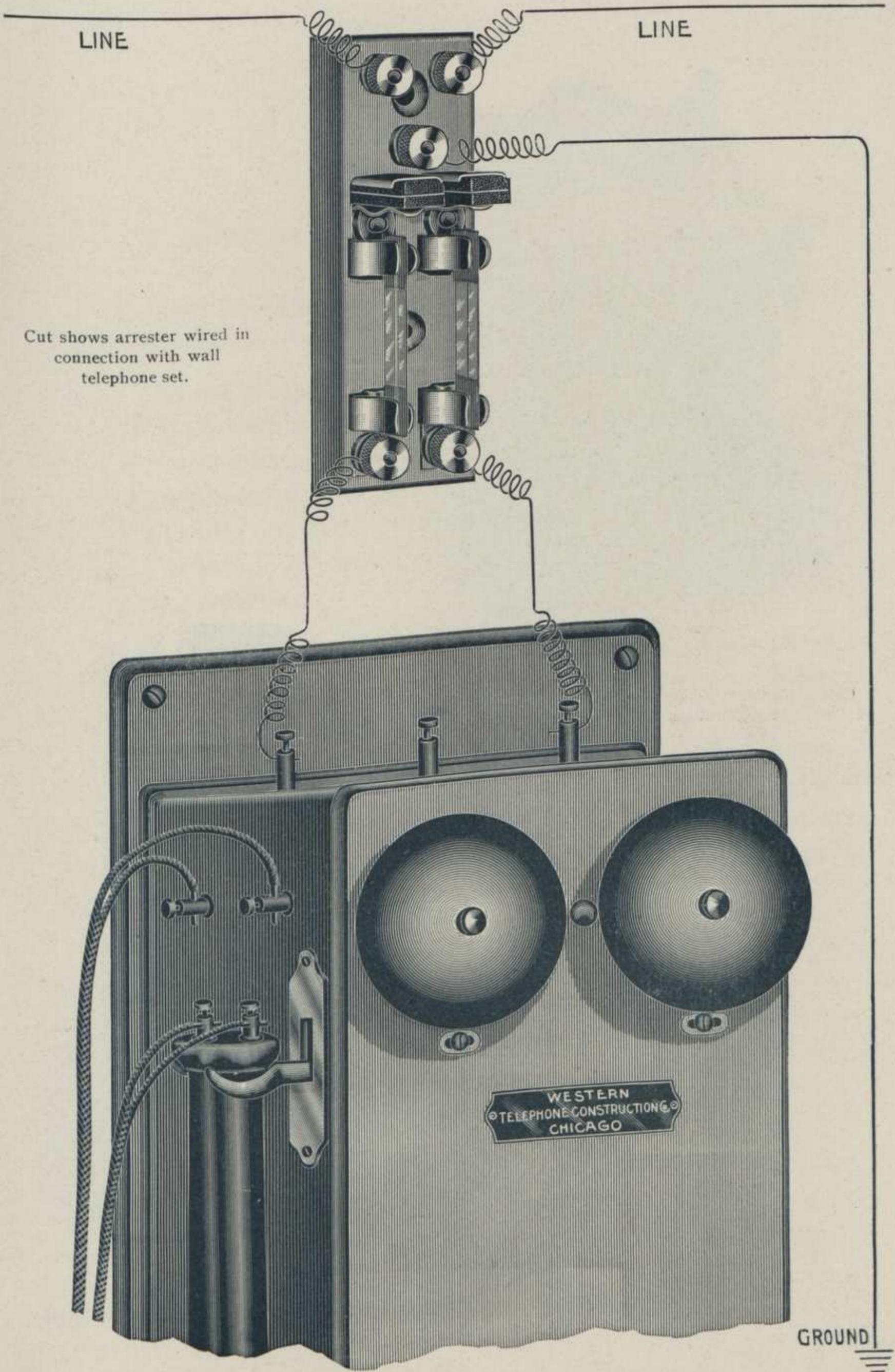
We will make special low prices on this No. 1 dynamic set.



Western Wall Cabinet Set "F" with double length battery box—a very attractive and popular set.



Western Cabinet Set "E" especially desirable for use in Hotels, Telephone Booths and public places generally.



Cut shows arrester wired in connection with wall telephone set.

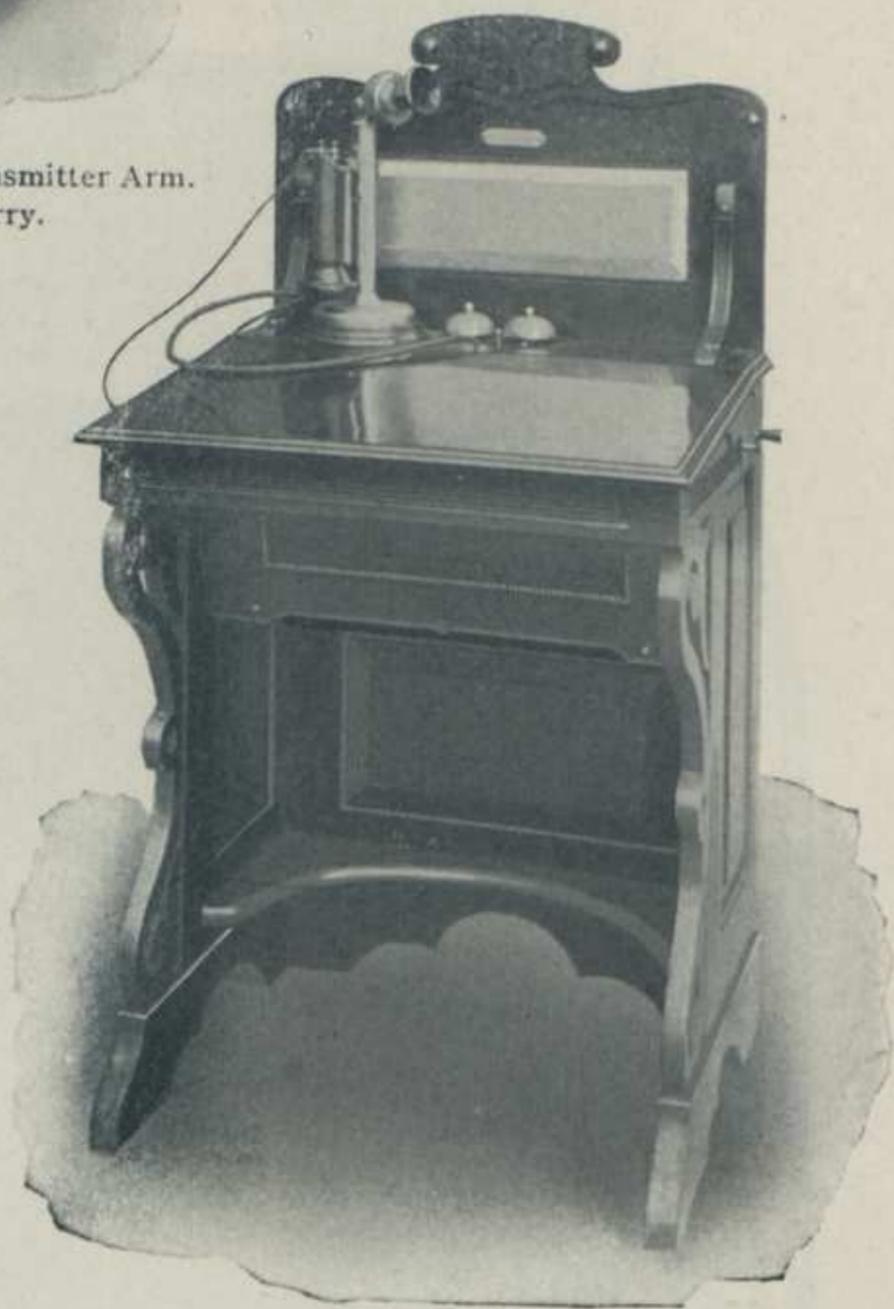
WESTERN
 TELEPHONE CONSTRUCTION
 CHICAGO

GROUND

Severe tests of above Arrester under all conditions have demonstrated its efficiency.



Cabinet Desk Set--Type A. Goose Neck Transmitter Arm.
Beveled Glass Front. Oak or Cherry.



Cabinet Desk Set--Type B. Portable Transmitter Stand.
Beveled Mirror. Cherry.

Cabinet Desk Telephone Sets

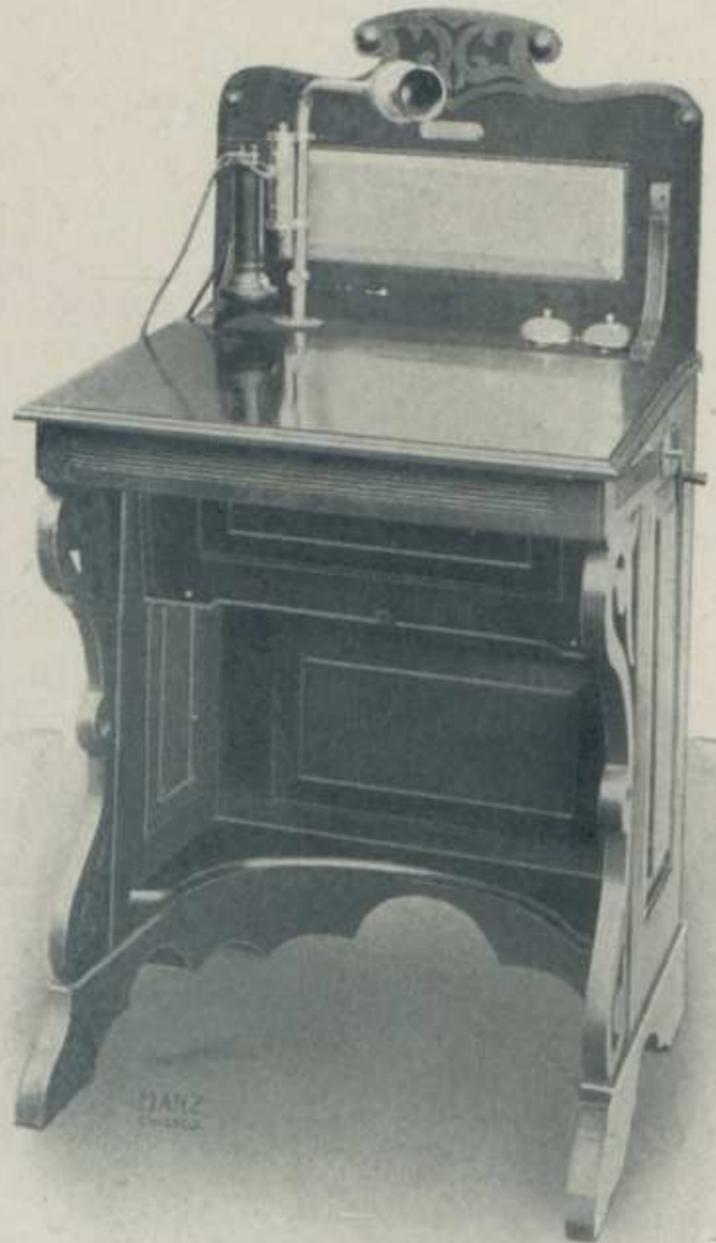
We show on pages 102 and 104 four different styles of Cabinet Desk Telephone Sets.

Type A has goose neck arm transmitter. The generator, induction and ringer coils, and switch, are placed at back of desk behind a beveled French plate glass, where they are exposed to view, but being enclosed they are free from dust and dirt. The generator, bells, ringer coil supports and binding posts and switch are all nickel plated, all parts of switch are made of German silver. Receiver hangs on switch hook at left side.

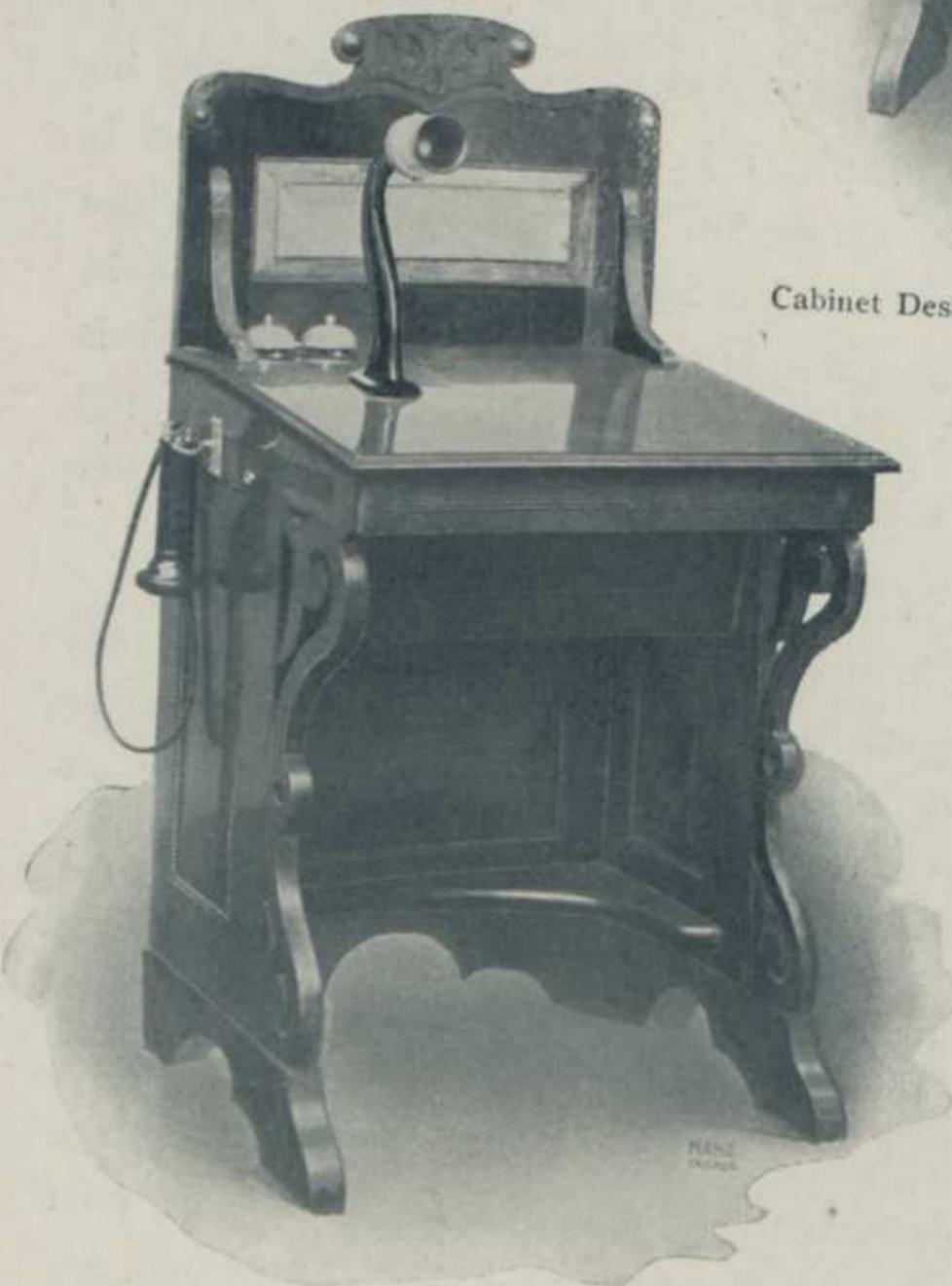
Type B has a portable transmitter stand, which is mounted on nickel plated base. The transmitter is of adjustable type and is placed on upper end where shown in cut, the switch is placed in the vertical standard, and the receiver is suspended on the switch hook, which is attached to the transmitter standard. A beveled mirror is placed in front just above the top of the desk. The bells are located on top of and at the rear of desk. The generator, induction and ringer coils, and batteries are placed in a case under top of desk.

Type C has a goose neck arm transmitter with receiver on left side. The generator, induction and ringer coils, switch and batteries are placed in a compartment under top of desk, transmitter hangs at left side, where shown in cut, and has mirror of beveled glass the same as in type D.

Type D is similar in construction to types B and C, excepting that it is provided with an adjustable swinging arm with transmitter and receiver mounted thereon. The switch and switch hook are mounted in a cylindrical case, which is attached to the vertical part of the arm. All exposed parts of the arm and its connections are nickel plated.



Cabinet Desk Set—Type D. Swinging Transmitter Arm.
Beveled Mirror. Cherry.



Cabinet Desk Set—Type C. Gooseneck Transmitter Arm.
Beveled Mirror. Cherry.

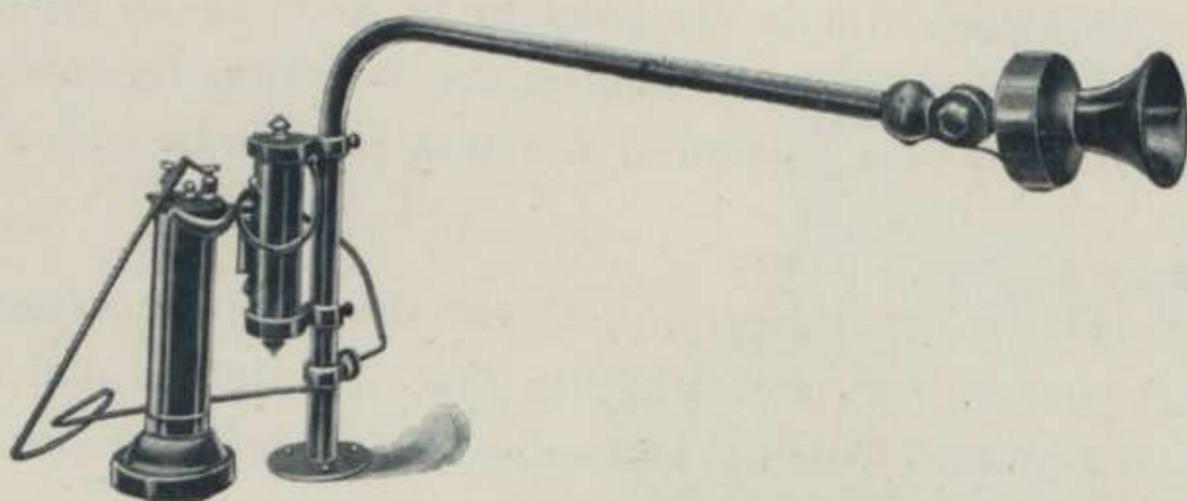
The Swinging Arm is designed to be screwed on top of desk. The long arm carrying the transmitter may be swung forward for use, or back over the rear portion of the desk so as to be entirely out of the way.

Each of these types are equipped with the same generators, transmitters, receivers, bells and switches that are used in our Western Express Telephones which are described on preceding pages.

All of the four types of these cabinet desks are of the latest design. The cabinet work is of quartered oak, cherry and mahogany, and all are finely polished. All contact points of the switches are platinum pointed and all are fitted with our well known type of Western transmitter, and our new receiver.

These four styles of cabinet desk telephones are fitted for bridging or series as desired.

For elegance of finish, mechanical construction, electrical efficiency and artistic design, they cannot be approached. They speak for themselves as do all other Western Company's telephones.



Swinging Arm Desk Set, nickel or oxidized copper finish.

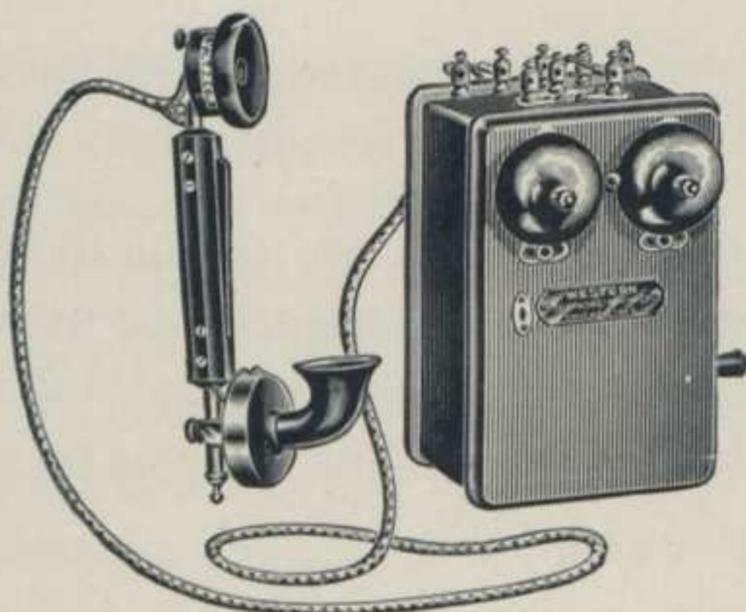


Portable Standard Desk Set, nickel or oxidized copper finish.



Portable Rocker Arm Desk Set, finished in oak or Walnut.

Portable Desk Telephones



Portable Desk Set, nickel or oxidized copper finish.

The accompanying cut shows a portable desk telephone employing a combined transmitter and receiver, and is one of the many new types of improved appliances lately placed on the market by us. We claim the combined transmitter and receiver to be the most perfect instrument of the kind thus far produced. Some of the particularly

meritorious features embraced in its construction are a platinum contact switch mounted in the handle or stem of the instrument, which is grasped in the hand, is of improved Watson design, and makes and breaks telephonic circuits in practically the same manner as does the approved telephone switch-hook ordinarily mounted in the magneto bell-box and operated by the influence of the telephone receiver. This switch does not simply open and close the local battery circuit (which action, of itself alone, does not subserve the purpose of a perfect switch, for use with a complete telephone set), as is the case with those switches furnished with other combined transmitter and receiver sets. The switch requires no appreciable effort to operate, and is positive and reliable in action. The relative distance of mouthpiece of transmitter from receiver is not permanently fixed, but can be easily adjusted or varied to suit the convenience of user.

The transmitter is of solid back, amplifying type, having large volume of voice transmission, perfect distinctness of articulation under all circumstances, and is adapted for use over long high resistance lines, as well as short circuits.

The receiver is of bi-polar type and has compound magnets; the magneto generator and bells provided for use with this set are of high efficiency and adapted to meet requirements of the most exacting

service. Cut shows box with generator, bells and induction coil mounted thereon, which arrangement is generally preferred. However, extension bell and induction coil are furnished mounted in one box and magneto generator in a separate small box, if desired.

The set is furnished adapted for use in connection with lines equipped either with series wound or bridging bell telephones.

These combined receiver and transmitter sets are certain to be extensively adopted, being highly efficient, of ornamental and light weight, and particularly on account of the convenience afforded the user to assume a perfectly comfortable position while carrying on a conversation.

In this connection we desire to call attention to our Swinging Arm Desk Set, Portable Standard Desk Set, and Portable Rocker Arm Desk Set shown on page 106.

The Swinging Arm Desk Set is the same as the one described on page 103, used in connection with type D of our Cabinet Desk Set. The Portable Standard Desk Set is shown complete with the magneto generator and call bell. This instrument is furnished on a handsome nickel-plated stand and which is provided with a large enough base to prevent its being easily overturned and which may, therefore, be moved about to any part of the desk to suit the convenience of the user. The magneto generator and call bell box is so arranged as to be secured under the desk, within easy reach of the user and yet entirely out of the way. This box may, however, be mounted on the wall or on the side of a desk, or, in fact, in any position where it is most convenient.

The Portable Rocker Arm Desk Set can be used on a desk or table or in any convenient place to suit. It is mounted with our Adjustable Rocker Arm Transmitter and new Bi-polar Receiver, and is mounted in a handsome case of walnut or oak.

The four portable desk sets are very finely finished, and so constructed as to secure first-class results, and placed on a desk, make them very convenient for the users.

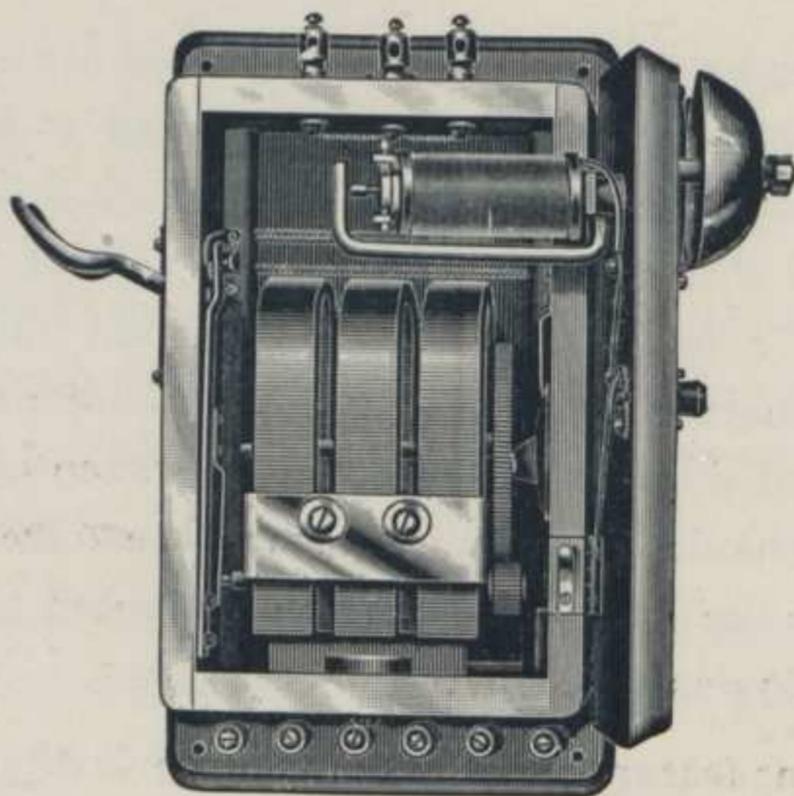
Magneto Bells

Among the many new appliances which we are now placing on the market the attention of the trade is called at the present time particularly to their new Magneto Bells of both series and bridging type, constructed with a knowledge of the various requirements of service for which a telephone bell is demanded and of the various bells now in the market and their merits. These new bells possess great efficiency and durability, and for appearance and perfection of electrical and mechanical details are unsurpassed, are made from the best materials, by the best workmen, and adapted to meet demands of the most exacting as well as ordinary service.

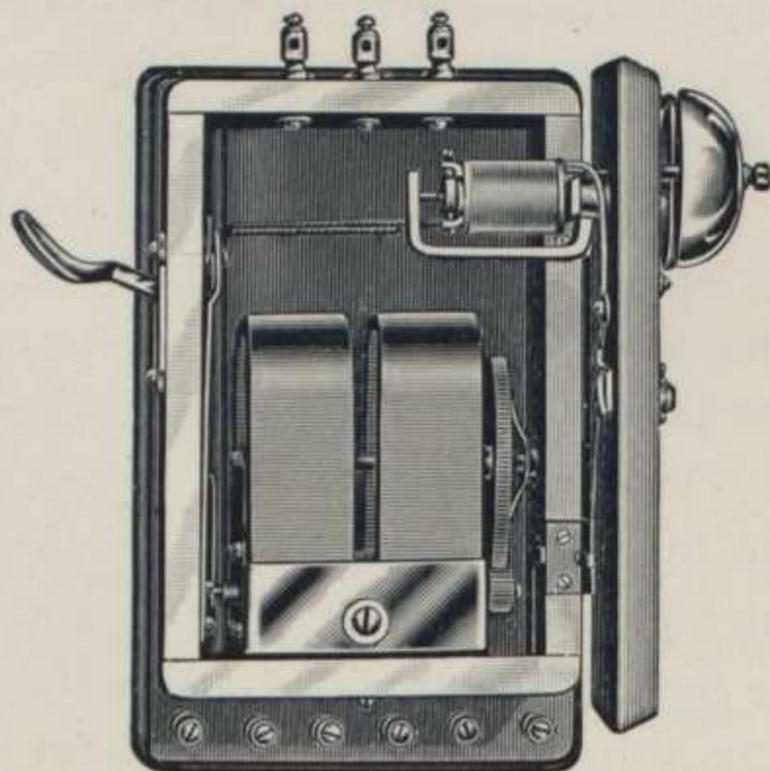
One important feature about the magneto is that the owner can change from the bridging to series, or vice versa, in a few moment's time, thus avoiding the purchase of a new telephone, should a change be desired.

Cuts of both the standard series bell and of the bridging bell will be found on page 110. The armature of the series bell is wound to a resistance of 600 ohms. The generator has large compound magnets of best quality magnetic steel and is guaranteed to ring well through resistance of fully 15,000 ohms, operated at moderate speed. The ringers of bridging bell are wound to resistance of 1,200 ohms, this being in our estimation the most practical resistance for winding of bridging ringers for general use. The bridging generator is wound to ring through high resistance, and has very heavy quantity out-put, adapting it for use in ringing a maximum number of bells of the bridge type on long high resistance lines. The automatic shunt with which the bridging generator is provided, is, we think, the only shunt on the market which is thoroughly well adapted for use in connection with bridging instruments.

They are also provided with an automatic switch hook with springs of the best quality German silver anti-friction bearings, platinum contact points, outside binding posts for attachment of receiver cord tips



"Western" Bridging Magneto Bell.



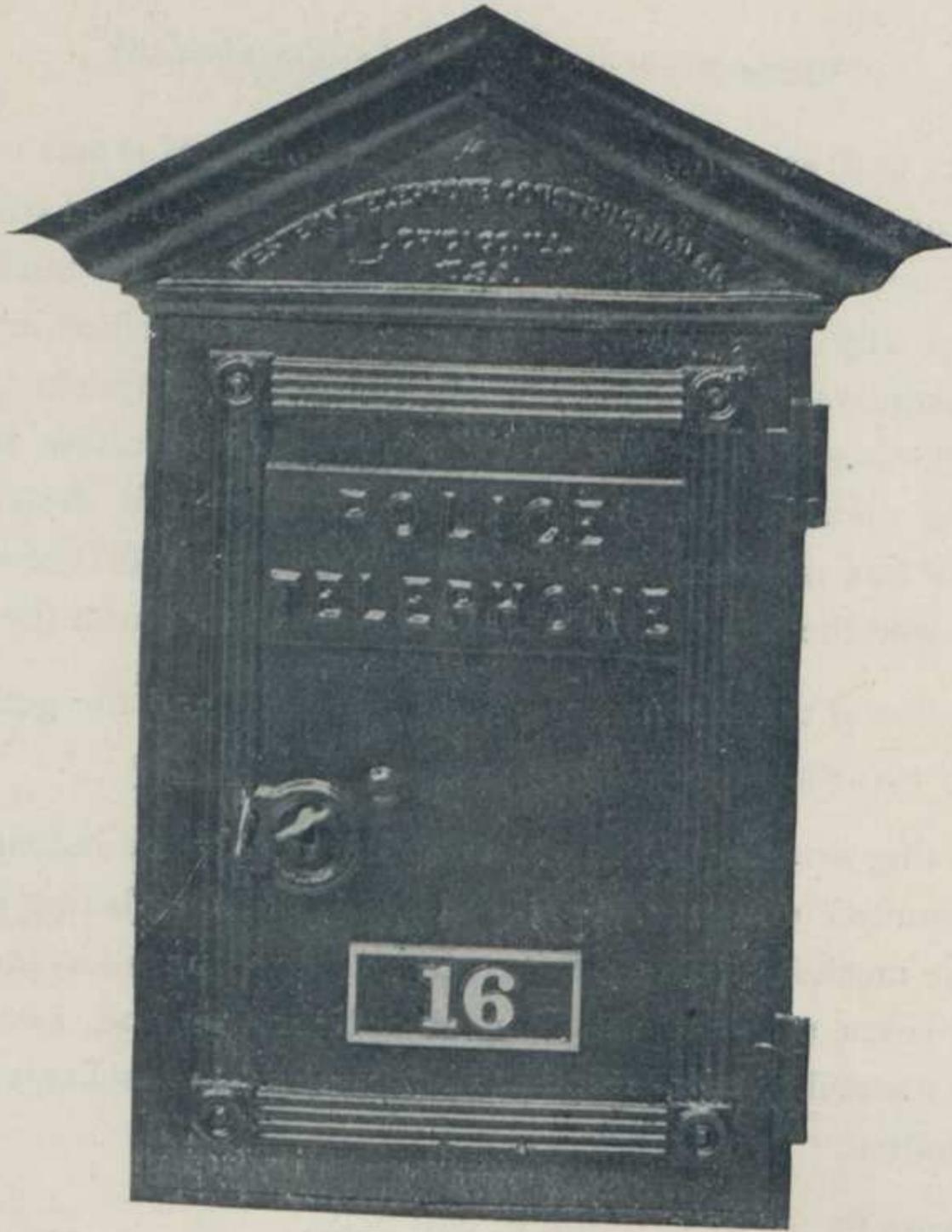
"Western" Series Magneto Bell.

and primary and secondary transmitter circuits. Magnets enameled with finest quality of red enamel, fitted with nickel polished trimmings; all connections are soldered; the slotting and wiring are much neater than that of any bell made. The bell box is furnished in selected quartered-oak, walnut or cherry finely polished and finished, nickel-plated trimmings. The box is of proper size to allow the placing of long distance type of induction coil therein if desired. The back of bell box is extended above and below top and bottom of box proper, so that the bell can be screwed on its support from the outside.

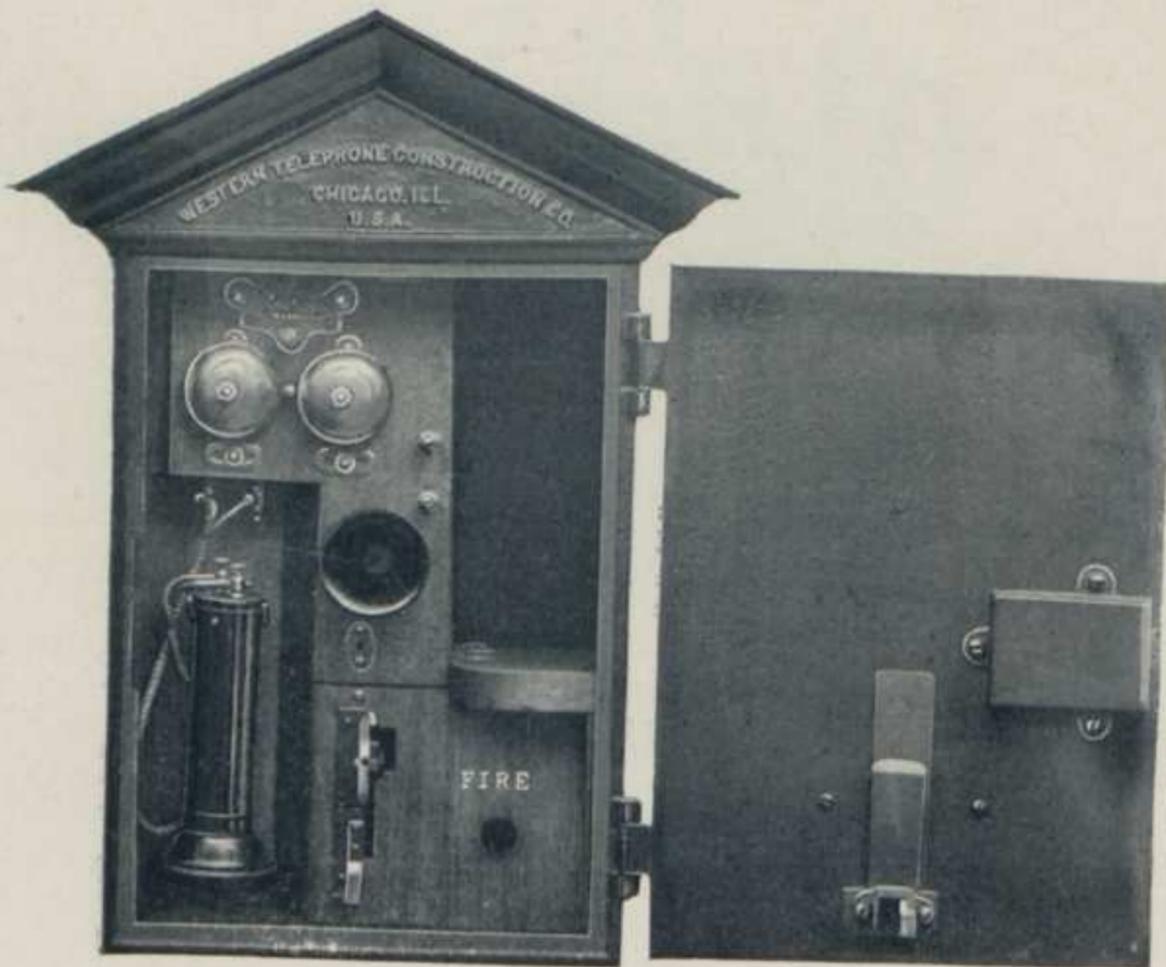
The sides of the box are of heavy material, and the generator is very firmly screwed in position.

Lightning arrester plates are so arranged that the incoming lines can be grounded on either side of the bell. We are placing this magneto on the market strictly on its merits, with the assurance that it will stand years of wear and tear of ordinary service, and that for efficiency, durability, appearance and perfection in mechanical details it is unequalled.

See page 83 for description of call bells.



Patrol Box, Closed.



Patrol Box, Automatic Ringing Device, Double Key Lock, Etc.

Police, Fire Alarm and Railway Patrol Boxes

On the opposite page we show two cuts of an apparatus recently put on the market by this Company, designed to meet the requirements of an efficient outdoor patrol service. The apparatus is enclosed in a cast iron box of the form shown and provided with a hinged door which fits so closely as to preclude the entrance of moisture. It consists of a complete telephone set, comprising a powerful magneto generator and call bell, a granular carbon transmitter—our Western Giant type—a bi-polar receiver, automatic hook-switch with platinum contact points, a lightning arrester, and two cells, preferably of dry battery. A special automatic selective signal transmitter is provided where desired, and, in fact, these boxes will be equipped with apparatus for giving service of any desired character.

We make a specialty of the construction of telephone equipment for use on electric railways. These boxes, when placed at frequent intervals along the line of any railway, afford an ideal means of communication between all parts of the railroad system. Our telephone apparatus is used on some of the largest electric railway systems in the world, and has proved its superiority over others by giving long continued good service under the most adverse circumstances.

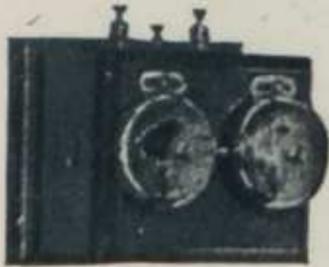
We will be pleased to furnish estimates for any desired service. Our engineering department will draw up specifications, upon requirement, that will assure complete immunity from inductive troubles—from trolley or electric light wires—which have proven the bane of so many installations of this kind.



Operator's Receiver and Headband.



Lineman's Test Set.



Extension Bell,
1,200 ohms, 120 ohms, 80 ohms
oak, walnut or cherry.



Repeating Coil.

Lineman's Test Set

We have designed and perfected a Lineman's Test Set that is novel and unique. It consists of a powerful generator made of three large permanent bar magnets of best quality magnet steel, new type armature with ample amount of wire space, wound with sufficient amount of wire to insure proper results. One new feature in this test set is that two cells of dry battery are placed within the permanent magnets over the armature and securely fastened in position, making a very compact and complete form of generator and batteries combined.

Another new feature is a combined transmitter and receiver, which we claim to be the most perfect instrument of the kind ever produced.

Some of the particular meritorious features embraced in its construction are a platinum contact switch mounted in the handle or stem of the instrument. It is of the improved Watson design, and makes and breaks telephone circuits in practically the same manner as does the approved telephone switchhook ordinarily mounted in the magneto bell box, and operated by the influence of the telephone receiver. A detailed description of this combined receiver and transmitter is found on page 107. The call bells used in this set are described on page 83. The generator combined with the batteries as above described and the call bells are mounted in a neat box of quartered oak, highly polished, with a convenient handle for carrying same. The combined receiver and transmitter are carried in the cover of the case.

For efficiency, durability, compactness and design, this set has no equal. Will make prices low, considering the high grade of apparatus.

Batteries

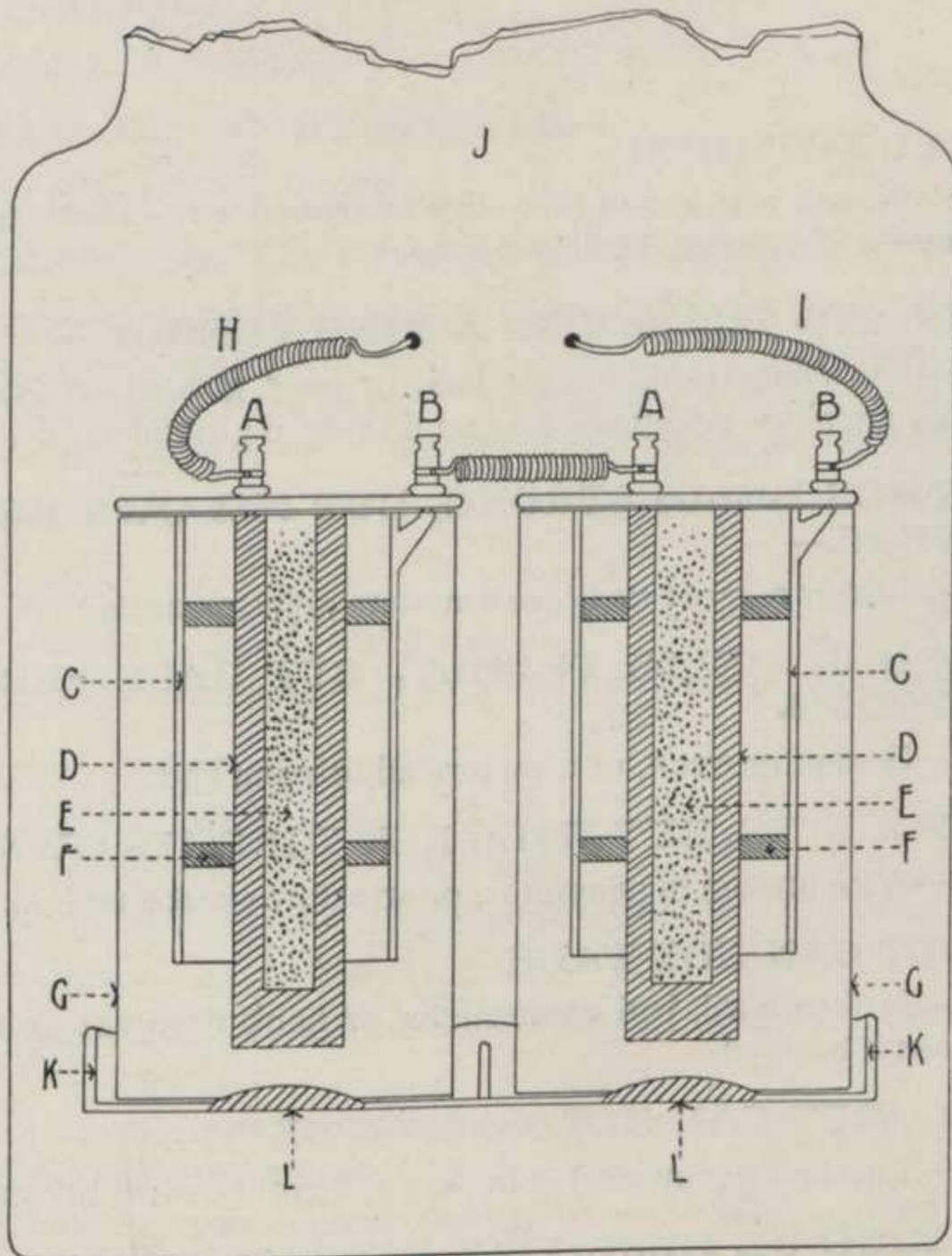
Two cells of battery are used with each telephone. They are of our regular Western Giant type, consisting of a carbon cylinder containing powdered carbon and manganese in proper proportions to serve as an efficient depolarizer. The zinc element is cylindrical in form and surrounds the carbon element, but it is so arranged that a short-circuit between the two is impossible. A solution of salammoniac forms the electrolite. The glass jars are of the best glass, and the whole cell when assembled is so arranged as to prevent creeping of the salts and reduces evaporation to a minimum.

Care should be taken to keep the batteries in good condition, and while ours are of a superior type and will last longer than any others made, they will eventually become exhausted by evaporation and continued use. When batteries show signs of weakening, they should be replenished. It is then best to empty the cells and wash them, together with the zinc and carbon elements, and re-charge them, using four ounces of salammoniac with each cell and fill them with clean water, when they will be good for a long time.

Remember that with a poor weak battery it will be difficult to understand what is said over the lines.

Sometimes telephones are placed in warehouses and other places where the batteries are likely to freeze during extreme cold weather. In such places, or in any places where desired, we can furnish dry batteries of any of the types on the market.

We always recommend and furnish our Western Giant batteries with our telephones, unless there is good cause or reason for using dry batteries.



BATTERY CONNECTIONS

The above diagram shows a section of backboard; shelf holding two cells of Western Giant Battery and connections.

The batteries are composed of a carbon electrode where shown at D, and a zinc electrode where shown at C. The zinc electrode is made of a cylinder of sheet zinc, which surrounds the carbon element, and is insulated with rubber from the carbon where shown at F. The electrodes are attached to the carbon cover of the cell, which holds them in position. The binding posts of zinc electrodes are shown at B and the binding posts of the carbon electrodes are shown at A. These cells are placed side by side in the battery box on a shelf shown at K, and are held in position by lips marked L. The battery wires are shown at H and I. One of these wires is connected to the carbon electrode A, the other to the zinc electrode B. The two cells are connected together as shown in the cut, by a wire running from binding post B of the zinc electrode to binding post A of the carbon electrode.

It should be borne in mind that one of the electrodes is positive and the other negative, and that in connecting the two batteries to the wires, which come through the backboard, one of the wires must be connected to the positive and the other to the negative electrode. In connecting the batteries together, the connection must be from positive electrode on one battery to the negative electrode on the other. If a mistake is made in connecting zinc to zinc or carbon to carbon, no results will be obtained, and care must be taken to avoid that kind of connection.

We show the accompanying diagram with this explanation, so that no mistake will be made in connecting the batteries.

Telephone Troubles

BELL WILL NOT RING—

Cause—Broken wire in bell box—line or ground wire—short circuit if bridging metallic, grounded if bridged lines.

RECEIVES AND TRANSMITS A RING FEEBLY—

Cause—Bad connections in bell box, or poor ground—resistance cross if bridging metallic—resistance ground if bridged grounded line.

RINGS OTHER BELLS STRONG, BUT IT'S OWN BELLS ARE WEAK—

Cause—Ringer magnet weak, or armature adjustment bad.

RINGS OTHER BELLS FEEBLY, BUT RECEIVED RING IS STRONG.

Cause—Generator weak, or armature adjustment bad.

RECEIVES A RING, BUT WILL NOT RING ITS OWN BELLS—

Cause—Wire broken in generator, or armature short circuited.

RINGS, BUT CAN NOT TALK—

Cause—Broken cord, bad connections, or hook does not go up to place—line open if bridged.

CAN RING, BUT CAN GET NO RESPONSE—

Cause—Line badly grounded or broken and grounded; if bridged, line open.

CANNOT RING OR RECEIVE A RING—

Cause—Wire broken in office or line—short circuit if bridged metallic—grounded if bridged to ground.

TWO SWITCHBOARD DROPS FALL OR TWO BELLS RING TOGETHER—

Cause—Office wires or line wires crossed—if on common return wire—return wire broken or annunciator ground broken.

BELL RINGS FREQUENTLY WITHOUT APPARENT CAUSE—

Cause—Swinging cross with telegraph or other lines.

RECEIVER WEAK—

Cause—Bad connections, diaphragm bent or dirty, position of diaphragm not correct (should be $\frac{1}{8}$ " from magnet), or permanent magnet weak.

SPEECH RECEIVED IS STRONG, BUT TRANSMITTED IS WEAK—

Cause—Speaker stands too far from telephone, or battery is weak.

SPEECH INDISTINCT WITH A BUBBLING, BUZZING SOUND—

Cause—Loose connection at microphone.

SPLUTTERING OR GRATING NOISE IN TELEPHONE RECEIVER—

Cause—Loose connection at battery, transmitter or hook.

CAN HEAR, BUT CANNOT TALK—

Cause—Primary circuit open.

BE SURE THE BATTERIES ARE PROPERLY CONNECTED—

Keep batteries in good condition, as per instructions posted on same.

Connect one battery wire with the zinc pole of the battery, the other with the carbon pole of the battery. In connecting two batteries together, connect from carbon to zinc. Never connect zinc to zinc or carbon to carbon. Battery zinc must be kept clean and free from crystals and renewed if badly eaten.

The battery cell should be free from crystalized sal ammoniac. The solution should reach the neck of the jar.

Battery wire connections must be carefully guarded against corrosion.

OBSERVE THE FOLLOWING—

Observe the interior wiring and repair all slipshod work, such as sagging wires, two wires under the same staple, etc.

Always place receiver on switch hook when through talking.

Don't oil hinges in bell box.

Do not experiment with the interior of the telephone if you are not posted on its construction.

Do not short-circuit the telephone on top by placing a lead pencil between the lightning arrester points.

Don't stand too far from the transmitter while talking. The proper distance is from two to six inches from the mouthpiece, according to the length of line over which you are talking.

Talk clearly and not too fast, and don't talk loud, as it is unnecessary.

Keep the receiver well pressed to the ear when you are listening.

If a line is open after a thunder storm, a wire is probably burned off in an annunciator or in the ringing magnets of a magneto bell on the line.

If the diaphragm is bent or rusty, substitute a new one. Contact points should be soldered, and all working parts of the instruments free from dust and corrosion. Cords should be tested carefully for breaks.

Bells should have wire connections well fastened and points of contact soldered.

See that all binding post connections are tight.

Examine carefully the points or teeth of lightning arresters after each storm, to see that plates are not in contact with each other by fused points.

Points should always be separated about the thickness of a sheet of paper. Dry ice is an excellent insulator, and a ground wire in frozen earth is absolutely worthless.

When bell rings, or persons are heard talking on two or more lines simultaneously, the lines are in contact, or crossed, or return ground wire broken.

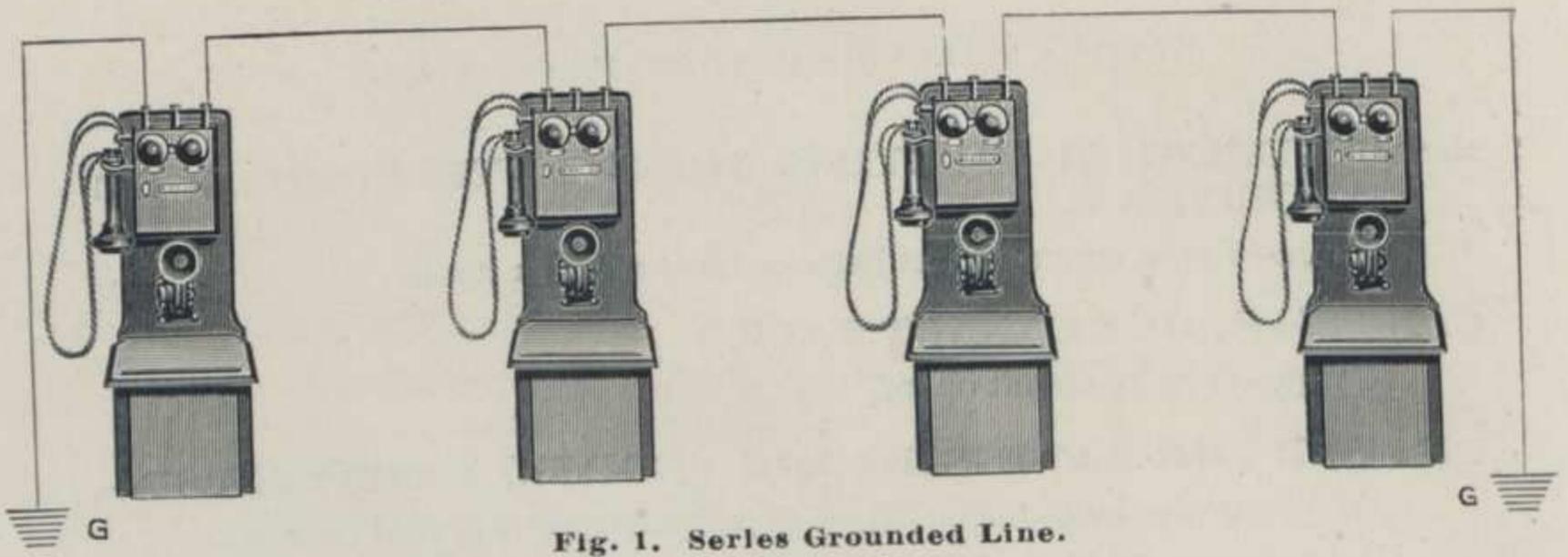


Fig. 1. Series Grounded Line.

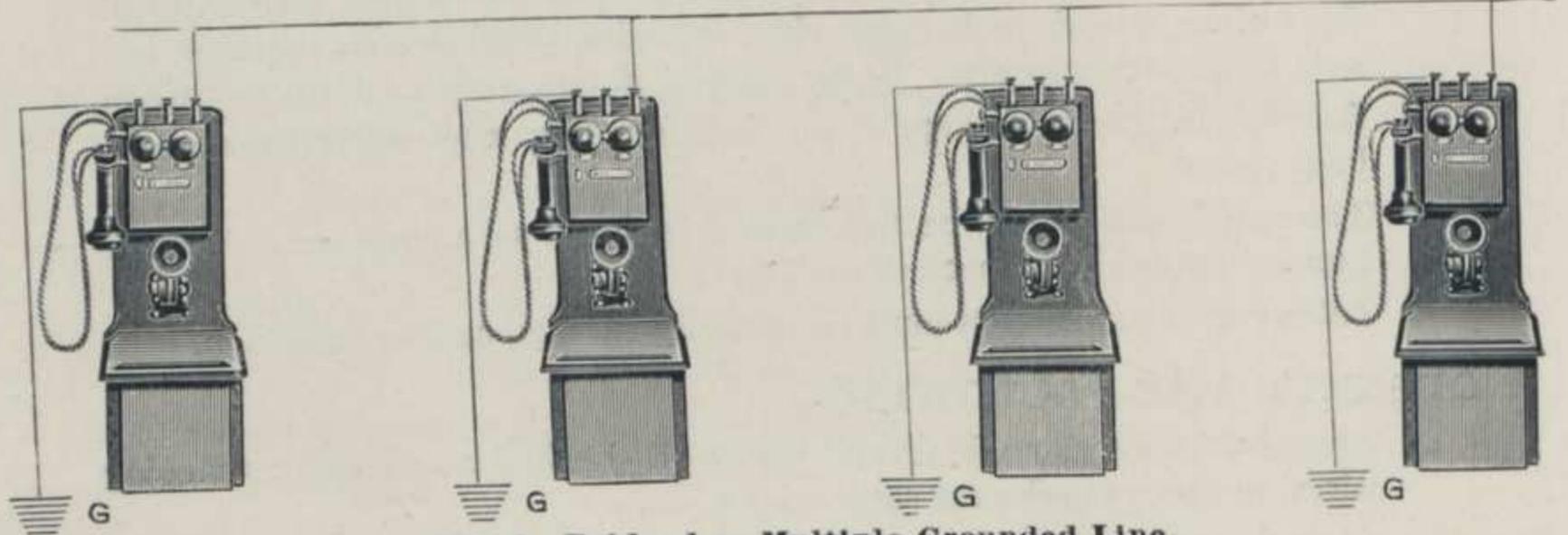


Fig. 2. Bridged or Multiple Grounded Line.

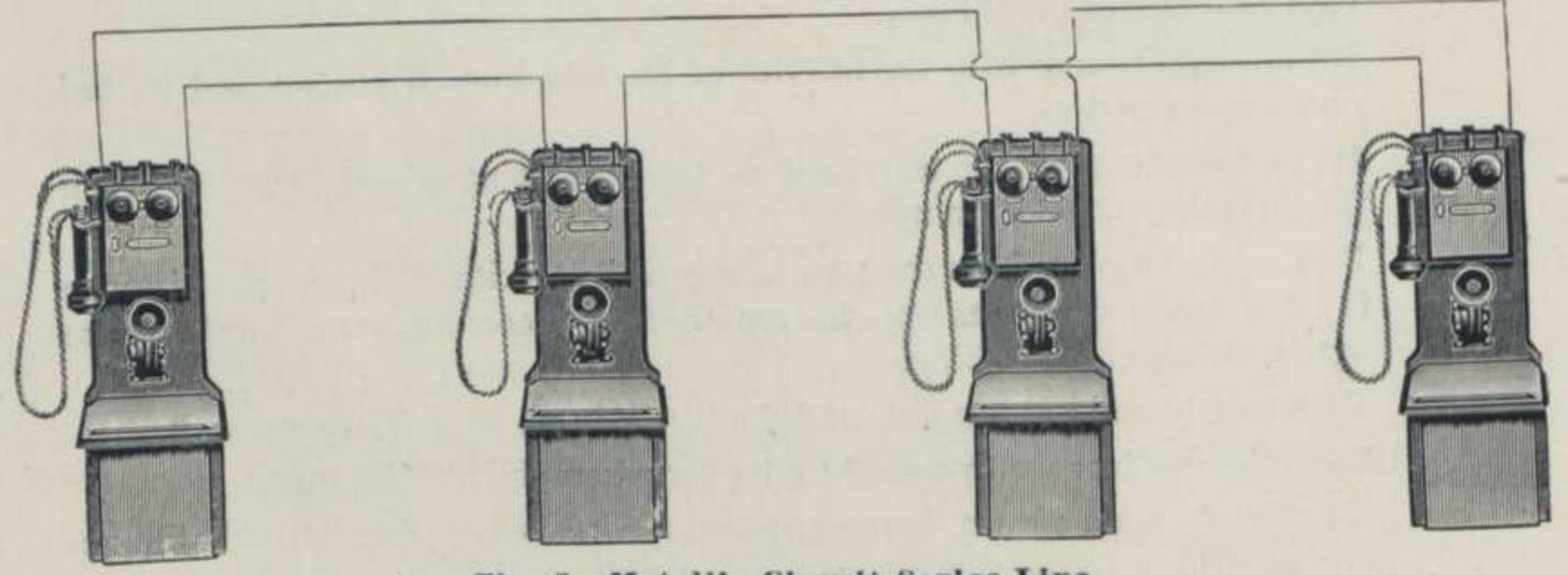


Fig. 3. Metallic Circuit Series Line.

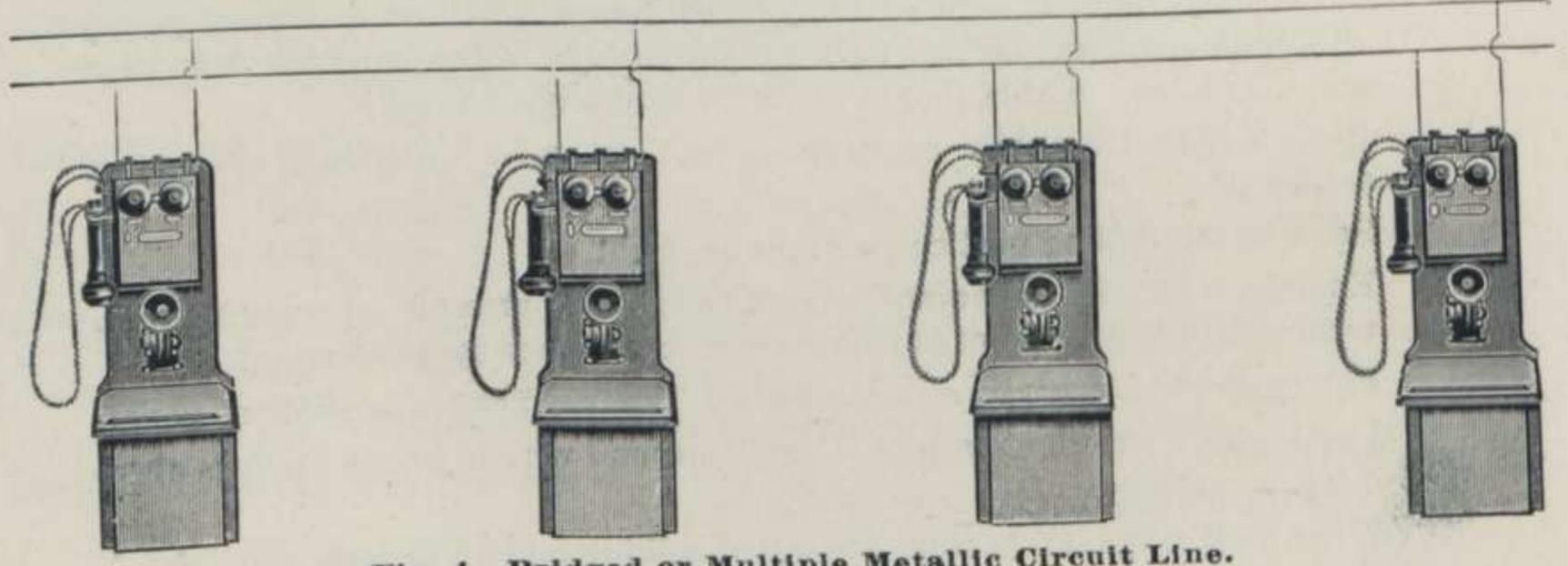


Fig. 4. Bridged or Multiple Metallic Circuit Line.

EQUIPMENT FOR PARTY-LINES
 Write for special circular describing this system

Testimonials



GALENA TELEPHONE COMPANY.

GALENA, KANS., May 12, 1898.

HOME TELEPHONE AND TELEGRAPH COMPANY,
Fort Wayne, Ind.

Gentlemen:—In several telephone papers we have seen write-ups of your Exchange and that you are using apparatus made by the Western Telephone Construction Company, of Chicago. We are going to replace our old common return board with a larger metallic board and would like to have your opinion of Western apparatus. Hoping you will favor us with an early reply, we are,

Yours truly,

GALENA TELEPHONE COMPANY.

GEO. W. BEERS, President.
S. M. FOSTOR, Vice-President.
LOUIS FOX, Secretary.
CHAS. McCULLOCH, Treasurer.
W. J. VESEY.
CHAS. S. BASH.
C. F. PFEIFFER.
J. W. SALE.
C. D. LAW.

} Directors.

HOME TELEPHONE AND TELEGRAPH COMPANY.

PRESIDENT'S OFFICE.

FORT WAYNE, IND., May 14, 1898.

GALENA TELEPHONE COMPANY,
Galena, Kans.

Gentlemen:—In reply to yours of the 12th inst. will say that the Western Telephone Construction Company's apparatus gives us perfect satisfaction. We are now operating fifteen hundred telephones and are increasing the plant to a two thousand capacity and we have not found it necessary to make any change whatever. Subscribers who are now using both telephones, the Bell and ours, claim that we are giving fifty per cent. better service today than the Bell people ever gave, which naturally goes to prove that the system we have must be a good one. Without doubt this is all that is necessary to convince you that the Western people are all right.

Yours respectfully,

HOME TELEPHONE COMPANY,

THEO. THORWARD, Manager.



MAIN EXCHANGE OF THE HOME TELEPHONE COMPANY, FORT WAYNE, INDIANA, EQUIPPED BY THE
WESTERN TELEPHONE CONSTRUCTION COMPANY

WESTERN TELEPHONE CONSTRUCTION COMPANY

I. H. MOULTON, Pres.

W. E. CAHILL, Vice-Pres.

WM. LOHMILLER, Secy. and Treas.

LA CROSSE TELEPHONE COMPANY.

LA CROSSE, WIS., March 30, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
250 S. Clinton St., Chicago, Ill.

Gentlemen:—Replying to yours of recent date, beg to advise that the nine hundred capacity switchboard you furnished us a little more than one year ago is giving excellent satisfaction, rendering perfect service. It was only after using a board made by another manufacturer, and examining many others, that we concluded to buy yours, and the step taken has not been a moment regretted. We can highly recommend your apparatus to any one desiring a first-class outfit. The telephones also are "up-to-date" and meet all the demands required. They are all right.

Respectfully, etc.,

LA CROSSE TELEPHONE COMPANY,
WM. LOHMILLER, Secretary.

MISSOURI UNION TELEPHONE COMPANY.

W. H. ALLEY, Manager.

BROOKFIELD, MO., March 28, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—This company has been operating a telephone system here for the past two years, we have a Western Switchboard of three hundred capacity and two hundred and ninety telephones in operation. Of this number about two hundred are Western telephones, and I desire to say that your apparatus is giving first-class service and we are well pleased with your goods and gentlemanly treatment.

Yours very truly,

MISSOURI UNION TELEPHONE COMPANY.

W. H. ALLEY, Manager.

ALEDO TELEPHONE COMPANY.

EDWARD DOOL, Proprietor.

ALEDO, ILL., June 6, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—July 12th, 1897, we opened our exchange at this place using two sections of your No. 1 one hundred drop switchboard filled for one hundred and thirty lines. On our opening day we had less than one hundred subscribers. We have now over one hundred and sixty, with several orders ahead, and this in a town of two thousand inhabitants. We receive nothing but words of praise from our patrons and we attribute our success to the completeness of our switchboard and Western Giant A phones.

Yours truly,

ALEDO TELEPHONE COMPANY.

WESTERN TELEPHONE CONSTRUCTION COMPANY

R. W. GOUGH, President.
GEO. W. SHARP, Vice-President.

WARD R. BLISS, Solicitor.

H. V. SMITH, Secretary.
JOSEPH MESSICK, Treasurer.

DELAWARE COUNTY TELEGRAPH AND TELEPHONE CO.

CHESTER, PA., July 9, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—After a test covering a period of six months, it gives us pleasure to say a word respecting the merits of your switchboard and telephone. Our multiple transfer system switchboard, which is of six hundred capacity with four hundred drops installed, works to perfection, while the upwards of three hundred and fifty phones, among them being your Giant Rocker Arm wall sets, portable desk, cabinet and swinging arm sets, have all given the best of satisfaction.

We can but add that your apparatus is head and shoulders above the Bell Company outfit here, and in fact our subscribers prefer your phones to even the American Bell Long Distance type. Every Independent Telephone Company should thoroughly test your apparatus before selecting other makes. No mistake can be made in buying from the Western Telephone Construction Company.

Yours truly,

DELAWARE COUNTY TELEGRAPH AND TELEPHONE CO.,
R. W. GOUGH, President.

LEE COUNTY TELEPHONE COMPANY.

Exchange, Ayres Building.

DIXON, ILL., May 28, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your inquiry of the 26th, would say, we have your make of switchboards here at Dixon, three one hundred drop and one ten drop toll line board, also one one hundred drop board at Amboy and one ten drop toll line board, also one each at Harman, Shaw, West Brooklyn, Compton, Lee Center, Ashton and Franklin Grove and one new one ordered for Steward. We also have one at Paw Paw and one at Eldena of another make, for which we are extremely sorry, and would like to exchange with you for your make. We commenced in October, 1896.

Yours truly,

L. D. PITCHER, President.

THE LYNCHBURG TELEPHONE COMPANY.

LYNCHBURG, VA., March 23, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill,

Dear Sirs:—We consider it a delightful privilege to state that we have used your instruments and switchboards for nearly four years, and consider them as reliable as any on the market. You may assert that we have between five and six hundred instruments at work. Yours very truly,

THE LYNCHBURG TELEPHONE COMPANY.

WESTERN TELEPHONE CONSTRUCTION COMPANY

CAROLINA MUTUAL TELEPHONE AND TELEGRAPH COMPANY.

CHARLESTON, S. C., April 5, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your valued favor of March 22nd, we beg to state that our exchange has been in operation since September 1st, 1897. We have about five hundred phones in use and a switchboard capacity of six hundred telephones.

We are more than pleased with your apparatus and consider it first-class in every respect. With it we are giving quicker and better service than the Bell with their latest system.

One point demanding special attention is the freedom of our system from instrument and switchboard troubles. One man attends to the switchboard and inspects the whole five hundred phones, and then has time to spare. What more can you ask?

Yours very truly,

CAROLINA MUTUAL TELEPHONE AND TELEGRAPH CO.,
MAURICE HUNTER, Manager.

GEORGE KRUEGER, President.

C. J. MAYER, Treasurer.

M. J. CARROLL, Secretary.

JOHNSTOWN TELEPHONE COMPANY.

General Office and Exchange, Cor. Market and Locust Sts.

JOHNSTOWN, PA., March 24, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your inquiry of March 21st, would say, that our exchange has been in operation for almost four years, and the number of telephones we have in use is five hundred and thirty, the greater number of which are Western Telephone Construction Company's phones, the capacity of switchboard is five hundred. We can say without any hesitation that your phones give us absolute satisfaction, and will not hesitate in recommending them, as your company certainly know how to make telephones.

Yours very truly,

JOHNSTOWN TELEPHONE COMPANY.

ALBEMARLE TELEPHONE COMPANY.

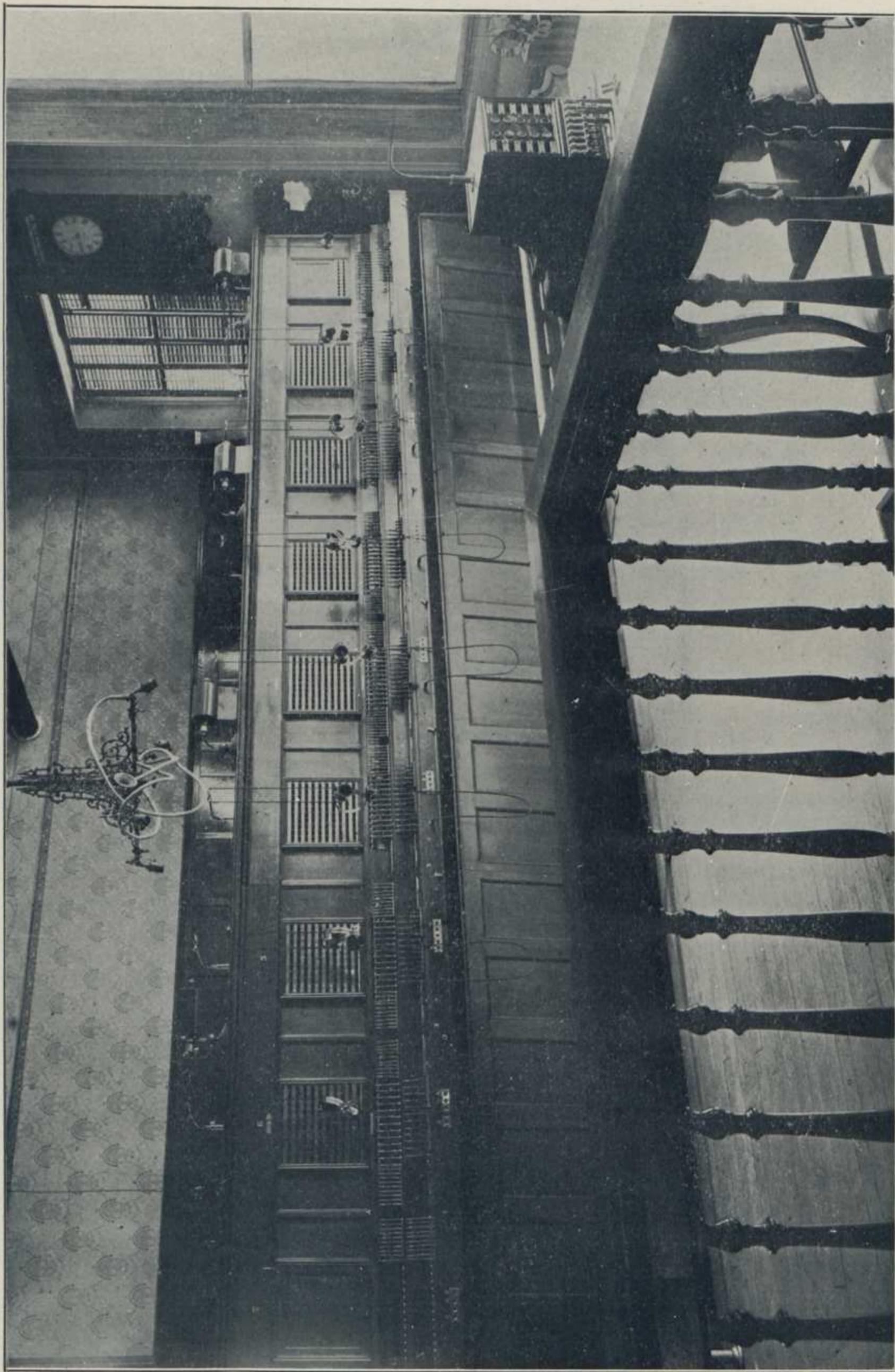
CHARLOTTESVILLE, VA., May 28, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to yours of May 26th, would say, we have bought four one hundred drop improved switchboards of you and these drops are now nearly all in use. We do not hesitate to say that these boards have given us entire satisfaction and so far as our experience has gone, they are first class in every particular. Our exchange has been in operation about four months.

Yours truly,

ALBEMARLE TELEPHONE COMPANY.



EXCHANGE OF LA CROSSE TELEPHONE COMPANY, SHOWING A NINE HUNDRED DROP SWITCHBOARD
FURNISHED BY WESTERN TELEPHONE CONSTRUCTION COMPANY

WESTERN TELEPHONE CONSTRUCTION COMPANY

WAYNE COUNTY TELEPHONE COMPANY, Inc.

EDWIN E. CREBS, President.
D. P. MOORE, Treasurer.
C. M. BROCK, Sec'y and Gen. Mgr.

CAPITAL STOCK, \$25,000.

FAIRFIELD, ILL., June 17, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—In July, 1896, we put one of your No. 3, one hundred drop switchboards in our exchange, which we used until a short time ago, when we replaced it with a one hundred and fifty drop improved board, built up in special cabinet, having six special drops for the toll lines in the same cabinet, making it one of the very best exchanges and toll boards, in our judgment, that can be built, it being very compact, yet all parts easy of access.

We have been using this new board about two weeks now, and we like it better every day. It is without doubt the best board in Southern Illinois. The No. 3 one hundred drop board which we replaced was giving perfect satisfaction, our only reason for changing was to get more capacity and a board with special toll drops for our toll lines.

Very truly,

WAYNE COUNTY TELEPHONE COMPANY,
Per C. M. BROCK, Sec'y and Gen. Mgr.

TICONDEROGA TELEPHONE COMPANY.

TICONDEROGA, N. Y., June 17, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to yours of March 22nd, beg to say we are now operating one hundred and fifty telephones and a one hundred and fifty drop switchboard, all of your make. We began charging rents January 1st, 1896, and have yet to find any apparatus that we think would suit us or give any better service than yours. We average about twelve hundred calls per day.

Yours truly,

TICONDEROGA TELEPHONE COMPANY,
G. B. BASCOM, Treas.

CITIZENS TELEPHONE COMPANY.

Central Office, Telephone Block, Main Street.

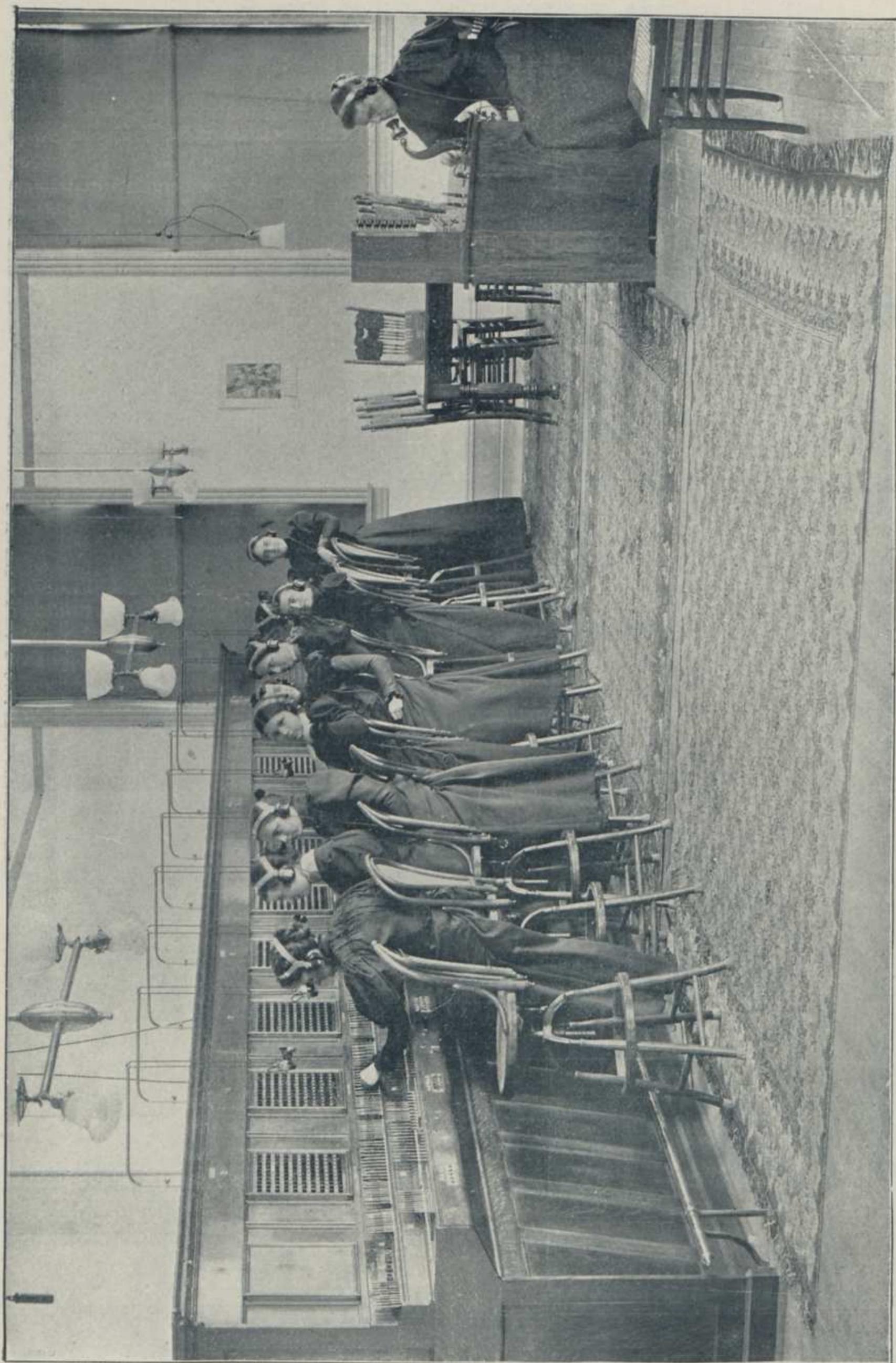
LACONIA, N. H., June 3, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gents:—We are now using three of your make of switchboards of one hundred drops each, two at Laconia and one at Franklin, and it gives me pleasure to state that they are giving perfect satisfaction, so that when we have occasion to add more switchboard facilities to our exchange, we shall most assuredly put in the Western Telephone Construction Company's make.

Yours truly,

CITIZENS TELEPHONE COMPANY,
H. J. ODELL, Mgr., Lakeport, N. H.



EXCHANGE OF THE DELMARVIA TELEPHONE COMPANY, WILMINGTON, DELAWARE,
WESTERN APPARATUS THROUGHOUT

WESTERN TELEPHONE CONSTRUCTION COMPANY

BERTHA TELEPHONE COMPANY.

OPELOUSAS, LA., June 12, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—In reply to your letter of June 3rd, will say, we are pleased to state after one year's use that the switchboard furnished by you consisting of one hundred drop board with eighty drops installed is giving entire satisfactory service. It is in operation constantly, and I have not had any trouble with the working of board whatever. We would be pleased to show the workings of this exchange to any one in this part of the country who may desire to call upon us.

Yours respectfully,
BERTHA TELEPHONE COMPANY,
A. B. PICKETT, Manager.

D. H. LOGAN, Pres.

THOS. DUPUIS, Supt.

L. D. ROBINSON, Sec'y and Treas.

WASHINGTON TELEPHONE COMPANY.

WASHINGTON, IA., May 30, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—We placed in our office two years ago two of your improved No. 1 type of switchboards of one hundred drops each; installed one hundred and forty drops and have increased the number to one hundred and eighty-six at the present time, and we will say that the switchboards have given us splendid service and we are well satisfied with them in every respect, would not exchange for any other.

WASHINGTON TELEPHONE COMPANY,
L. D. ROBINSON, Sec'y.

MAYSVILLE TELEPHONE COMPANY.

JAMES W. CHAMBERS, President and General Manager.

MAYSVILLE, KY., June 11, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Dear Sirs:—Your letter asking how many phones we have installed and how both switchboard and phones are doing, was just received, and I will answer same at once. The Maysville system has been in operation now for about eighteen months, and both the people of the city and our company are pleased with the service of the phones. We have two of your one hundred drop switchboards and about one hundred and fifty phones. While the switchboard is not of your latest pattern, we consider it the best we have had any experience with. Our operator easily attends to the one hundred and fifty phones, and we think could manage the two complete boards without help. It gives the company pleasure to state that we are much pleased with our plant. Yours respectfully,

MAYSVILLE TELEPHONE COMPANY,
J. W. CHAMBERS, President.

WESTERN TELEPHONE CONSTRUCTION COMPANY

THE NORTHWESTERN OHIO TELEPHONE COMPANY.

CAPITAL STOCK, \$10,000.

WAUSEON, O., March 30, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your letter of March 22nd.—Our exchange at Wauseon was started March 15th, 1896, with sixty subscribers. We have steadily increased until now we have one hundred and fifty on our list. This for a town of two thousand inhabitants we consider a pretty good showing. We are using your apparatus, both switchboards and telephones, and are very much pleased with both. They have given us no trouble to speak of since we started. We can cheerfully recommend your apparatus to any who contemplate putting in an exchange. I am,

Very truly yours,

ED. L. BARBER, President.

CITIZENS TELEPHONE COMPANY.

LANCASTER, KY., April 1, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—One year ago I installed a telephone plant in this city with your new one hundred drop switchboard and about eighty telephones, Western Giant A. A., which have given good satisfaction. Not a single one of your telephones have required repairing and a large majority have not been recharged since I began operation on March 25, 1897. These telephones are giving excellent service and with proper care will last a lifetime. I regard them as among the best talkers made, and I can recommend them to persons desiring something neat and durable. They will give satisfaction under all circumstances.

Your dealings with me have been honorable, and I trust that my business may require more of your excellent work.

With best wishes,

J. B. KINNAIRD, M. D.

THE CARNEGIE TELEPHONE COMPANY.

CARNEGIE, PA., June 3, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.,

Gentlemen:—Your inquiry about switchboards received, we are using two one hundred drop boards of your make, and have one hundred and eighty-seven phones in use, have been using same for about a year and a half. Have had no trouble with board, it works perfectly and satisfactorily.

Yours respectfully,
CARNEGIE TELEPHONE COMPANY,
Per F. R. MCGREW.

CAMBRIDGE SPRINGS ELECTRIC TELEGRAPH & TELEPHONE CO.

CAMBRIDGE SPRINGS, PA., March 28, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Three years ago we bought our first board, which was one of your ground return boards of twenty-five drop capacity. One year afterward we exchanged it for a fifty drop board of the same kind, which we presumed would be as large as we would ever need, but last November we found we had seventy subscribers on the board and were compelled to buy a larger one. This time we bought one of your latest improved full metallic circuit boards and find it a perfect and up-to-date board in every respect and would recommend it to any one that is in search of first-class apparatus.

We have one hundred and four phones in face of the bitter Bell opposition in a town of two thousand inhabitants, which we have never canvassed, and orders for eighteen more phones. We are using your Western Giant Rocker Arm, two cells, and are satisfied that the best is the cheapest in the telephone business, as the cost of repairs on cheap phones and switchboards cuts down dividends.

Please find enclosed order for phones and oblige,
Yours truly,
C. W. JONES, Secy.

ED. SAMSON, Pres. and Gen. Mgr.

W. H. CISNE, Treas.

C. M. BROCK, Secy.

JACKSON UNION TELEPHONE COMPANY.

ANNA, ILL., June 6, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—We put in one of your No. 1 switchboards, one hundred drops, May 1st, 1897, and were obliged to add another February 1st, 1898. This is of same capacity and now has fifty drops in use. We consider the Western board the most rapid of any we have seen in use. It is well made and we believe will give good service.

Yours truly,
JACKSON UNION TELEPHONE COMPANY,
Per ED. SAMSON, President.

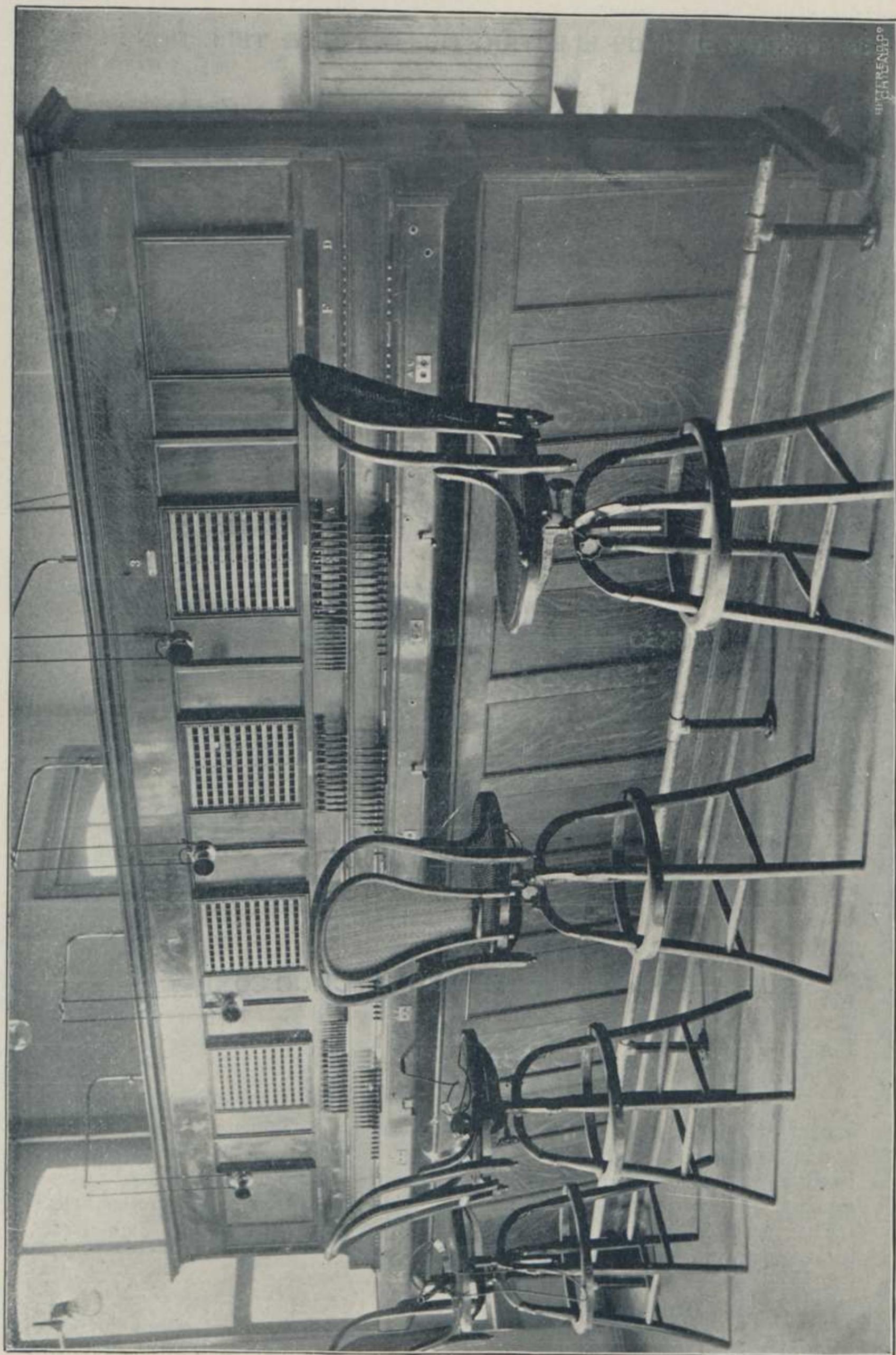
TUSKALOOSA TELEPHONE AND ELECTRIC COMPANY.

TUSKALOOSA, ALA., April 5, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your inquiry of recent date, will say, our exchange is equipped complete with Western instruments and switchboard. We have now one hundred and seventy-five subscribers. Our service is first class, and we never have any complaints. In my opinion the Western instruments are the highest grade of telephones on the market, and require less attention than any telephones I have handled during fourteen years of practical experience. The switchboard is the quickest to operate, with less expense, and the most durable apparatus I ever saw. It will stand hard punishment, and last forever.

Yours truly,
DAN ROMAN, Supt.



SWITCHBOARD OF THE DELAWARE COUNTY TELEGRAPH AND TELEPHONE COMPANY, CHESTER, PA.

WESTERN TELEPHONE CONSTRUCTION COMPANY

ROBINSON TELEPHONE EXCHANGE.

ROBINSON, ILL., March 30, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—In reply to yours of the 22nd inst., will say that we embarked in the telephone business one year ago. We started with twenty subscribers and an eighty drop capacity switchboard with forty drops installed. We now have forty-four subscribers and have placed an order for six more phones. We intend increasing our list to seventy-five subscribers this year.

We use Western Telephone Construction Company's phones and switchboard, and are well pleased with same. Our customers are well pleased with service given. We have men using our phones who claim they are much better than the Bell.

Very truly yours,

ROBINSON TELEPHONE EXCHANGE,
C. W. CHAMBLIN, Manager.

SHARROCK & GRABLE,

Agents for The Edgemont Company.

EDGEMONT, S. D., April 11, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Dear Sir:—About August 1st, 1897, I placed one of your switchboards in use in our exchange at Edgemont, S. D. The switchboard has a capacity of one hundred phones, although we only have fifty drops in place, the other fifty spaces being ready to fill when the exchange demands it. We have been using about forty telephones on this line nearly all the time since, and I wish to express my entire satisfaction with the operation of the board in every respect, as it has never given us any trouble at all.

Yours truly,

J. B. HICKS.

WILLIAM W. RYON, Pres.

JOHN QUINCY ADAMS, Sec'y.

H. E. MURTY, Supt.

SHAMOKIN VALLEY TELEPHONE COMPANY.

Office of J. P. HELFENSTEIN, Treas.

SHAMOKIN, PA., March 25, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Dear Sirs:—Your letter of March 22nd to hand. In reply would say that we started our system on April 26th, 1896, with one hundred and twenty-five telephones. We have now six of your switchboards of five hundred and twenty-five drop capacity with six hundred of your telephones in use. We have examined and tried every kind of apparatus on the market and we find none equal to yours.

Yours very truly,

SHAMOKIN VALLEY TELEPHONE COMPANY,
Per J. P. HELFENSTEIN, Treas.
H. E. MURTY, Supt.

H

WESTERN TELEPHONE CONSTRUCTION COMPANY

NATCHEZ TELEPHONE CONSTRUCTION COMPANY.

NATCHEZ, MISS., June 3, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—I am pleased to be able to say that our entire system furnished by you is giving general satisfaction.

We are using your Western Giant A telephones and your full metallic multiple type cabinet switchboard with three hundred drops in rubber cases.

After several months' trial we find them to be an immense improvement in every way over our first equipment.

We use common returns of heavy insulated wire, and line wires of No. 14 extra BB, on glass insulators after leaving distributing board.

We also use your power generators, driven by a small alternating current motor, and keep the hand generators in reserve. We have very few troubles, and have passed through several severe electrical storms unscathed.

We opened our exchange on July 1st, 1897, with one hundred and fifty subscribers, the Bell exchange having one hundred and thirty-five. We have now about reached the limit for our board capacity with a steady increase, while the Bell list does not number a dozen.

Our rates for residences and business houses are \$18 and \$30.

Yours truly,

W. P. STEWART.

THE VAN WERT HOME TELEPHONE COMPANY.

VAN WERT, O., May 31, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—We have in use two of your one hundred drop switchboards. We find them first-class and give us the best of satisfaction. One of the boards was installed over three years ago when we opened this exchange and is still doing good service.

Yours truly,

THE VAN WERT HOME TELEPHONE COMPANY.

PALESTINE TELEPHONE COMPANY.

L. C. KETCHAM, Gen. Mgr.

PALESTINE, TEXAS, June 15, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—Replying to your favor May 31st, the Company has two of your switchboards, one hundred and fifty drops, which have been in use for two and one-half years and are giving satisfaction.

PALESTINE TELEPHONE COMPANY,

L. C. KETCHAM, Gen. Mgr.

WESTERN TELEPHONE CONSTRUCTION COMPANY

RICHLAND COUNTY TELEPHONE COMPANY.

OLNEY, ILL., April 7, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—In reply to your favor of March 22nd, will say that this exchange was put in operation October 7th, 1896, with forty-five subscribers. We have now one hundred and forty-five. We are using the "Western" boards and telephones. We have two one hundred drop boards and prefer them to anything we have ever seen or handled. *They give perfect satisfaction and have never caused a cent of expense for repairs.* In our opinion they are "the only" switchboard. We have tried and tested a great variety of different telephones and find that the "Western" gives the best service of anything we have ever used. On our toll lines, of which we have two hundred and fifty miles, we have never been able to find the equal of the "Western" long distance phone. We have over two hundred of your telephones in successful operation.

Very truly yours,
RICHLAND COUNTY TELEPHONE COMPANY,
Per D. P. MOORE, Manager.

THE OBERLIN TELEPHONE COMPANY.

OBERLIN, OHIO., June 24, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:—The Oberlin Telephone Company commenced business August 1st, 1891, with one one-hundred drop board furnished by you. About a month later another board of yours with fifty drops filled was added. We now have one hundred and thirty-eight connections, we have a copper wire system on the common return. At one time we were almost persuaded by the representative of the agent of another company to make a change, but we are now satisfied that we made no mistake in purchasing the board of you. It is doing good work and when we hear of the trouble in other exchanges, we feel satisfied.

Yours respectfully, W. H. PEARCE, Secretary.

**THE PEOPLE'S TELEPHONE & TELEGRAPH COMPANY
OF SOUTH DAKOTA.**

C. L. JENSEN, President and Manager.

HOT SPRINGS, S. D., July 2, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen.—Your favor of June 12th at hand and in answer thereto we take great pleasure in testifying to what we regard the unrivalled merits of the No. 1 switchboard of your company. We are using the full metallic circuit and it is certainly the best and renders the most satisfactory service of any board of which we have any knowledge. Our board has been in use three years, with seventy drops installed and now in use, and we have practically had no trouble during the long period.

Yours truly,
THE PEOPLE'S TELEPHONE & TELEGRAPH COMPANY.

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WESTERN TELEPHONE CONSTRUCTION COMPANY

THE GORDON TELEPHONE COMPANY.

GREENVILLE, TENN., April 14, 1898.

WESTERN TELEPHONE CONSTRUCTION COMPANY,
Chicago, Ill.

Gentlemen:— It affords me much pleasure to advise you of the entire satisfaction that your apparatus and especially telephones at Piedmont, W. Va., and contingent points give, both for exchange and long distance work. Not only are the instruments in question neat and serviceable but are strong and not likely to get out of order, and in our estimation both your transmitters and receivers are superior to those manufactured by other first-class supply houses.

As witness of our satisfaction, I will ask you to forward us by fast freight twenty more of your long distance double battery walnut telephones, and also switchboard as per the enclosed specifications. The switchboard is for our new system regarding which I have already communicated with you. I am,

Faithfully yours,

REGNARD F. FENNELL, MGR.
GORDON TELEPHONE COMPANY.

