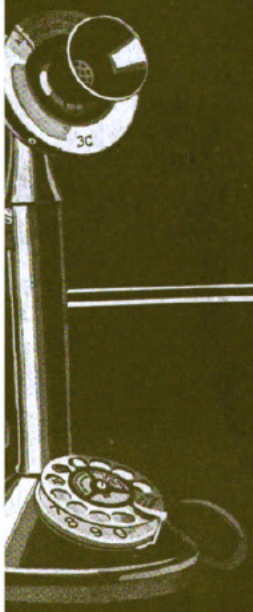
MATIC HONE

for the Telephone Profession

MONTHLY BY
MPANY, CHICAGO, U.S.A.

No. 9-10



Sept.-Oct.
1922

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erman, Chicago · October 24-27

SANTA MONICA BAY HOME TELEPHONE CO.

LOS ANGELES, CAL.

Mr. W. S. Vivian,
Mgr. Dept. of Public Relations,
Automatic Electric Co.,
Chicago, Ill.

Dear Sir:

Appreciating as we do the remarkable growth in our business and the satisfactory service being furnished our subscribers through the use of the Automatic system, we think it may not be out of place to advise you of this fact.

We have an installation of about 5000 telephones.

Our business increased over 18% in 1921.

We earn and pay 8% dividends on our stock.

Our subscribers are satisfied with service given.

These seem to be the chief essentials in the conduct of the telephone business.

Very truly yours,

SANTA MONICA BAY HOME TELEPHONE CO.

L. C. Torrance, President.

AUTOMATIC TELEPHONE

A Journal of Information for the Telephone Profession

Issued Monthly by AUTOMATIC ELECTRIC COMPANY, *Chicago, U. S. A.*

H. E. CLAPHAM - *Editor*

This publication will be sent without charge to all interested persons upon request

Vol. 10 | Sept.-Oct., 1922 | No. 9-10

Come to the Convention

THE coming annual convention of the United States Independent Telephone Association, to be held at the Hotel Sherman, Chicago, October 24th to 27th, promises to eclipse all past national meetings both in magnitude and in importance to the industry.

It will be a bigger convention because operating companies and manufacturing companies alike are making greater and more concerted efforts than ever to impress every person interested in the telephone business with the benefits to be derived from being present.

It will be an important convention because it comes at a time when there was never greater need for interchange of thought and the dissemination of new ideas in the operating, commercial and engineering fields.

The past year has wrought great changes in all of these departments; old methods and old standards, once thought to be immutable, have passed or are passing; new standards are being established. Open minded discussions of these things will be certain to bring to light new and valuable ideas that will do much to establish a firm foundation for the future of the business.

The manufacturing companies have anticipated these changes, which in many respects are revolutionary, and are concentrating every effort on making their equipment displays at the convention more interesting and attractive than in previous years. It is safe to say that this fact alone will more than justify the expenditure of time and money necessary for any telephone man to visit the convention.

The Sales Department of Automatic Electric Company has taken great care to make its equipment display complete in every detail, and even better than in previous years, notwithstanding the fact that Strowger Automatic telephone equipment has always been one of the chief centers of attraction. The time has long passed when automatic was considered to be a particular kind of telephone equipment which could be used only under appropriate conditions and could not be considered standard for all places and purposes. Every up-to-date company now knows that automatic equipment *is* standard, for the very smallest and the very largest exchanges as well as those of intermediate sizes, even though in many cases it will be some years, because of economic or engineering conditions, before its use will become universal.

Four Good Reasons Why You Should Attend the National Convention—

1. Telephone men of national repute will present the latest ideas from the commercial and engineering fields.
2. The very best and latest central office, sub-station and line construction equipment will be displayed.
3. Favorable opportunities will be presented for mutual discussion of topics by men with common interests.
4. Every facility will be offered for enjoyable social gatherings.

Besides an unusually attractive display of central office automatic switching equipment, Automatic Electric Company will exhibit to the telephone field for the first time a series of entirely new and ultra modern common battery telephone instruments, — Series 21 — both wall and desk types. These telephones have taken many months to develop and will undoubtedly present standards of perfection heretofore unknown.

Automatic Electric Company extends to every telephone man at the convention a most cordial invitation to visit its exhibit rooms and to make the most thorough study of the various equipments on display, to watch them in operation, and to discuss them with the Company's engineers and experts who will be present, and to ask the representatives of companies already operating it what their experience has been.

Every facility will be provided to enable operating companies to study the adaptability of Strowger Automatic equipment to their requirements. Such a study will carry with it no obligation, will commit them to no particular course of action, but will provide them with valuable data upon which to base clear, constructive thinking as to the solution of the problems many of them now face.

While at this writing all of the details of the convention program have not yet been made public, it is known that the subjects to be covered will be of timely interest and of the utmost importance to the field. Among them will be included radio development and its relation to the telephone industry, Bell and Independent Relations, and Substation Protection.

The benefits to be derived by visiting the convention for at least one or two days cannot be overestimated. The value received will be many times the necessary expenditure of time and money.

Type 21 Wall Set

Type 21 Desk Stand

"Type 21"—The Latest and Best in Telephone Instruments

These New Wall and Desk Telephones are the Result of Years of Experience and Research by Automatic Electric Company's Development Staff, and Combined All the Approved Features of Existing Types, as Well as Many Others That Are Distinctive and Entirely New

ALTHOUGH the greater part of the efforts of Automatic Electric Company's development and research staffs have been directed to perfecting Strowger Automatic central office equipment, and in adapting it to new and different service and traffic requirements, the proper design of subscribers' station equipment has never been subordinated to this process.

Nothing has been permitted to enter into central office design that might tend to make substation equipment inconvenient or unreliable in operation. Nor have any changes been permitted in telephone design that might adversely affect central office equipment operation. The improvements in both equipments have proceeded along parallel lines.

With these points continuously in mind, and realizing the necessity of establishing a high and permanent standard in telephone instrument design, to conform with the rapid strides made during the last few years in the use of automatic equipment, the efforts of several members of the development staff of Automatic Electric Company have for many months been concentrated on the design of a new series of telephones,—instruments that would establish new and better standards—both in exterior appearance and in mechanical and electrical construction. The new Type 21 Wall and Desk Telephones, illustrated on these pages are the result.

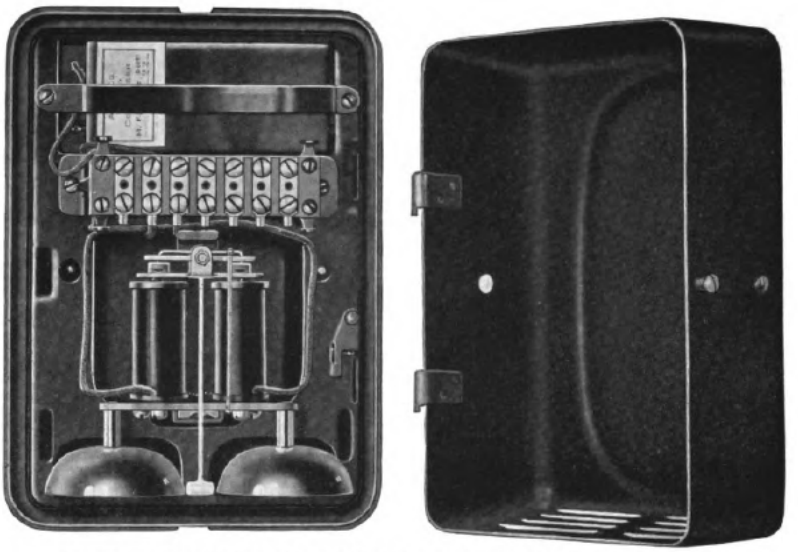
Side View of Desk Stand, Showing New Mounting Neck

These new telephones are not only adapted for use with all two-wire automatic central office equipment, but may be used to advantage with any common battery manual switchboard as well. This feature is of particular value to those companies who are now operating common battery manual switchboards, and who are contemplating the installation of automatic equipment some time in the future, in that

The gongs are fastened to posts on the ringer frame inside down, and are drilled eccentric to permit easy adjustment. The ringer is entirely enclosed and the bottom of the cover perforated with radiator slots.

To protect the parts from dust when installed and from injury when handled in shipment, a zinc base cover is provided. This is fastened to the back of the base by two screws, and is grooved and perforated to accommodate the line wires.

Another interesting and valuable feature of the wall set is that the entire base and interior assembly is interchangeable with that of the desk set ringer box, so that a ringer box may be converted to a wall set or vice versa merely by changing the cover assembly.



The Type 21 Bell Box Is Identical With the Wall Set Except for the Plain Steel Cover

In each case the cover is fastened to the base by means of "hook and slot" hinges. The cover may be removed entirely by opening wide, and lifting slightly. When the cover is closed the hinges are completely concealed. The hinge rivets are cut flush and are invisible from the outside.

The locking device on the cover is another new and interesting feature. It consists of a tongued spring riveted to the side of the cover and operated by a screw. Turning the screw in slightly causes the tongue to engage a slot in the base.

The design of the cover is such as to combine an extremely pleasing appearance with convenience and sturdiness. On the cover of the wall set are mounted the transmitter, calling device, receiver hook and springs, terminal block and necessary wiring. The terminal blocks of the base and cover are connected by a neatly formed cable.

The dial is mounted below the transmitter at a pleasing and convenient angle. The receiver hook is easily removable for convenience in shipping. A detachable directory hook is furnished with each ringer box or wall set.

The receiver cap and shell, and transmitter mouthpiece are constructed of bakelite, and the receiver and desk stand cords are of the same shade of brown as the base cover. Both the wall and desk sets may be furnished for use with any type of circuit.

For city service they may be furnished with series or booster circuits for use on both party and individual lines. These circuits have been revised to embody improved dialing and transmission features which will, it is believed, make them superior in operation to all existing types.

While the engineers responsible for these improvements in telephone design and construction are open minded regarding the possibility of still greater improvements at later dates, it is felt that these new instruments, designed with a view to future as well as present trends of development, represent the very newest ideas, in exterior and interior design, and the utmost in convenience, in simplicity of construction, and in ease of maintenance.

Every Part of the Wall Set Is Easy of Access for Adjustment or Replacement

Canvas of Rural Subscribers Shows Overwhelming Preference for Automatic

A LITTLE more than a year ago, a ninety line C.A.X. (Community Automatic Exchange) was installed for the LaPorte (Ind.) Telephone Company at Union Mills. The expressions of approval from subscribers directly after the cutover have been again emphasized, after a year of service, by the results of a recent canvas, which was conducted personally by Mr. W. S. Vivian, Manager, Department of Public Relations, Automatic Electric Company, with the assistance of Miss White, secretary to Mr. Frank V. Newman, General Manager of the LaPorte Telephone Company.

About twenty-five subscribers served by the Union Mills C.A.X. were called on. With two or three exceptions they were farmers and were on party lines serving from eight to twelve subscribers per line. Almost without exception, the subscribers were enthusiastic about automatic service, and stated that they would not want to revert to the former magneto service.

Following are extracts from some of the expressions received:

"We like automatic because we always know whether we can get the line desired."

"The automatic service is quicker and more accurate."

The Union Mills C. A. X. Is Installed in This Building. The Picture Shows F. V. Newman, General Manager of the LaPorte Telephone Company and Miss White, His Secretary.

"The signals on the automatic system are more clear and distinct."

"Our new telephones talk better than they did with the old system."

"The new automatic service is superior to the old style service in every way."

"We have much less trouble with the automatic."

One subscriber who uses the free toll service to LaPorte and other exchanges of the LaPorte Telephone Company, as well as other long distance services, said, "The automatic is quicker and better in every way. We do not have to wait for central to answer. We do a great deal of talking over the country, and in fact use the long distance service to all nearby towns and cities, and we find the dial telephone a great help in the handling of these calls."

Others spoke particularly of the unfailing distinctness of the code rings used to signal party and rural line subscribers. These signals are machine generated, and are therefore more uniformly reliable than the hand controlled signals of a magneto exchange.

The Union Mills C.A.X. is typical of a number of small automatic exchanges, that have been and are being installed in small towns and rural communities in various parts of the country.

An Interesting Piece of Automatic Telephone History

IN these days of progress when telephone companies are "going automatic" one after another in rapid succession, the substitution of dial service for manual service creates no great stir except among the subscribers and operating companies immediately affected.

Back in 1892 when the first Strowger Automatic exchange was installed at LaPorte, Indiana, things were different. Automatic switching of telephone lines was just as new and intriguing to the public as motorless flying is today, and attracted just as much attention.

Soon after the LaPorte automatic exchange was cut in service, Mr. Joseph Harris, then secretary of the Strowger Automatic Telephone Exchange, the predecessor of Automatic Electric Company, arranged for a special train from Chicago to LaPorte and sent in-

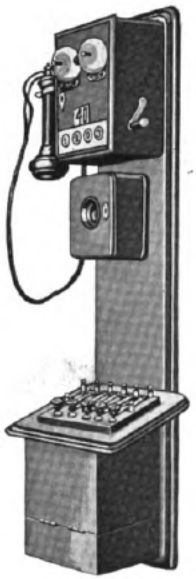
vitations to a number of interested people to visit and inspect the new equipment.

The letter of invitation reproduced herewith was furnished by courtesy of Mr. G. H. Storey of LaPorte. Mr. Storey was Superintendent of the LaPorte Waterworks for many years. LaPorte is famous for being not only the home of the first automatic exchange, but also of the first waterworks system in Indiana.

Ask for This Booklet at the National Convention

AN attractive new booklet, describing the equipment used in the latest Strowger Automatic telephone exchanges, has recently been released by Automatic Electric Company for distribution to all interested persons. This will be available at the National Convention or will be mailed to any telephone man upon request.

The Evolution of the Strow



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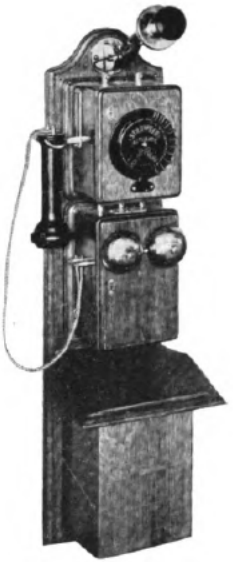

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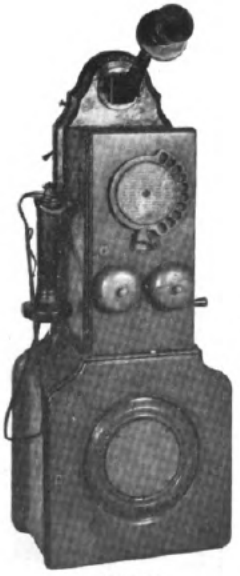

1900

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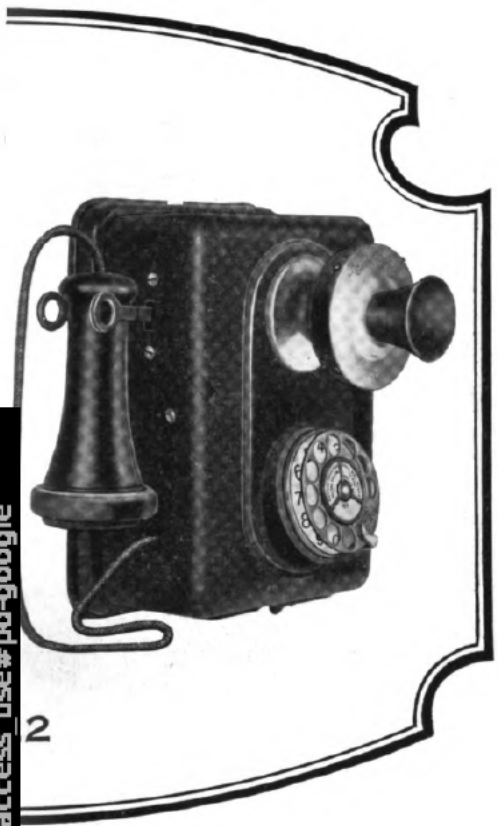

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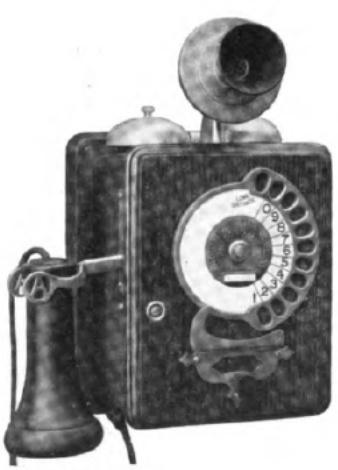


1907

Telephone Service at Long Beach, Cal., Now Automatic

Strowger Automatic Installation for Exchanges of Associated Telephone Company at Long Beach, Cal., Mark New Era in City's Growth. Both Company and Subscribers Express Entire Satisfaction Over New Service

"THE conversion of Long Beach's new automatic exchange has 'gone over' one hundred per cent perfect, and the telephone service is now virtually in the hands of the telephone users."

The above statement was given out by the Associated Telephone Company of Long Beach, Cal., on the morning of Sunday August 20th, shortly after the "cutting dead" of the old manual equipment and the pulling of the insulating strips which separated the new automatic switchboard from the subscribers' lines.

The same day found most of the subscribers of that city dialing their telephone calls with as much ease and confidence as if they had been accustomed to it for years past, and in spite of an unusually severe load, caused largely by subscribers who wanted to "experiment and see how the new system worked," the equipment more than lived up to expectations.

The Long Beach press, in reporting a statement given out by Mr. Heffley, the local manager, said that the Company was well pleased with the change, and that the service had exceeded its expectations. A few people had made the mistake, according to Mr. Heffley, of attempting to use their old numbers, forgetting that new numbers had been assigned in every case. He expressed the belief that after a short period of readjustment and experience in use, no trouble would be found in using the new system.

The New Main Office Building at Long Beach.

Telephone history at Long Beach began in 1903 when the Home Telephone Company was organized and opened its exchange with 168 subscribers. The growth of the Company continued steadily and rapidly until 1916, when negotiations were completed for the physical merger of the properties of the Home Company and the Pacific Telephone and Telegraph Company. This was completed October, 1918, the total number of subscribers, after the elimination of duplicate service, amounting to about 6600.

Main Office Switchroom Showing Information and Complaint Desks.

During the past four years, the subscriber list has increased to about 13,000, twice that of 1918, showing that the telephone company has lived up to its adopted policy of, "as Long Beach grows, so the telephone industry grows."

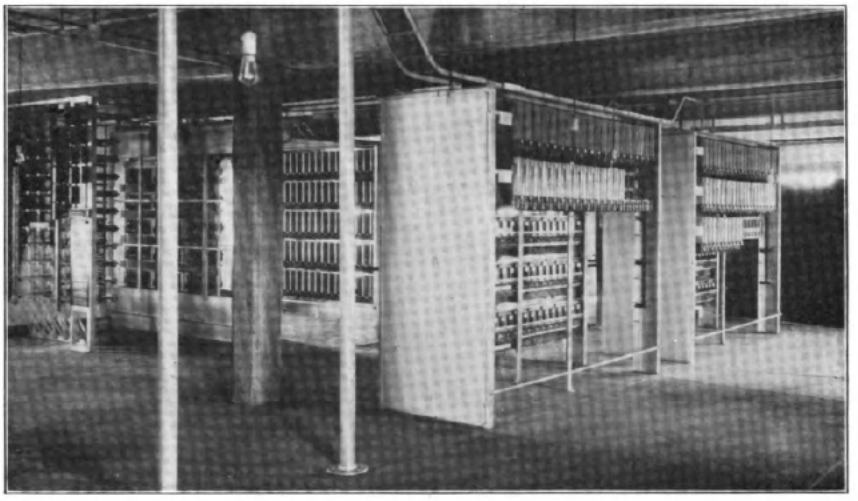
A little more than a year ago, the officials of the telephone company, of which Mr. Geo. B. Ellis is President and Mr. Sam R. Heffley, Manager, anticipating the continued growth of the city, began investigations to determine kind of the telephone equipment that would conform most suitably with the promised rapid development. The result of this investigation was the conviction that automatic was "the" service of the future, and a contract was accordingly made with Automatic Electric Company for the manufacture and installation of the switchboard and other equipment.

In October of last year, the telephone company began preparations by arranging for the construction of a new main exchange building at Fifth St. and Elm Avenue. Immediately upon its completion, the Associated Telephone Company established in it its business office.

In May of this year the installation of the automatic switchboard was begun by a crew of men from Automatic Electric Company under the supervision of Mr.

C. M. Sells, chief installer. Through the earnest work of these men and that of the employes of the local company, the installation of the switchboard at the Main office and East (branch) office, as well as the necessary extensions and changes in the outside plant, were completed and everything was ready for conversion on the scheduled date.

The actual cutover was begun at 12:30 A. M. on Sunday morning, August 20th, and was completed in about ten minutes. The cutover procedure was directed jointly by Mr. C. R. Austin, Engineer for the Associated Telephone Company, Mr. H. P. Mahoney, Superintendent of Installation and Operation of Automatic Electric Company, and Mr. James Engh, Operating Department, Automatic Electric Company.



The East Office Automatic Switchboard.

CUTTING JUMPERS

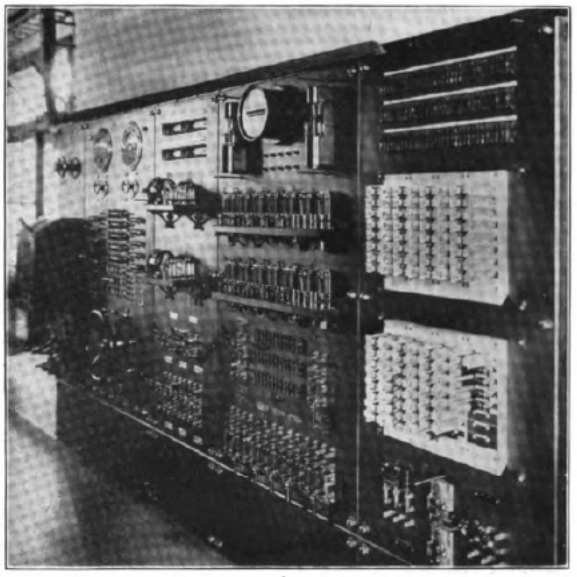
The first operation was the cutting dead of the manual switchboard in the old Main office at 225 East First Street. This was accomplished by cutting the jumper wires at the old main distributing frame. Simultaneously, the jumper wires at the East office were cut, and in both offices connection was then made between the subscribers' lines and the new automatic switchboard.

The final operation was the removal of the insulating strips at the new distributing frames, bridging the final gap between the telephone subscribers and automatic service facilities. There were, of course, many other details to be considered in connection with the cutover process. All these, however, had been carefully prearranged, with the result that there was not a hitch in the entire proceeding.

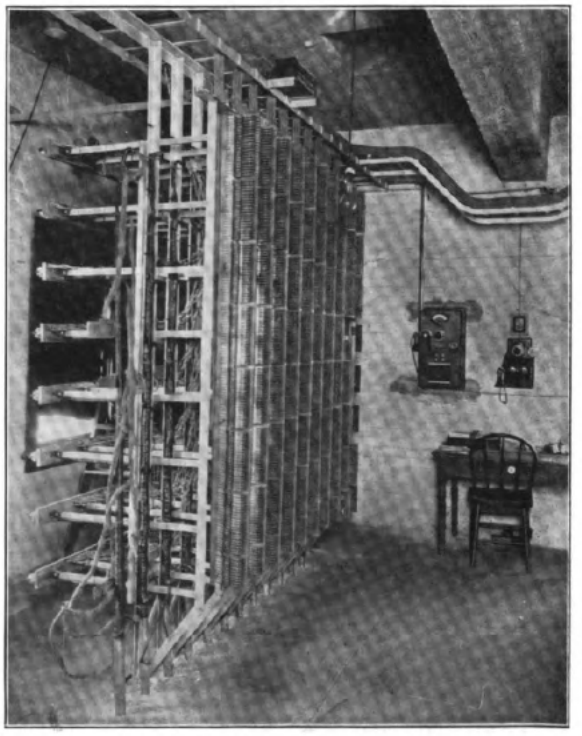
From an equipment standpoint there is nothing that can be regarded as unusual, or radically different from other recent automatic exchanges. The Main office automatic switchboard has an installed capacity of 1,300 single lines, 2,100 party lines, and 400 P. B. X. trunks. The East office switchboard serves 200 single lines and 1,000 party lines. One hundred one-way trunks connect the two offices. The two switchboards serve more than 13,000 stations.

REPLACES C. B. MANUAL

The manual switchboards replaced are both of the common battery type, that at the Main Office having been installed about seventeen years ago, and recently



Long Beach Main Office Power Switchboard.



East Office Main Frame Showing Wall Test Cabinet

Long distance telephony is described briefly, but some very interesting facts are given about the transcontinental line, with a brief showing of the vacuum tube repeater.

Telephone traffic and measured service are grouped together, with their fundamental principles clearly explained.

Phantom, simplex, and composite circuits come next.

Outside construction receives ample space (117 pages) including open wires, cables, poles, underground conduits and cable splicing. The writing shows the hand of experience in this work—experience obtained by years of practical construction and operation, and based on sound engineering principles.

After discussing office terminal cables, service connections, substation wiring and electrolysis of underground cables, comes a chapter on telephone engineering. This covers only the engineering of telephone plants inside and out.

A chapter on telephone testing (manual and automatic) closes the book.

The chapters are short and well written. It is an easy book to read and should continue to occupy the high place which the previous edition earned.

Notes on the Operation and Maintenance of an Automatic Office

Extracts from a Paper Presented Before the Canadian Telephone Convention at Montreal, P. Q., August 28th-September 1st, 1922

By A. J. BARNES

Equipment Engineer
Maritime Telegraph and Telephone Company, Ltd.,
Halifax, N. S.

THE object of this paper is to outline some of the operating and maintenance points of an automatic office and to compare certain of these features with those of a manual office under similar operating conditions.

Since February 19th, 1921, the Maritime Company has had the "Lorne" automatic office in service in the multi-office system of the city of Halifax, N. S. During the past month we have kept on a similar basis, a monthly analysis of the operating costs and service conditions in each of the Lorne automatic and Sackville manual offices. The service requirements of these two offices are similar in nature. The two offices serve adjoining sections of the city, and each serves both business and residence subscribers. They have very similar traffic load curves with the same busy hour load and length of holding time per call. For the period under analysis both offices have been operated by our own trained men. In the case of the automatic office this staff was formerly in charge of the manual plant, and they received their experience with the automatic equipment during its installation and while working during a sixty day maintenance period with the chief installer of Automatic Electric Company of Chicago.

Scope of Paper:

To deal with all of the three branches, commercial, traffic, and plant, would be to cover too wide a subject. All of these must be considered when analyzing the service rendered to the subscriber. This paper will therefore deal chiefly with plant conditions, with just a short prelude on some points relating to the other two departments.

Commercial

The members of the commercial staff, who are in daily personal touch with our subscribers, state that there is a distinct contrast in the attitudes of the automatic and manual subscribers. The average subscriber who has used the automatic service prefers it to the manual system. A question very often asked by the manual customer is, "When will the company give me the dial system?" Subscribers who use both classes of service (business service in the Sackville area and residence service in the Lorne area, or vice versa), are decidedly in favor of the automatic. The requests made by others using the Lorne service only are such as to recommend converting the whole city to automatic. It would appear that once they form the habit of controlling, by means of their dials, complete connections, they object to passing their calls to operators as required on trunked calls to manual offices which are not equipped with call indicator apparatus.

We did not go to the elaborate expense of giving personal instruction to each subscriber by means of a flying squad, at the time the new service was cut over. All the instruction received by our subscribers was given by printed word, either in press advertisements or in pamphlets mailed out with the bills. This method covered our situation with great satisfaction both to the subscribers and the company.

Traffic:

Peg count records are made daily of the calls per hour handled over various groups of trunks, such as:

(1) Outgoing calls to each group of first selectors serving various classes of line switch units through their common groups of secondary line switches.
(2) Incoming calls from other offices at incoming selectors.
(3) All calls handled by second selectors.
(4) All calls handled by third selectors.
(5) All calls handed by connectors separated in groups according to requirements.

As this particular office was designed with trunking equipment for its full initial installation of 2900 subscriber lines, and to date only about 70 per cent of the subscriber line switch equipment is working, it necessarily follows that there has been no need of careful traffic studies. But this condition will not last for long, and traffic conditions will have to be followed more closely to meet future growth requirements.

At the manual offices, the traffic department has found it necessary to keep the service up to a uniform high standard, as it is our opinion that the advent of the automatic service has made the demands of the manual user more exacting. This is especially true of those subscribers who are using both services.

The incoming calls at manual offices are handled at regular "B" positions. The incoming trunk circuit, which is cord ended, was the former manual circuit with a change in the keys and a slight alteration in the wiring. Call indicator apparatus could not be proven in due to the small number of "B" positions now in use. The traffic department reports that the operating load maintained at this inward position is about the same as on a call wire basis. It is important that the answering time on these incoming trunks must be low, otherwise if the automatic subscriber is kept waiting he will hang up his receiver and dial the office digit again. This procedure usually results in a subscriber coming in over another trunk either on the same operator or at another position. A traffic situation is thus created similar to two manual operators dodging each other on a group of trunks between a P.B.X. board and the main exchange. To overcome this feature we have found it necessary to reduce the answering time to an average of about two seconds.

In a manual system if the "B" operator discovers a trouble on the incoming trunk, she will immediately cap this cord and assign other trunks to the "A" operators. With the automatic arrangement a trunk out of order is not guarded from incoming calls until it is made busy at the automatic end. Hence it is most essential that the troubles discovered at a manual office should be quickly reported to the automatic office for action.

The dialing of the outgoing trunk calls by an "A" operator at the manual switchboard has not caused any appreciable drag over the call order system. The time interval involved in dialing a call was found to be about 15 per cent more than with the old method. But the machine ringing feature, distinctive busy tests and accuracy of connection and rapid disconnection at the automatic end has greatly reduced the percentage of voluntary supervision required by the "A" operator, so that the time lost in the establishment of a connection has been practically eliminated by the positive features of the automatic service.

PLANT:

Engineering and First Costs:

As the first cost of automatic equipment is higher per line than manual apparatus it becomes more desirable to reduce the amount of spare equipment to as low a point as possible. It is a debatable question, in engineering initial equipment, if one should follow the standard three year period of excess apparatus. We have found that the automatic equipment is more flexible than manual, and that extensions and alterations can be made without affecting the service to the same extent as in manual offices. The traffic department always looks for trouble when an installation crew starts work in a manual office, as the period during alterations is not conducive to accurate and quick working by the operators. The switches, however, have none of these same human failings.

Again, it is a difficult and often a costly proposition to obtain accurate traffic data for engineering the initial requirements of an automatic office. The results usually show a wide variation between maximum and average conditions, and also with different seasons of the year. We would recommend that specifications for equipment be based on very conservative traffic data with cabling and mounting frames for maximum conditions. With the automatic system of alarms signals and traffic meters it becomes almost second nature to the maintenance staff to ascertain quickly any congestion of traffic in the various branches of the trunk plant. Peg count meters will give true traffic conditions, and if the cabling is based on the maximum requirements it becomes a simple procedure to install the extra switches where needed and to remove the grounds on the release trunks. Conditions of surplus or insufficient equipment will quickly and accurately become known to the operating staff.

Where the community to be served requires a number of classes of service such as one, two, or four party flat rate, one party message rate, etc., an intermediate distributing frame between the line switches and connector banks will increase the working efficiency of the plant, and will no doubt prove itself in from a cost standpoint. With such a frame and facilities for balancing up the originating traffic, there is a smaller difference between the average and maximum requirements, and therefore a reduction in the amount of equipment needed. It might be contended that such a frame, as with the "B" type main frame, mixes up the apparatus so that it becomes difficult for the maintenance staff to locate quickly a case of trouble on a given subscriber's line. But a good system of card records, which is essential to any type of office eliminates this argument.

MAINTENANCE STAFF:

Shortly after the cutover we had a staff of 20 employes for both inside and outside maintenance work. In June, three months after the cutover this staff had been reduced to 13 employes, and again in March, 1922, we made a further reduction to eleven, as follows:

1 Wire Chief
2 Switchmen
2 Test Board and Rack Men
2 Routine Test Girls
1 Complaint and Trouble Operator
2 Outside men—one on routine inspection of subsets, and the other a trouble shooter.
1 Janitor

Thus the cost of operation of the automatic office has been gradually decreased. It has been our experience as well as that of other companies, that after six months the staff becomes more familiar with the equipment and more expert in their work. We also found a great reduction in the work required at the traffic desk, in fact this traffic has now become so light that at certain hours of the day it is covered by the routine test girls who continue their testing and are called to this desk by the night alarm signal.

We further estimate that this present staff of eleven employes will handle this office with a considerable increase in the number of lines. We are aiming to operate this office, by the time it has reached its ultimate growth at a figure no higher than the plant maintenance figure of a manual office of similar size. If the regular routine test work of an automatic office is to be kept strictly up to the standard, and this practice we consider essential for satisfactory operation, then there is a limit to which the staff can be reduced. An automatic office with an ultimate capacity of 8000 lines should have an initial installation of at least 4000 subscriber lines to obtain a good staff efficiency at the start.

Some C. A. X. Facts

WHAT THE C. A. X. IS—A simple automatic switchboard for the small town or rural community arranged to operate without attention, except for infrequent visits at intervals of one or two weeks. It is simple enough to be entirely reliable at all times, economical to install and easy to maintain. It is complete enough to be adequate for all small town traffic or service requirements.

WHAT IT DOES—Provides first class automatic service twenty-four hours a day without operators. Entirely eliminates operators' salaries, and thereby makes operation profitable. Completely solves all problems of small exchange service.

HOW IT DOES IT—All connections between local subscribers are handled automatically by means of the subscriber's dial and the automatic switches.

Whenever it is desired to make toll or other calls requiring the services of an operator, a special number is dialed which signals an operator at a convenient attended exchange to which the C. A. X. is connected by one or more trunks.

The C. A. X. installation at Boston, Indiana, (pictured above) is typical of many that have been placed in service in various parts of the country. The Manager of the Company operating the above writes, "The C. A. X. installation at Boston has eliminated the last manual switchboard from our system. After fifteen years' experience in operating Automatic, I am more than ever convinced that it is the only real service."

Further facts gladly supplied for the asking.

AUTOMATIC ELECTRIC COMPANY

Factory and General Offices, CHICAGO, ILLINOIS

BRANCH OFFICES:

NEW YORK CITY, 21 East 40th St.; CLEVELAND, 415 Cuyahoga Bldg.; PHILADELPHIA, The Bourse Bldg., COLUMBUS, 516 Ferris Bldg.; BOSTON, 445 Tremont Bldg.; ROCHESTER, Mercantile Bldg.; DETROIT, 525 Ford Bldg.; WASHINGTON, 905 Munson Bldg.; CINCINNATI, Union Central Bldg.; LOS ANGELES, 238 San Fernando Bldg.; PITTSBURGH, 608 Fulton Bldg.; KANSAS CITY, 1001 New York Life Bldg.

ASSOCIATED COMPANIES

International Telephone Sales and Engineering Corporation, New York

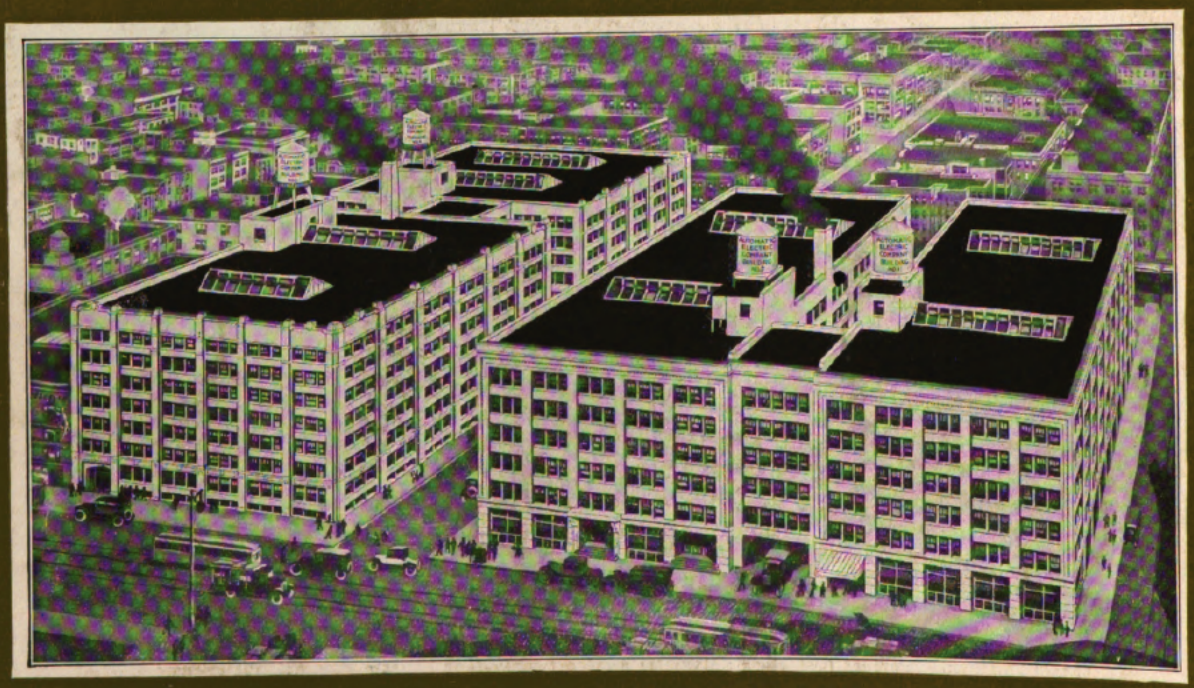
International Automatic Telephone Co., Ltd., London

Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston, Paris

Automatic Telephone Mfg. Co., Ltd., Liverpool

Automatic Telephones, Australasia, Ltd., Sydney

The Home of the Automatic



Automatic Electric Company's Factory, at the Corner of Morgan and Van Buren Streets, Chicago. It has a Floor Space of 10 Acres and is Devoted Exclusively to making Automatic Telephones and Telephone Supplies.