

THE BELL TELEPHONE NEWS

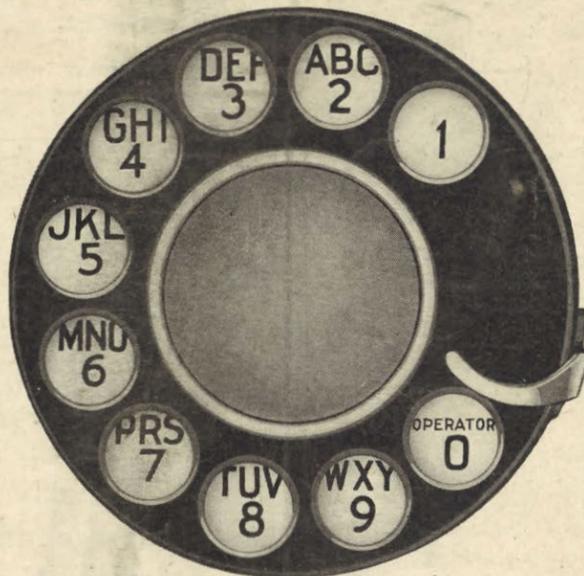
VOLUME NINE



NUMBER NINE

In This Issue —

“Machine Switching for the Bell System”



Subscriber's Dial

By Bancroft Gherardi, Vice-President and Chief Engineer, and
Harry P. Charlesworth, Equipment and Transmission Engineer,
of the American Telephone and Telegraph Company.

APRIL 1920

X-Ray Lighting

from Concealed Sources

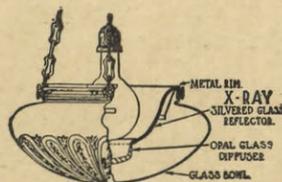
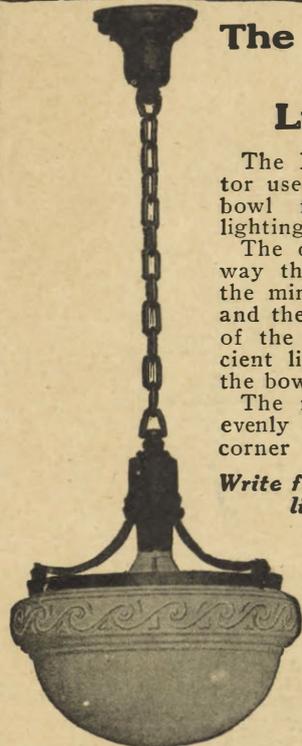
The X-Ray Reflector in the Luminous Bowl

The X-Ray silver-mirrored reflector used inside the X-Ray luminous bowl fixture gives true indirect lighting.

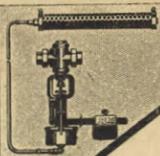
The diagram below illustrates the way this principle is worked out—the mirror reflector inside the bowl and the porcelain cup at the bottom of the reflector which allows sufficient light through it to illuminate the bowl itself.

The result is a flood of mellow, evenly diffused light to the furthest corner of the room.

Write for our new booklet on office lighting—Serial No. 134



National X-Ray Reflector Co.
New York CHICAGO San Francisco



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SAVE LABOR
SAVE MATERIAL

with

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Your employees, in office or shop, work better, with fewer mistakes and accidents, when the room temperature is *automatically kept right*.

Automatic control in processes involving heat saves labor and material.

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Ask us to prove it to you at *our risk*.

THE POWERS REGULATOR CO.

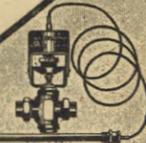
Specialists in Automatic Heat Control

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**The Canadian
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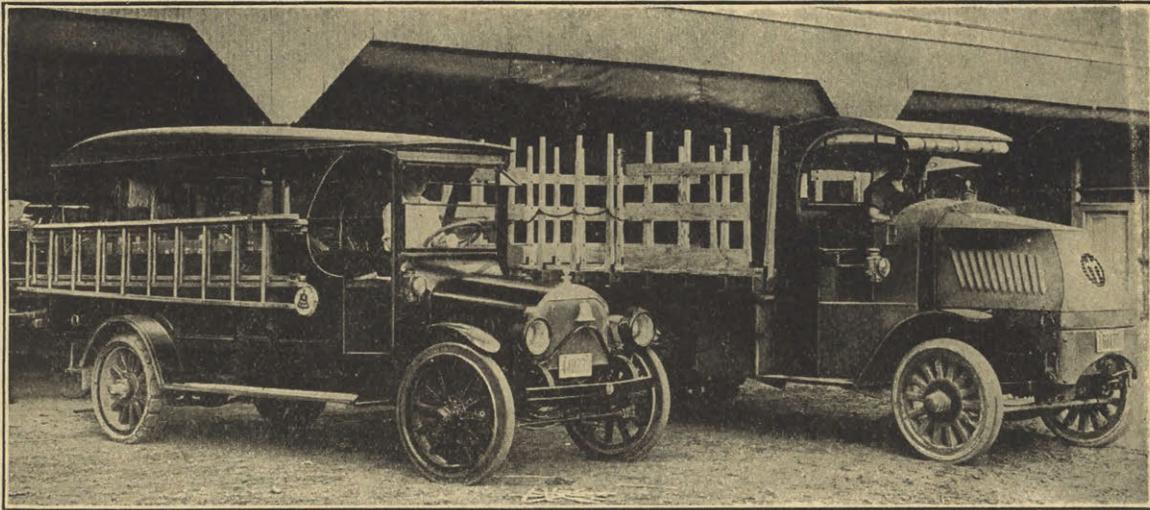
will put you in touch with personal and experienced insurance service for getting most reasonable rates and broadest protection for your property, household goods, automobile, baggage and jewelry against fire and theft.

Get our advice—our firm is manager of the insurance department of the A. T. & T. Co.

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INSURANCE IN ALL ITS BRANCHES
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Mack Trucks



Light and Heavy Duty Mack Trucks in the Service of the Southwestern Bell Telephone Company, St. Louis, Mo.

MACK Trucks have had a long record for dependable service in the telephone industry. Some of the earliest trucks used by the Bell Telephone Companies were Macks. Among the special equipments furnished were: Post Hole Diggers, Winch Trucks, and large fleets of Mack Transportation Trucks, most of which are still rendering satisfactory service.

The high standard of quality which goes to make up Mack Trucks is reflected in the big mileage rolled up year after year, with practical certainty of the trucks always being ready to respond when needed in an emergency. Their regularity of service is due to their excellence of material and construction, which gives the best truck insurance against costly operation.

Capacities, $1\frac{1}{2}$ to $7\frac{1}{2}$ tons.

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INTERNATIONAL MOTOR COMPANY, New York

To pull a large Pole
in 8 minutes or to
straighten any Pole in
less than Two minutes
use the

No. 328 Simplex Pole Pulling and
Pole Straightening Jack



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UNIQUE Furnaces and Torches



Unique Furnaces and Torches burn kerosene oil, generate quickly, and give about twice as much heat as can be obtained from gasoline.

The combustion is so nearly perfect that there is practically no unburned carbon to clog the burner and generator.

They are indorsed by fire underwriters because they are safe; by telephone companies because they are economical and durable, and by cable men and line men because they

eliminate trouble and bother.

Write us today and we will send you our literature describing these articles, and demonstrate to you every claim that we make for them.



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TIPTON, INDIANA

The National City

Bank is a member of the Federal Reserve System and of the Chicago Clearing House Association.

Savings depositors in this bank are afforded the same security and service as the depositors of large sums in our Commercial Department.

Liberty Loan Bonds carried in safe-keeping for our Savings Depositors without charge.

The National City Bank OF CHICAGO

Southeast Corner
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OPEN SATURDAYS 9 A. M. TO 8 P. M.
ALSO MONDAYS UNTIL 6 P. M.

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National Bank Protection for Your Savings

Take advantage of this feature by opening an account in our Savings Department. 3% interest on savings deposits.

The years just ahead of you are big with opportunity, and you should save so as to take advantage of them.

FIRST AND OLD DETROIT NATIONAL BANK

Member Federal Reserve Bank

BELL TELEPHONE NEWS

One Policy

Universal Service

One System

Volume 9

CLEVELAND, OHIO, APRIL, 1920

Number 9

THE MONTH IN CLEVELAND

News Notes and Personal Items of Interest

W. F. Johnson, Representative

Revenue Accounting Department

Lulu Mahn, Correspondent.

A very enjoyable party was given at the home of Miss Harriet Hackett on February 16th. The guests were the girls of the addressograph section, also the Misses Olga Sedlay, Olga Zieske and H. Ohmer. There was plenty of music and jolly games during the evening but the best part of all was the eats, especially the whipped-cream Jello; the table was very pretty with its valentine decorations. All had such a happy time that it was quite late before they turned their faces homeward.

Miss Barbara Ohmer of the addressograph section left March 13th for Cincinnati and wishes through the NEWS to express her gratitude to her co-workers for the pleasant hours spent with them.

Miss Anna Williams had often told her associates that when she married she wanted to wear a blue satin dress. When she told them one day that she had bought a dress of that description they surmised that the eventful day was near and so it was. Miss Williams changed her name to Mrs. George Munde March 10th, the ceremony being performed at her home at 7 p. m. After celebrating, she returned to work and was the center of interest, receiving congratulations and best wishes of her co-workers.

Miss Mildred Kulow entertained the O. N. T. Club on February 26th at her home, 8010 Cory avenue. The girls brought their sewing but very little was accomplished as Mr. Trimmer, the violinist for the evening, with his accompanist, Miss Mumea, rendered such a wonderful musical program that the members kept their feet instead of their hands in constant motion. Miss Kulow makes a delightful hostess and the man whom she expects to entertain for life is surely to be envied.

Why Some of Us Come to Work

- Miss Brennan—To show us her sweet disposition.
- Miss Brinker—Ask her yourself.
- Miss Buettner—To keep the A. B. C. cars in business.
- Mrs. Churchward—To nurse the sick.
- Miss Fenner—To display her diamond.
- Miss Fathauer—To give general information.
- Miss Grossman—To keep her noon-dates.
- Miss Kaye—To entertain the girls at noon.
- Miss Kulow—To increase her bank account.
- Miss Lawyer—To become an expert accountant.
- Miss Mahn—To raise ferns—overnight.
- Miss Marinchak—To study—stenography.
- Miss Moore—To cheer us with her smile.
- Miss O'Connell—To cultivate her charm.

- Miss Patten—To be somebody's "pal."
 - Miss Raufman—To work orders.
 - Miss Roseweld—To become popular.
 - Miss Ryan—To figure her income tax.
 - Miss L. Smith—To distribute our daily mail.
 - Miss Steffens—To act "Dignified."
 - Miss Stiffler—To receive her mail.
 - Miss Wagner—To lend a cheerful, helping hand.
 - Miss Walsh—To make herself count.
 - Mrs. Munde—To advise us on an interesting subject—namely, "How to keep a husband."
 - Mr. Brett—To pat his pet lock of hair.
 - Mr. Folsom—To eat pie a-la-mode for lunch.
 - Mr. Herbkesman—To buy gasoline for his Dodge.
 - Mr. Martz—To display his fine penmanship.
- And now the real reason why we all come to work is:
- To wear out our old clothes,
 - To tell about our woes,
 - To talk about our beaux,
 - And attend the weekly shows.

Garfield News

Zella Bowyer, Correspondent.

Miss Anna Johnson failed to report for duty February 26th, but appeared the next morning with a beautifully carved wedding ring and a new name. She now signs her checks "Mrs. Finau." The following day another surprise came—Miss Irene Hudec revealed her secret (and they say women can't keep secrets). She became Mrs. Levy in October, 1919.

Mrs. Hazel Graham believes in "Safety First," and is wearing glasses since Misses J. Krnoul and Magdeline Boyert received their diamonds.

Mrs. Jack Geshner is glad that their son will have a birthday every year. Jack Jr. arrived February 28th, tipping the scales at nine pounds. Both mother and son are doing nicely. She says her troubles are all "Jacks." It used to be multiple jacks.

A Leap Year dance was given by the girls of this office in February at the Pythian Castle. Nearly two hundred couples attended and all reported a good time.

Miss Florence Gales has been home sick (home-sick for Garfield Office?). She was about to take up her new work as assistant city instructress. The girls miss her very much and wish her every success in her new work.

Rosedale's loss is Garfield's gain. We are very glad to welcome Miss Hazel C. Polcar, successor to Miss F. Gales.

Miss A. Murin was maid-of-honor at her cousin's wedding

BELL TELEPHONE NEWS

in Newark, New Jersey. She has been wearing a smile ever since her return and we are wondering if she met him in Elizabeth, Linden or New York, as she visited all three.

Harvard Notes

Frances M. Edwards, Correspondent.

Many of the Harvard operators have returned and the office seems more pleasant with the familiar faces there again. Among the most seriously ill were: Mrs. Clara Miller, Miss Katherine Strube, Miss Emma Naderer, Miss Mary Guiliano.

Miss Lillian Lord, evening chief operator, had her tonsils removed on a Sunday so she could report for work Monday evening, but fate made her take ten days' leave in spite of her plans. Mrs. F. Edwards acted as evening chief during her absence.

The "big sister" of the Harvard exchange is somewhat of a fortune teller. One day Miss Carrie Reidl seemed unusually anxious to have her fortune told. Miss Strube, "big sister," shuffled the cards and started, "You have just answered 'yes' to an important question—and, why, yes there is a ring so close to you—let me see your hand." But there was no ring—for Miss Reidl had been wearing it in her pocket. Since Miss Strube could see it why not be game and wear it, Miss Reidl?

Now we hear Maxine Leonard is wearing a diamond on the Q. T. also but promises us by the time this appears in print she will be game too.

The Prospect Do-Do Club has accepted our challenge and (by the time this appears in print) we know will be annihilated completely. Come on, other offices, and challenge us, too.

Miss Margaret Heid has been transferred to Main office as supervisor. Many of the operators feel as if we can not do without Margaret Heid at Harvard. She was one of our general chairmen representing the "Harvard Group" in the association.

Anyone calling "Harvard" on February 29th (Sunday) and the "one in charge" would have been surprised to hear a voice say "Miss Sexton." Oh, yes, our chief operator is "on the job" seven days a week. When Miss Fathhauer was taken sick, Miss Sexton came in from Lakewood and took charge until she could assign some one else in Miss Fathhauer's place.

Miss Katherine Strube will move to Baltimore, Maryland, where her brother has purchased a farm. Many of the newer supervisors owe their training to Miss Strube's care and patience as senior supervisor. We are hopeful Miss Strube will keep in touch with Harvard girls and we have her promise for a good dinner of boiled cabbage from "Strube Farm." Our best wishes for success go with her and her mother and brother.

Main News

Ruth Enright, Correspondent.

Miss Edith Kapferer received a diamond and of course we knew what that meant. One day she whispered to someone the date of the wonderful event. That someone hurried and arranged a shower at Miss Kapferer's home, which was a success. The future bridegroom was present 'midst a bevy of girls and he helped unwrap some of the beautiful gifts. Later Miss Kapferer became Mrs. E. Dowswell and after a short honeymoon she is back with us again.

Miss Springman, though small, decided she was capable of a more serious and larger undertaking than supervising and became Mrs. William Hetky. We wish you success, Mrs. Hetky.

Miss Dorothy Sampson received a beautiful diamond. We won't be surprised if she suddenly changes her name to Mrs. W. Cahoon.

Miss Dorothy Le Duc, Miss Spencer's clerk, was surprised with a shower, which brought so many beautiful gifts she cannot remember them all. However she said she "loves and appreciates everyone of them." Miss Le Duc was married March 20th. Immediately after the ceremony the newlyweds

left for a honeymoon of two weeks. They are going to make their home in Wyoming. Miss Le Duc has been with the telephone company ten years.

Mrs. Fetterman, formerly Marlo supervisor, left March 13th for the West. Mrs. Fetterman is going to make many stops on her way. We envy you, Mrs. Fetterman; however, hope you have a pleasant and restful time.

Main girls took active part in the Electrical Show. We take pride in boasting of our Galli Curcis. The attraction at the show was their voices heard in the chorus of four hundred. The girls also appeared in costume to sing.

There was excitement a plenty in the Main Rest Room when the announcement of advance in salary was put on the bulletin board. It was the talk for days. However, we're not mentioning the bonus for regular attendance. The result, we are sure, will be instantaneous.

Miss E. Madigan, who has been ill since Christmas, is back with us again. Being unable to operate, Miss Madigan is doing clerical work.

Now that the "drive" for new applicants is on with the wonderful reward for the recruits, the force will be enlarged and service made 100%. Knowing that the Main girls are ambitious and thrifty, we would like to take a peep at their bank accounts, which surely will swell after reaping the rewards for new operators.

Miss Gorry, who has been here from Chicago for six months, has returned. Miss Gorry during her stay has helped us so much. The girls of the Main Office wish to extend their gratitude and welcome to the Chicago girls, who have been helping us and working faithfully and conscientiously.

Marlo News

Phyllis Woodworth, Correspondent.

Young ladies at Marlo formed a "Bachelor Girls' Bob Party," met at Rocky River in the "Home-like Sweet Shop," and there started on a sleigh ride with horns, whistles and rattles (and chewing gum). Arriving at their destination they received a hearty welcome and a chicken dinner. Miss Woodworth kept the glasses filled—with water. The evening was spent in dancing. Did they have a good time? Ask their guests, the Misses Erickson, King and Janik.

Mrs. Ethel Scott, Genevieve Murphy, Phyllis Woodworth, Emma Lang, Rose Haferd and Ruth Swan, who were absent because of illness, are back again "feelin' fit."

The following girls were recently promoted: Leona Marshall, supervisor to instructor; Irene Roskos, junior supervisor to supervisor; Celia Dechant, operator to junior supervisor.

Miss Mary Gibson, night operator, has been transferred to the Main exchange. She will be missed by her co-workers at Marlo.

Misses Bertha Meres and Hazel Rowlands have been absent for some time due to illness. Hope soon to see their happy faces and have them back in their places.

Miss Casey's desk is now the scene of a school, with Leona Marshall as teacher and the supervisors as scholars.

Our old friends, Mrs. Ruth Steppke, Mrs. Rose Murphy, Miss Helen Blum and Mrs. Helen Cleary, are back with us again. We are glad to have them with us. Miss Fluck sure does appreciate having Miss Blum back.

Mrs. King, night chief operator, was called to New York because of illness, but is back with us again.

News of Prospect

Marie Trampenau, Correspondent.

Why all the happy faces at Prospect? Haven't you heard? It's 'cause of our grand raise and attendance premium.

Been thinking of going bathing? See Miss Florence Travnik. While crossing the creek in Gordon Park one Sunday in March, the ice broke and poor Florence had to wade out.

BELL TELEPHONE NEWS

When we asked how the water was the only answer we received was "Brrrrrrrrr."

The Misses Lottie Jackson and Vesta Vowie became Mrs. early in March. Vesta often said the day she left to be a bride would be kept secret, but she made the mistake of talking about it to "a little birdie." As a result she had to climb a mountain of boxes and baskets to get to her locker, which was beautifully decorated with old tin cans and dusters. Later she enjoyed a rice shower all by herself. Stepping off a street car she opened her umbrella, in which rice had been placed.

Prospect led in the line of songsters at the Electric Show. The majority of girls were from that office.

Rosedale Notes

S. Zepp, Correspondent.

Miss Hazel Polcar was the guest of honor at a theater party given by the day supervisors. A delicious supper was served at the Cleveland Hotel, after which they went to the Hippodrome and enjoyed a very good entertainment.

We miss Mrs. Crittenden and Miss O'Field, who have been absent because of illness. Hope to have them with us again real soon.

The Ouija board and puzzles have been discarded. Our new game is trying to find our lockers and a way to the lunch room while the building is being remodeled.

Mrs. Manary, Miss McCrone and Miss Slama have returned after several weeks' illness.

On March 3rd Rosedale said "Farewell" to Miss Polcar, our former chief operator, and "Welcome" to Miss Whipple, our new chief operator. After supper, which was enjoyed by everybody, Mr. Porter surprised us by announcing that moving pictures were being shown in the library. The pictures were followed by dancing. Candy and flowers were prizes given to the girls whose names were drawn by Mr. Pate. To show their appreciation and esteem for Miss Polcar, the Rosedale girls presented her with a lovely diamond ring.

Plant Department

Construction Items

J. J. McCarty, Correspondent

The epidemic of sickness is gradually leaving us and the men are returning one by one. Mr. Swain had a serious case of smallpox, but is back on the job again. Bill Ulm was laid up and came back to work but suffered a relapse and had to return to the sick list. He's picking up now, however.

Mr. McGrail will be wearing the blue uniform of a fireman this summer instead of a Cleveland Telephone Company baseball uniform, as he leaves us soon to join the city fire department.

With the opening up of the weather things are beginning to get lined up for a start on our summer's big work. Some of the pocket billiard experts got together last week and arranged a little tournament for Saturday afternoon, which furnished considerable enthusiasm for the day. Mr. McMahon found himself getting trimmed, so he suddenly discovered that Harry Jelinek had his "stick," which discovery caused him to quit promptly, saying, "How can you expect a man to shoot if some one else takes his stick?" The championship went outside the construction division to Ernie Wood, but in the future we're going to see that the construction lands on top. If we can't do it any other way, we'll see that only construction men get in the game.

Even though Jack Gaffney and McGrail won't be with us this year, we think the division will be well represented on the baseball team with Geyser, Diehl, Jelinek and Fields back in harness, with a possibility of Cleary, Frank Dailey, Kipfstuhl, Werner, Campion, Porter and Dellinger breaking into the line-up. The company is very anxious that a team of real class be put in the field and are willing to back a real team to the

limit, so what a team needs besides that is plenty of boosters and a genuine interest taken in the team by the other employes. Let's count on the construction division to make itself felt in company ball this year. Practice will be held as soon as the weather permits. Any one wishing to try for the team, call E. G. McGreery at the plant office for information.

Maintenance News

W. E. Rogers, Correspondent.

On March 10th the M. E. C.'s held a successful meeting at the home of Miss Sills. In addition to the regular business, a combined recipe and kitchen shower was given for Miss Dillinger, who left the office at the end of March to take up her "life work." Her leaving is taken as a loss by all associated with her, and a distinct gain for Mr. Angell.

Everybody was glad to welcome John O'Toole back after his seven months' absence. We missed his happy smile.

Mr. Rogers has been ill at home for some time and we will be glad to see him back.

Calvin Crepps, formerly repairman at Main exchange, is now in the installation section of the plant.

Edward Hammerstingle, who has withstood a long siege of illness at the Lakeside hospital, is gradually improving. We wish him rapid recovery.

About the middle of March R. G. Shilling received an S. O. S. from ——— because his pet hens were devouring their eggs. Eggs being 90 cents a dozen, Mr. Shilling dropped all matters of lesser importance and broke the speed laws getting home. Arriving there he caught the delinquents in the act. All hens were severely chastised and the prize rooster was consigned to the rabbit hutch. Mr. Shilling's mind being relieved he was able to return to work the following day.

Report of Employés' Benefit Fund Committee

THE CLEVELAND TELEPHONE COMPANY

To Employés:

In compliance with the provisions of the plan for employés' pensions, disability benefits and death benefits, an audit of the receipts and disbursements of the employés' benefit fund for the year ending December 31, 1919, has been made and a certificate of audit by R. D. Sheldon, traveling auditor for the American Telephone and Telegraph Company, is on file with the secretary. The following is submitted as the seventh annual report of the benefit fund committee:

Amount of the fund January 1, 1919.....	\$ 75,000	
Payments for the year 1919:		
Pensions	\$ 3,294	
Accident disability	6,128	
Disability expense (accident only).....	2,619	
Sickness disability	20,562	
Death benefits	1,782	
State insurance	701	
		35,086
		\$ 39,914

The above payments cover a total of 541 cases, about 18.7 per cent of the average number of 2,890 employés having participated in the benefits during the year. The expense of administration was paid by the company, and was not charged to the fund.

Interest at 4 per cent added to fund.....	\$ 2,716	
Appropriations made to restore fund to original amount (\$75,000).....	32,370	
		35,086

Amount of fund January 1, 1920..... \$ 75,000
EMPLOYÉS' BENEFIT FUND COMMITTEE.

W. I. MIZNER, Secretary.

John L. Spellman, Publicity Manager

B. E. Sunny has announced the appointment of John Lawrence Spellman as publicity manager of the Chicago Telephone Company and the Wisconsin Telephone Company, succeeding Clifford Arrick, who resigned to accept the vice-presidency of the National City Bank of Chicago. Mr. Spellman was born in Chicago thirty-five years ago and was educated in the Chicago public schools. For fifteen years he has been employed by Chicago morning newspapers, most of the time in "covering" the City Hall and writing principally on gas, telephone, traction and electric light matters, in their relations with the City Council and the State Public Utilities Commission.



JOHN L. SPELLMAN.

Mr. Spellman has been employed at various times by the City Press Association, the *Chicago Tribune*, the *Chicago Record-Herald* and the *Chicago Herald and Examiner*. He was day editor of the old *Record-Herald* and retires as automobile editor of the *Tribune* to join the telephone organization.

More Records

Speaking of records for long service reminded the P. B. X. division that it has five veterans in Chicago who stand high in point of continuous service. The P. B. X. men are:

James Hennessey, thirty-five years.

Peter Stichter, thirty-four years.

Otto Hild, thirty-one years.

John J. O'Brien, thirty years.

Matthew Phillipi, thirty years.

Although old in service with the telephone company, they are still young and active, and it is sincerely hoped that they will be with us many more years.

Bells Would Not Ring

The Cairo, Ill., exchange received a call from an uptown subscriber who had just had a telephone installed, stating that parties were calling her, but her bells would not ring.

Bert Arey, bug hunter, was immediately sent to rescue. While inspecting the ground wire which ran into a very dark basement he found that Charley Pierceall, the Kentucky speed king, had done a very good job of fastening the ground wire on a broom handle which he mistook for a water pipe.

The only thing we can say in Charley's favor is that he surely scraped the broom handle good and clean before fastening the ground clamp.

A Miracle in Michigan

Dr. Steinmetz, the noted electrical engineer, states that a message can be sent to Mars—at a cost of a billion dollars. That is theory.

Sir Oliver Lodge is attracting much attention because of his belief that he has communicated with the spirit of his dead son. He is doubted.

But the Bell System, a human, earthly affair, has established communication with St. Peter at the Golden Gate—and we can prove it.

The Michigan State Telephone Company was the medium of this marvelous feat. A patron at its Marquette office requested that the connection with St. Peter be established, and it was. If there are skeptics in any part of the United States or Canada, they are invited to ask "Long Distance" for "Joseph St. Peter, Golden Gate Hotel, Munising, Mich." (Consult directory for rates and have correct change ready.)

Economy

The following article was submitted by a Milwaukee subscriber:

Mr. Thayer (senior partner): "How do you like J. B. of inquiry department?"

Mr. Thayer (junior partner): "System personified! Economical too; economical of the most valuable ingredients in the world—'Time.' At first I was disposed to call it waste, but from my experience and yours I know it is *economical*. Keeps tab and pencil near the telephone, makes memorandum of number he wants, repeats it distinctly to operator in ordinary tone and ninety-nine times out of 100 gets party he wants. You and I have called for numbers, depending on memory to repeat them correctly to operator. If the line happens to be busy, we forget the number or transpose the figures, get the thing balled up at one end or the other of the line—lose our temper and good nature and caused irreparable *Waste*, the enemy of Economy."

Legal Department Head at Chicago

William Ruger, Jr., general attorney for the Chicago and Wisconsin Telephone Companies, was appointed to that position in September, 1919. Since the departure of E. S. Wilson last January, Mr. Ruger has been in general charge of the work of the Legal Department at Chicago.



WILLIAM RUGER, JR.

Mr. Ruger is a native of Wisconsin and attended the University of Wisconsin. He began his legal practice in 1897 as a member of the firm of Ruger & Ruger at Janesville. The practice of this firm was largely corporation law, with water power law as a specialty. After four years' residence in Milwaukee, Mr. Ruger was invited to become a member of the legal department of the Bell System.

Bell Telephone News

Published Monthly by

THE CLEVELAND TELEPHONE COMPANY

EDGAR S. BLOOM, *President*
 E. A. REED, *Vice President*
 C. L. MCNAUGHTON, *Secretary and Treasurer*
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BELL TELEPHONE BUILDING - - - CHICAGO, ILLINOIS

SUBSCRIPTION PRICE—Two Dollars a Year in advance, to all persons except employes of the Telephone Company.

Why Not Be Fair?

Many of us who spent our earlier lives in small cities can remember the strenuous efforts which often were made to secure railroads for our particular localities. Often special elections were held and large subsidies voted to help pay the cost of building branch lines which would put the home town on the map as a "railroad center." Later, efforts almost as great were made to secure electric traction lines.

In those days the night when the "juice" was first turned into the electric leads and the new street lights blazed forth was a time for celebration, and in one city which the writer remembers a local capitalist who had the courage to build an electric street railway was given a tremendous public reception, with bands and speech-making, at the "opera house."

Thus it was, and perhaps still is, with new utilities. But with the established companies the story is often different. They are made the target for abuse and attack of every sort and it takes a brave newspaper or public official to raise a voice in their behalf. But the proposition is simple if considered on its merits. The utility companies only ask for the right to conduct their business on a profitable basis which will enable them to make extensions and improvements to meet the public needs and pay a reasonable return to the investors.

A grocer, a restaurant keeper, or a clothing merchant is at liberty to increase the price of his goods whenever costs advance. The landlords, as many of us are finding through unhappy experience, may also increase rents to any figure they please. The utility company, however, must pay the increased cost of everything it buys and pay increased wages to its employes, but it is not at liberty to increase the selling price of its service at will.

Every man in business as well as every laboring man knows that the price of goods and the price of labor have risen tremendously in the past five years. He must know that utility costs have also risen in the same proportion. This being the case, how can any honest man object to a reasonable increase in utility rates to meet these conditions?

Ownership of Public Utilities

The granting of better rates to public utilities is usually considered a step which benefits only a comparative few. It is generally thought that the stockholders and perhaps the employes profit by the increase. The general public often believes that its only advantage in higher rates is better service. And yet practically every citizen of the United States now owns public utility securities, whether he is aware of the fact or not.

The explanation of how the billions of dollars of securities, representing investment in public service companies, have become so widely distributed as to bring universal ownership about is shown in an analysis of the extraordinary situation by Carl D.

Jackson, chairman of the Wisconsin Railroad Commission, in which he says:

"The actual ownership of most public utilities is by the people themselves. The first liens on most public utilities are very often owned by trust companies, banks and largely by insurance companies throughout the United States. Nearly every man carries an insurance policy. The average citizen has a bank account, yet not one citizen out of a hundred realizes that in one form or another his actual savings and insurance and his wife's and children's welfare depend upon the solvency and continued operation of public utilities.

"There is probably not one man in fifty whom we meet on the street who does not own a part of a public utility, whether he knows it or not. So the questions relating to public utilities are not confined to the consumers on one side and the public utilities as such on the other, but the whole question is one involving financially nine-tenths of the entire population.

"Furthermore, public utilities should not only be solvent in themselves, but there should still remain a reasonable incentive to reasonable development along the lines to be demanded by future generations. Nothing should take place in this country to discourage individual and collective efforts along progressive lines."

Don't Miss a Sherman Rogers Article

Sherman Rogers is now probably the most useful speaker on industrial problems. He was born in a country town in Minnesota thirty-four years ago, but early his family moved to Idaho where he got a grammar school education and started while still a boy to make his own way in the Idaho woods.

He not only did the most menial work in a lumber camp, but at one time he and members of his family undertook to do business for themselves with disastrous results. After this failure he went back to work as a lumberjack, but he, unlike most of his fellows, knew something of the employers' point of view.

During the past three years Mr. Rogers has studied labor conditions as a common laborer in shipyards, stockyards, steel mills and coal mines, and has come to the conclusion that most of the industrial troubles can be cleared away by a proper understanding between labor and capital. He thinks that the ninety-eight per cent of good men on both sides are badly advised and misled by the remaining two per cent.

Since his great speech at the annual dinner of the New York Chamber of Commerce he has spoken to over 30,000 employers, and is devoting all his time to such speaking and writing. When he has sufficiently covered the field of capital he proposes going to labor with the same "get together" message.

In New York the other day, he said that as a telephone user he has the greatest sympathy with those who are responsible for giving service, and felt that the least he could do to help was to be patient. His articles as well as his speech are full of meat.

Garden Time

It's garden time again. Vegetables are still high priced, probably more so than last year. So it behooves the gardeners to raise more and better "truck" than ever this year. And beside it will do you good to hoe and dig around out of doors. Get busy before the season grows too old.

War Decorations

Enlisted men in the United States Army were not overlooked in the distribution of official honors for service in the great war. They received 57 out of the total of 78 Congressional Medals of Honor and 3,593 of the 5,109 Distinguished Service Crosses. All of the 641 Distinguished Service Medals, which were awarded for meritorious service and not for acts of valor on the battle fields, were conferred upon officers.

BELL SYSTEM'S YEAR

*Annual Report of American Telephone
and Telegraph Company for 1919*

That the Bell System has passed through the strenuous period of war conditions with its plant management and finances intact and is in a healthy condition to undertake its post-war responsibilities with a minimum of delay, is clearly shown by the annual report of the American Telephone and Telegraph Company.

H. B. Thayer, president of the company, gives an interesting history of the details and results of the year's operation not only of the American Telephone and Telegraph Company, but of the whole Bell System. The system, although made up of many separate corporate entities, operates as one organization and enjoys the benefits of one organization—unity of purpose, standardization of material and methods, a single manufacturing, purchasing and supply department and a uniform policy. It is shown that there are advantages both to the stockholders and to the public in efficiency and economy of operation, in addition to the insurance value resulting from the national scope of the utility.

The report not only shows the component parts of the Bell System and their relationship to one another, but it describes how the system functions in order that each of the associated companies should get the greatest value from the headquarters organization with its accumulated experience and abundant resource. A statement of earnings for the five months' period since federal control is given more significance than the earnings for the complete year. In normal times the margin of undivided profits at the rate shown in the five months' statement would be considered ample. It compares favorably with any similar period in the system's history, but times are not normal and the commissions are asked to protect this necessary service by granting some increased rates so that the management may be prepared for some increased expenses.

Salaries and wages have been increased to meet the present standards and are believed to be generally fair and sufficient to attract the high class of personnel which is necessary to and has been characteristic of this service.

As in the past, the actions of rate controlling bodies have, in general, been acceptable. There are exceptions, as always, but the tendency is toward more equitable and more sound treatment. It is becoming more clearly understood that in a utility of this sort, which in order to give service must expand with the growth of the community, the test of rates—assuming economy and efficiency—is the return which will attract capital.

"No man and no corporation," says Mr. Thayer, "had a right to expect to come through the great war untouched. Our greatest loss was the loss of these margins for plant growth and reserves of men and women in training. During the war the restriction on the use of capital and material, coupled with the unprecedented demand for service, compelled us in some places to exhaust our plant margins and left us at the beginning of 1919 was an actual shortage of plant to meet the then demands. By the end of the year, except in a few localities, the usual facilities were restored."

There is a heavy loss shown during the war in men and women trained for telephone work and in young men in the minor supervisory positions. "Handicapped by this lack of plant and of employes, especially supervisory officials, we entered upon the year of the greatest demands upon us," says the report. "Unavoidably, therefore, the service, particularly in congested centers, has been impaired. It is now improving, but it cannot be brought to the pre-war standard until conditions approaching

those before the war again obtain. To do as well as has been done, no body of men and women ever labored more loyally in the public service than have the thousands in this service during the past."

The report describes the function of the department of operation, the legal department, department of development and research, and the department of accounts and finances, all of which are contributing to the development of the system so that it can meet the greatly increased demands that have been made upon it.

It is shown that the property has been maintained in accordance with the standards of the Bell System and is not allowed to deteriorate, and that additional plant is now being rapidly constructed so that in minimum time the maximum efficiency will be available.

Among the new features which are brought out in this report are automatic switchboards which have been developed by the Bell engineers and which while more expensive in first cost than manual boards, will do much to offset the increasing cost of giving telephone service.

The toll cable system is being extended westward and is expected to be completed to Chicago by 1923. In cooperation with the Cuban-American Telephone and Telegraph Company plans have been made to lay telephone cables to Havana, so that the principal places in Cuba will be in telephone connection with the principal places in the United States.

Many mechanical labor-saving devices have already been adopted to meet the shortage of unskilled labor, and other devices are being constantly studied and adapted to the needs of the business.

The report shows what is being done to provide adequate telephone plant and adequate traffic supervisory forces and operators. At one time the turnover in operators reached the rate of 80,000 a year. The adding of so many inexperienced people to the operating force reacted seriously on the service, but the turning point has been passed. Every resource of the Bell System has been brought to bear upon the service problem. In more than half the cities in the country the service has already been restored to normal, and during 1920 a return to substantially normal service is confidently looked forward to throughout the Bell System.

The stockholders are congratulated on the fact that the properties have come through the war unimpaired as to earnings. As a rule the public has been willing to pay fair rates and rate-controlling bodies ready to authorize them.

The department of development and research during the year has actively prosecuted work upon more than 500 improvements in the telephone art. The patent holdings of the Bell System have increased fully 12½ per cent during the year, and it now owns or controls, or is licensed under, more than 5,000 United States letters patent and applications therefor.

Special mention is made of the associations of employes which have been organized to maintain a spirit of mutual cooperation and confidence by providing regular facilities for the exchange of views between employes and the management.

There were 15,000 telephone men in war service from the Bell System, and practically all who have applied for reinstatement have been reemployed.

The total amounts of payment under the employes benefit plan for pensions, sickness, accidents and death benefits during 1919 was \$2,855,008.

BELL TELEPHONE NEWS

During the period of government control increased costs and uncertainty as to the authority of the government to fix rates resulted in failure of the government to earn its compensation. After the return of the properties to the owners a satisfactory adjustment was made with the postmaster general. At the end of the year the report shows that in the United States there were approximately 11,000 separate telephone companies. Of them 36 are associated companies of the Bell System, 9,403 independent companies whose telephone stations are connected with the Bell System and about 1,500 independent companies whose telephone stations are not connected with the Bell System. There are also a large number of rural lines and associations operated mainly on a mutual or coöperative basis and not rated as companies. Of these lines and associations there are 26,184 which connect with the Bell System.

At the end of the year the number of telephone stations which constitute the Bell System in the United States was 11,795,747, of which 7,739,159 were owned by associated companies of the Bell System. The increase in the total number of stations in the Bell System during 1919 amounted to 729,748.

There were 209,860 employes in the associated Bell companies at the end of the year, who are operating 24,162,999 miles of wire, of which 94.6 per cent was copper. The net additions to the Bell-owned plant during the year was over \$73,000,000.

For the whole Bell System with all duplications excluded the total income, including compensation, after the deduction of expenses, amounted to \$79,650,186, from which over \$27,000,000 was paid in interest and \$39,000,000 in dividends, leaving over \$12,000,000 surplus. The surplus earnings in the last five

months of the year since the end of federal control have been \$7,000,000.

The capital stock, bonds and notes payable of the Bell Telephone System outstanding in the hands of the public at the close of the year were \$1,060,000,000, while the net assets devoted to earning return on these outstanding securities amounted to over \$1,448,500,000. This is due to the fact that surplus and reserves of over \$388,500,000 had been invested in productive property.

For the American Telephone and Telegraph Company the net earnings of the year were over \$60,000,000. In round figures, the interest charges were \$15,000,000, the dividends \$35,000,000 and the resulting balance \$9,000,000, of which \$5,000,000 was appropriated to reserve for contingencies and \$4,000,000 added to surplus. The company and its predecessors have paid dividends to the public at the rate of at least \$7.50 per share each year for the past thirty-eight years, and during the past thirteen years the rate has been uniformly \$8 per share. The number of shareholders in the American Telephone and Telegraph Company was on December 31st 120,460, an increase of 8,000 during the year. To this number should be added some 9,000 employes of the Bell System who are paying for stock out of their wages. More than 19,000 employes have already paid in full for their stock and are stockholders of record. There are more women stockholders than men.

The report reviews certain questions and claims presented by C. H. Venner relative to the Atlantic and Pacific Telephone and Telegraph Company notes and includes a report of the stockholders' committee which completely disposes of this matter.

Schledorn Chicago Winner in Revolver Contest

We were aware of the ability of Bell riflemen, bowlers and others, but we did not know we had in our midst one of the best revolver marksmen in Chicago. Allow us to introduce C. W. Schledorn of the drafting division of the engineering department as an expert with the revolver. He is already known as an active member of the Bell Picture-Makers' Club. His hand-colored photographs won second prize and honorable mention at the recent exhibition.

The surprise came the latter part of March, when at the close of the United States Revolver Association's intercity match Mr. Schledorn finished with the individual high mark in Chicago. Teams representing 33 cities competed, each on its home range. The scores were all sent to the association's headquarters in Columbus, where they will be compiled.



C. W. SCHLEDORN.

Public Official Praises Operators

The following letter speaks for itself:

Mgr. C. U. Tel. Co.,
Indianapolis.

My Dear Sir:

I notice today the operator who handles my telephone, Main 2202, is so hoarse she can hardly say "Number, please."

I want to compliment you on such a loyal worker and it called to my attention that you are probably having a serious time with short help on account of sickness among your employes.

I have complained of service but I am pleased to note you are giving good service under the unavoidable conditions.

Yours truly,

(Signed)

LEO K. FESLER,
Auditor of Marion County.

Champion Pole Climber

You can talk about your champions,
Hunting game and catching fish,
Telling yarns and raisin' "taters,"
A champion for every wish,
But for just plain shooting trouble,
Chasin' shorts and hikin' poles
You must send the cup to Lawndale,
"Sidney" Hatch the title holds.

In the pursuit of his duties on March 12th, chasing wet shorts out of the junction boxes and other hiding places, Mr. Hatch had occasion to climb to a large junction box in an isolated part of the district. The wind was strong and blew the door of the box open with such force as to bend the hinges so the door could not be closed again. Mr. Hatch having on his Sunday suit including a white collar and kid gloves was unable to get around the door to the pole and would not attempt the "daring feat" of swinging down to the pole from the platform on which he stood. He called the office and informed us that he was marooned on the pole and wanted some help. Two men and an auto truck were hastily summoned to his aid and he was rescued without being injured. At present Mr. Hatch does not show any bad effects from the exposure.

Co-operation Means Strength

"The industrial strength of a community is measured by the efficiency of its public utility service. The strength of a public utility depends upon the good-will of the community and the coöperation it receives."—*Exchange*.

MACHINE SWITCHING FOR THE BELL SYSTEM

By Bancroft Gherardi, Vice President and Chief Engineer, and Harry P. Charlesworth, Equipment and Transmission Engineer, of the American Telephone and Telegraph Company

In the annual report of the American Telephone and Telegraph Company recently published, President Thayer has the following to say concerning one of the activities of the department of development and research:

"Great progress has also been made in subscribers' station and central office apparatus. Improvements, making both for economy and efficiency, have been perfected and standardized for use. Among these the most important is the machine switching system which has been the subject of constant study and experimentation by this Department over a period of more than ten years.

"It has been necessary not only to produce apparatus which would operate efficiently and economically, but also to perfect all of the details necessary to make this entirely new apparatus function properly in relation to the existing apparatus, the present buildings, the practice of the public, etc. That is, after its completion as an efficient mechanism it was necessary to make all of the adaptations so that its introduction would be economical and without disturbances to the public. This has been accomplished."

As to the engineering features of this question he says:

"During the past year the Engineering Department has been engaged in planning and directing the introduction of machine switching or automatic switchboards into the Bell System. It is our plan to study each improvement in apparatus to determine how it can most economically be made a part of the plant. Such studies show that in the large cities machine switching equipment should be employed for extensions necessary to provide for growth and for reconstruction to replace worn out equipment. Our experience has shown that by this procedure we are enabled constantly to change to new types of apparatus as they are developed, with the least amount of disturbance to the service, in the minimum time and without disturbing effects upon the employes or on the financial situation. Thus loss and waste incident to sudden change are avoided, apparatus not sufficiently proven is not incorporated into the plant, and the entire physical property of the System is by easy evolution keeping abreast of the development of the art of telephony.

"By the use of these automatic switchboards as we have planned to introduce them, increased capacity will be provided with proportionately small increases in the number of operators required and with a simplification of the service conditions in the large cities. While these automatic switchboards are more expensive in first cost than the manual switchboards, it is expected that the decreased operating expense of the automatic will do much to offset the increasing cost of giving telephone service."

Back of these brief reports lies a series of most interesting and important advances in the art which have been made by the development and research experts and engineers of the Bell System, namely, the creation of an improved switchboard system meeting the service requirements of the Bell System and which will permit the subscribers to make calls without the aid of an operator even under the intricate conditions of our largest cities.

A description of this new form of telephone equipment and service will, doubtless, be of great interest to our co-workers in all branches of the service, each of whom will, in some degree, be engaged in the application and operation of this new

system. We will, therefore, outline briefly some of the interesting work leading up to the adoption of this new form of switchboard as well as describe the system itself and its application to the service requirements of a large city.

From the invention of the telephone, the Bell System has continuously developed the telephone art, of which switchboards are but a part. New improvements in telephones, switchboards, lines and cables have followed one another with remarkable rapidity. While each successive type of apparatus to the superficial observer sometimes suggested similarity, nevertheless, each step in the evolution marked a decided improvement.

In general, these improvements have been of such a nature that they have not necessitated a change in the methods used by subscribers in making calls. One of the factors of the machine switching problem which added to its complexity was that from its very nature this system necessitated a change in the manner in which a subscriber made his telephone calls. This phase of the problem had to be most carefully considered so that the arrangements adopted for all classes of calls would be simple and could be employed by all subscribers without the chance of complications, difficulties or misunderstandings.

From the time of the earliest switchboards there has been a constant effort to perform various operations automatically so far as consistent with the service requirements, and many new features have been introduced from time to time for reducing the work required on the part of the operator. In line with these developments, telephone engineers early applied themselves to the problem of completing calls entirely without the aid of an operator. Many forms of automatic systems have been developed and tried out from time to time, but none of these satisfactorily fulfilled the complicated service requirements of large cities.

An indication of the magnitude of this problem may be secured when we consider that in New York City, for example, there are at present a total of nearly one million telephone stations served from about ninety central offices, and the predictions are that within the next twenty years the stations and central offices will have more than doubled. Each subscriber in this great network must be able to reach promptly every other subscriber. Due to the large area involved, a great number of calls within the city involve extra charges, which means that they must be specially supervised and ticketed. There are many different classes of service furnished the public, such as measured rate, flat rate, official, coin box pay station, attended pay station, and other special services such as information, etc. Not only individual lines, but party lines and private branch exchanges must be cared for. Furthermore, demands for service to the extensive suburban area surrounding this great city, as well as to the vast number of cities, towns and rural communities throughout the entire country require that provision be made for thousands of toll messages daily which must be recorded.



Figure 1. Telephone equipped with dial.

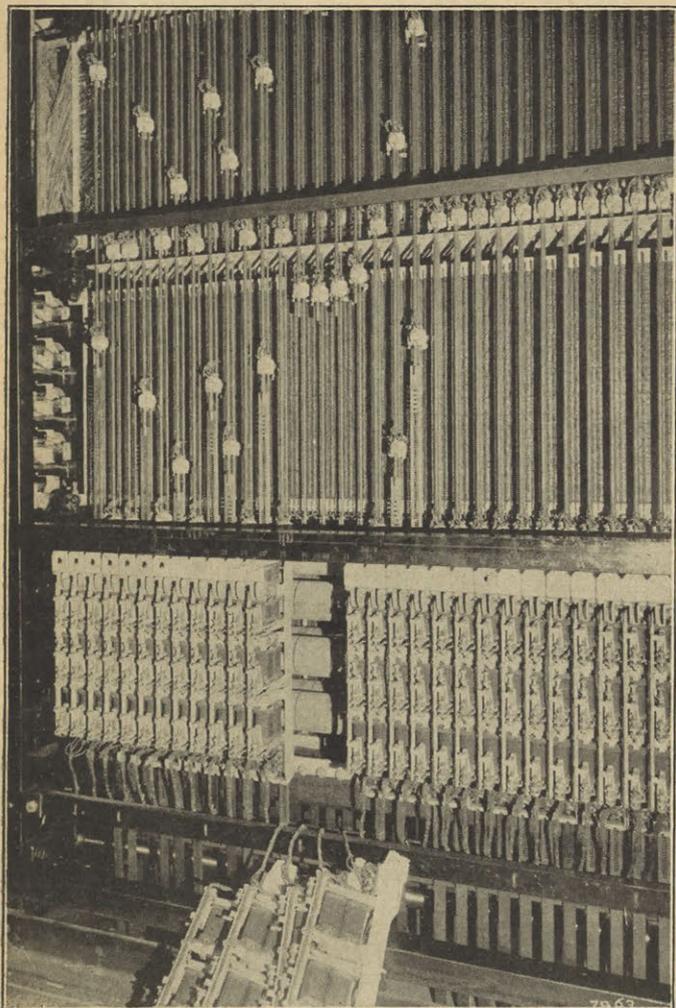


Figure 9. Typical selector frame showing constantly revolving friction rolls, magnetic clutches, and racks by means of which selecting mechanisms are moved up and down.

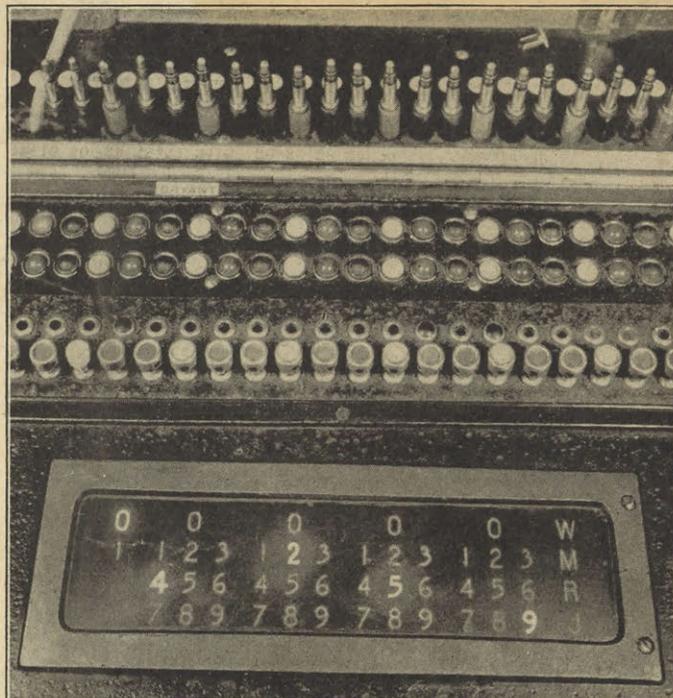


Figure 21. Call indicator at an incoming trunk position in a manual office showing number 4259 displayed.

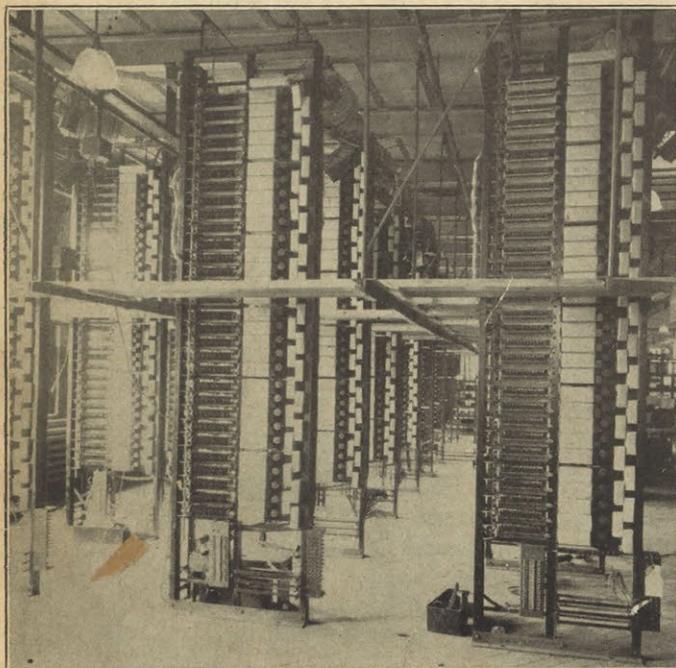


Figure 25. Sequence switch frame in process of assembly in the factory.

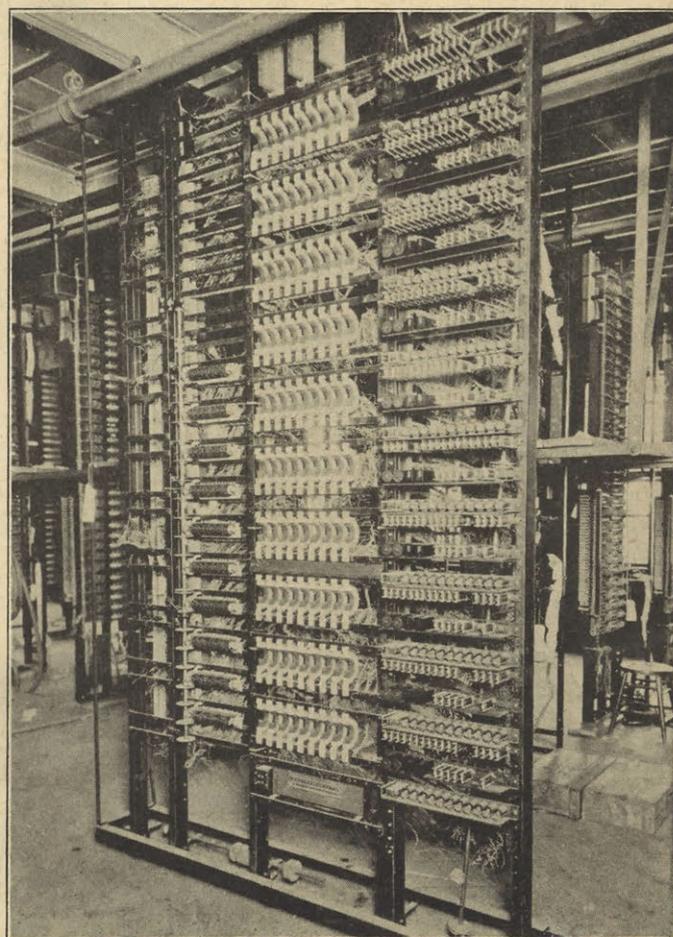


Figure 7. Sender equipment in process of assembly at factory.

supervised and timed. It will be clear that the problem of producing machine switching equipment which will satisfactorily perform a sufficient amount of the labor involved in handling the above service, so as to replace enough operators to warrant its existence, is not one that could be solved except after years of development work. It will also be evident that systems which might operate satisfactorily in cities of small or medium size, where service requirements are comparatively simple, would not meet conditions in these large metropolitan areas.

System Perfected and Tried Out Under Service Conditions.

As a result of exhaustive investigations and long continued experiments, the engineers of the Bell System have produced an automatic switchboard which satisfactorily meets even the exacting service conditions just referred to. It may be interesting to note in this connection that as a final step in the development of the system, three complete central office equipments of the machine switching type were installed at Newark, N. J. These installations were made on what is known as a "semi-mechanical" basis, that is to say, operators were employed to take the calls from the subscribers and transmit them to the machinery by means of numerical keys. It was thus possible to try out this form of apparatus without introducing any new method of calling on the part of the subscriber during the trial installation.

The results of these trial installations demonstrated conclusively that the new machine switching system would meet all the essential service requirements of our largest cities. The

Arens Dr John, r, 2156 Bathgate av.	FOR dham	4141
Arens Theatre, 623 8th av.	BRY ant	5409
Arend Ernest, A, Archt, 105 W 40.	ERY ant	3231
Arend F J, 165 Bway.	COR land	0940
Arend F J, r, 813 5th av.	PLA za	4226
Arends Katharine, MD, 178 W 97.	RIV rsid	0570
Arendt E, r, 156 W 86.	SCH uyer	2861
Arendt Edwd & Son, Leaf Tob, 151 Water.	JOH n	1635
Arendt Ellis, 151 Water.	JOH n	1635
Arendt Simon, r, 29 E 129.	HAR lem	4202
Arengee Co, 21 W 4.	SPR ing	7224
Arens A, Leaf Tobacco, 182 Water.	JOH n	4747
Arens Miss Adele, r, 29 W 84.	SCH uyer	2493
Arens Burchard, Cafe, 520 8th av.	GRE ele	5141
Arens Edgmont H, Bookseller, 17 W 8.	STU yvant	0717
Arens F X, r, 119 W 80.	SCH uyer	6347
Arens Max, Lawyer, 271 Bway.	BAR clay	5786
Arensberg A, Drugs, 1002 So Blvd.	INT rvale	2925
Arensberg M, r, 961 St Nich av.	AUD bon	1520
Arensberg Walter C, r, 33 W 67.	COL mbus	4826

Figure 2. Typical examples of new form of listing telephone numbers.

work of manufacturing equipment of this character is already well advanced and the first installations will be placed in service early in 1921.

How the New System Operates.

For those not already familiar with our new machine switching systems, we will describe briefly its fundamental and most interesting features.

Each subscriber's station will be equipped with the usual form of telephone instrument and in addition with a calling device known as a "dial" which will be mounted at the base of the desk stand as shown in the illustration, Fig. 1. This dial, as will be noted, has ten finger holes bearing the numerals 1 to 9, and also 0 and the word "Operator" in the tenth

hole. For the larger cities the dial will also bear certain letters of the alphabet as referred to below, while in the smaller cities numerals only may be employed.

In making a call, the subscriber will, of course, first refer to the telephone directory, but will find in the new directory that the central office name is printed somewhat differently than heretofore. Typical examples of the new form of listing telephone numbers are shown in the illustration, Fig. 2. As will be noted, these conform to the present manual listings, except that the first three letters of the office name are set out prominently. Simple as this change in the form of listing appears, until it was developed by the Bell System experts, no satisfactory system of designating telephone numbers for machine switching systems for large cities such as New York, Chicago, Boston and Philadelphia was known.

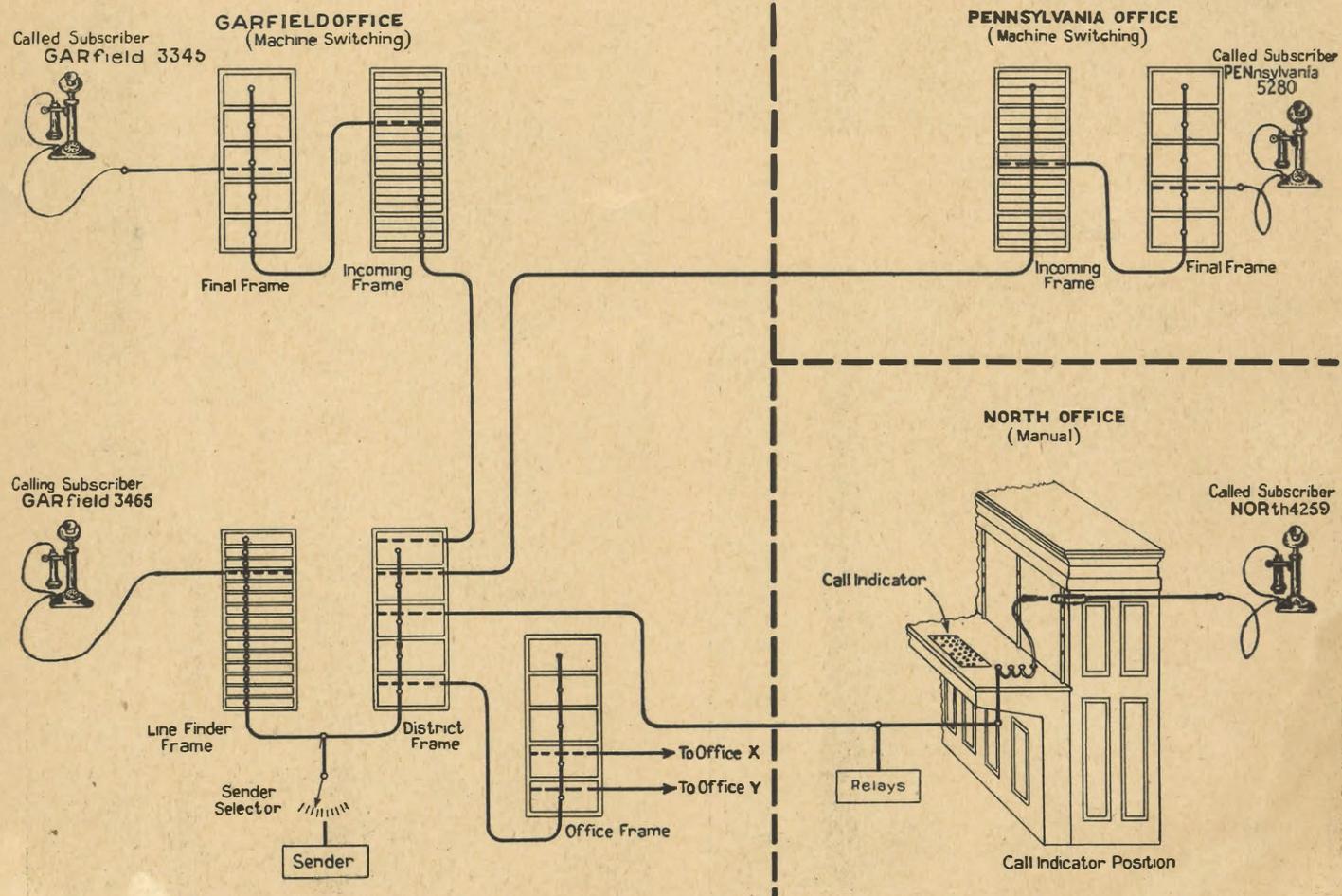


Figure 4. Diagram showing progress of a call from an automatic subscriber to another automatic subscriber or to a manual subscriber.

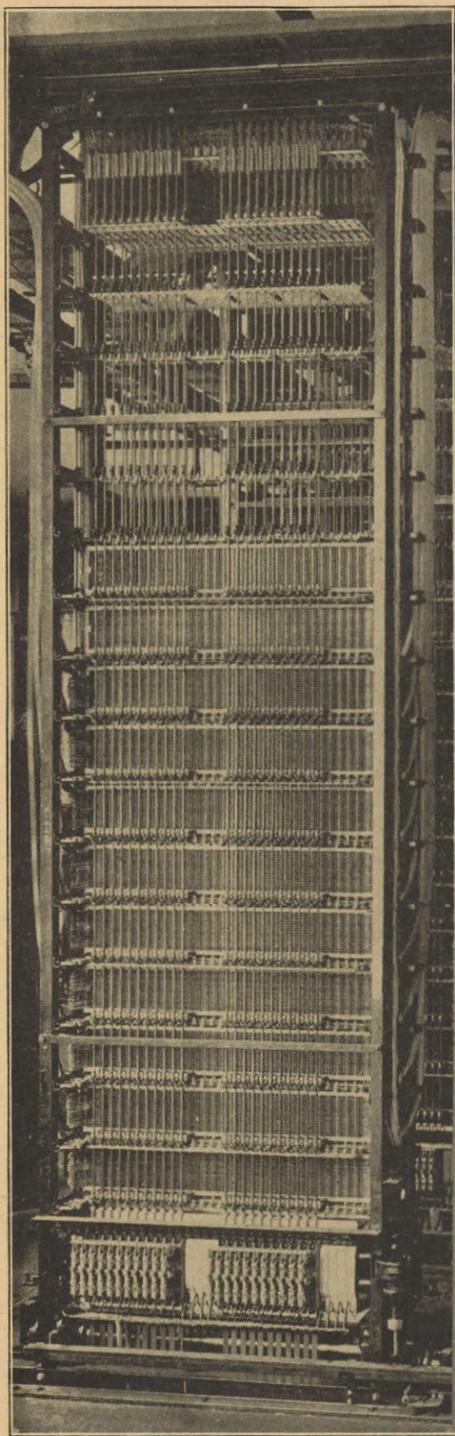


Figure 5. Line finder frame showing multiple banks and selecting mechanisms.

fore, not required in the first three letters of central office designation. Under this plan machine switching calls are passed to the central office mechanism by dialing the first three letters of the office name and then the four numerals, followed by the party line designation, if any. On calls to machine switching offices there will be no party line letters to dial, as these offices are arranged on a terminal per station basis.

In medium-size multi-office cities where six-digit calling is practicable, only the first two letters of the office name will be given prominence in the directory. In very small multi-office cities where five digits only are required, the telephone number may consist simply of five numerals and no letters may appear on the dial.

One of the unique advantages of the plan developed for designating telephone numbers is that it does not necessitate the abandonment of all of the existing manual listings. For manual operation it leaves the listing substantially as at present. For machine switching operation, the same form of listing is used, a clear indication being given in the directory as to the portion of the listing which should be dialed in making an automatic call. Various other plans have been proposed, all of which either have involved serious objections, such as changing the whole system of manual designation, or the use of combinations difficult for the subscriber.

Under the plan adopted, the dial as illustrated in Fig. 3 (shown on front cover of this magazine) will carry the complete alphabet with the exception of two letters (in this case "Q" and "Z"), in addition to the ten numerals. The letters omitted will be those infrequently used, and, there-

How a Typical Call Is Handled.

Having secured the desired telephone number from the directory, which we will assume to be "PENnsylvania 5280," the subscriber will first remove the receiver and listen for the "dial tone" which indicates when the apparatus is ready to receive his call. He will then insert his finger in the opening of the hole over the letter "P," rotate the dial until the finger comes in contact with the metal stop shown in the picture and release the dial, which will automatically return to normal. He will then repeat this operation for the letters "E" and "N" and in turn for the four numerals 5-2-8-0.

We will now describe briefly the progress of the call through the major pieces of apparatus. As will be seen from the diagram illustrated in Fig. 4, the line of the calling subscriber, whom we will assume to be a subscriber in the "GARfield" office, appears at a so-called "line finder frame." When the receiver is removed from the switchhook preparatory to dialing, the line is selected by a "line finder" and connected to an idle "sender" by means of a "sender selector." Upon completion of these operations, which take but a fraction of a second, the "dial tone" is sent out to the calling subscriber as mentioned above.

When the subscriber dials, the electrical impulses (on a decimal basis) are transmitted to the "sender" which receives and registers them, in turn translates them to the proper basis for the control of the apparatus which is not operated on the decimal system, and then governs the selection through the ap-

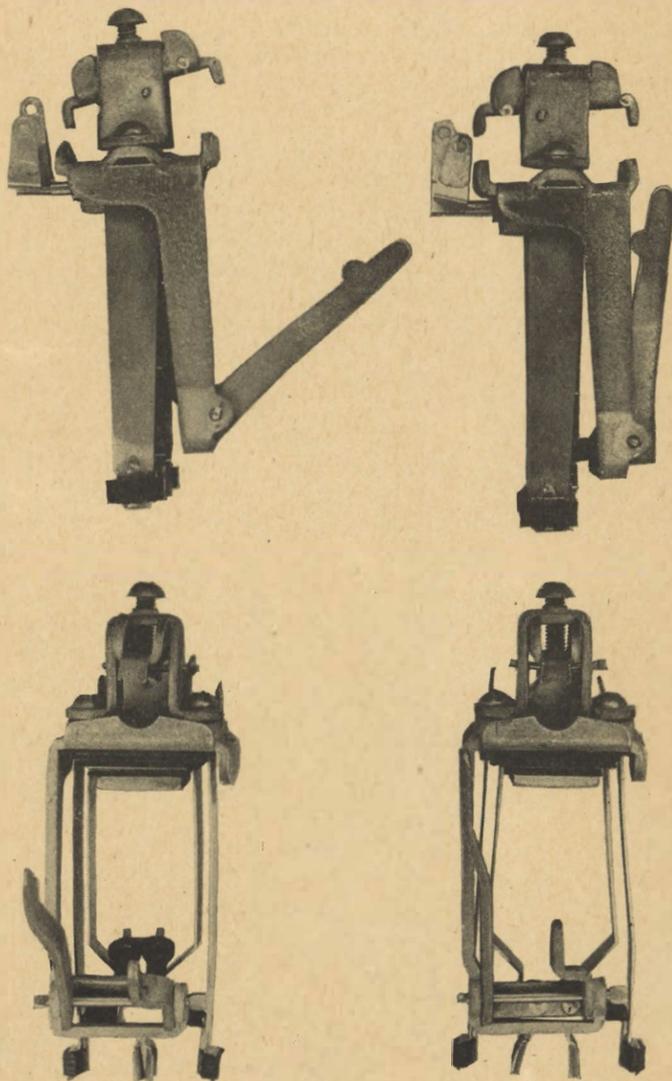


Figure 24. Selector multiple brush shown in operated and non-operated positions.

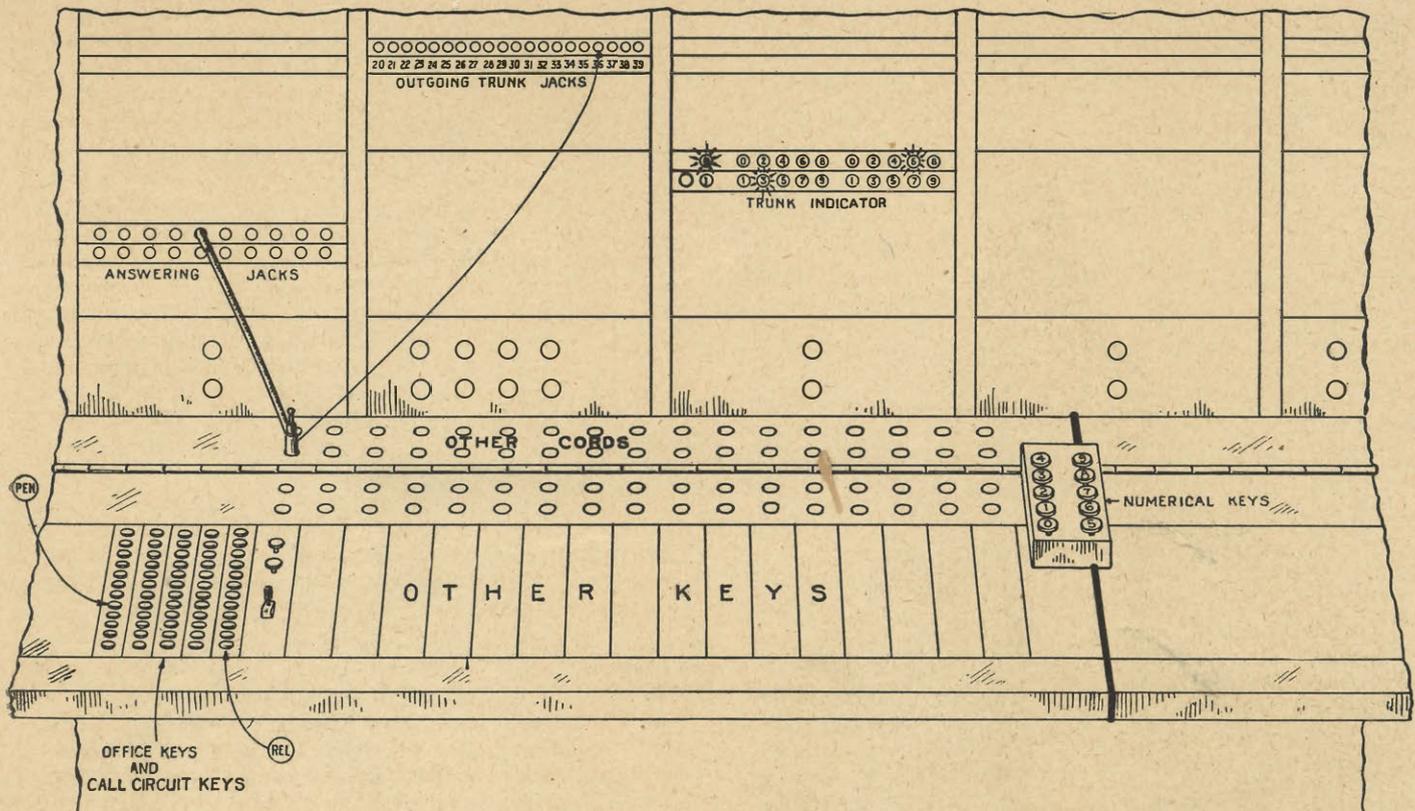


Figure 17. Position in manual office equipped with numerical keys for completing calls to automatic offices.

paratus as referred to below. If the subscriber, for any reason, should fail to dial the full number, the selection as described later, would not be completed, but the call would be taken up by a maintenance employé and the subscriber advised of his error in case he had not already hung up and dialed again.

The "sender" automatically causes the particular "district selector" which is permanently associated with the "line finder," originally used, to start up and select a trunk to the office desired, namely, "PENsylvania," either directly or through an "office selector" in case the number of trunk groups is too large to be placed on the "district selector." Assuming that the "PENsylvania" office is on an automatic basis, the trunk chosen will terminate at an "incoming selector" frame and the "sender" above referred to will cause the call to be routed through the "incoming selector" to a "final selector" and thence to the particular line desired. When the connection is thus completed, audible signals will be sent back to the calling subscriber to indicate that the station is being rung or that the line is busy. If the line should be out of order, the connection would be automatically completed to an operator who would so advise the calling party.

If the call had been for another subscriber in the same office, namely, GARfield, instead of in the PENsylvania office, it will be noted that the call would be routed from the "district selector" to an "incoming selector" in the same office and thence to the particular "final selector" in which the desired subscriber's line is located.

As soon as the subscribers have completed conversation and hung up their receivers, the connection through the automatic machinery is immediately disconnected and the apparatus returns to normal.

Automatic Completion of Call Closely Resembles Procedure In Manual Operation.

Those who are familiar with the manual switchboard will doubtless be impressed, from the description given of the completion of a call, with the rather striking similarity of the prog-

ress of a call through the full mechanical and manual systems. It may be interesting, therefore, to carry this comparison further.

As mentioned, aside from the dial, the automatic and manual subscribers' telephone sets are very similar.

With the manual system, when the subscriber removes his receiver from the hook it causes the apparatus to light a lamp associated with the answering jack. The operator on noting the light, takes up a cord and plugs in. With the mechanical system, the removal of the receiver causes a "line finder" to take up the subscriber's line in readiness for the next operation.

With the manual system, the operator next throws a listening key and notifies the subscriber she is ready to receive the call by saying, "Number, please?" With the mechanical system, the "sender selector" proceeds to attach an idle "sender" and this "sender" indicates to the subscriber that it is ready to receive the call by sending out the "dial tone."

With the manual system, the subscriber next gives his order orally to the operator. With the mechanical system the subscriber by means of the dial gives the number electrically to the "sender" by pulling the letters and numerals of the number as already described.

With the manual system the operator knows from the office name that has been given, the proper routing of the call. She gives the number desired to the incoming operator ("B" operator) at the distant office, obtains a trunk and connects it with the calling line by plugging in with the other cord of the pair she previously used in answering. With the mechanical system the "sender" upon receiving the office code from the subscriber's dial, recognizes its significance and causes the "district selector" to select an idle trunk leading to an "incoming selector" at the desired office.

With the manual system the incoming operator at the distant office locates the desired subscriber's number in the multiple before her. She tests the line to see if it is busy and if it is not busy she inserts the plug of the incoming trunk in the multiple jack and the ringing is started automatically. If the



Figure 22. New buildings now nearing completion at the Western Electric Company's Hawthorne plant to be used for the manufacture of machine switching equipment.

line is busy, she plugs the trunk into a jack which sends back the busy signal. With the mechanical system, the "sender" causes the "incoming selector" to locate the group of trunks leading to the "final selector" caring for the particular 500 lines in which the desired number is located, and causes the "final selector" to locate the line desired. The "final selector" tests the line to ascertain if it is busy, and if it is not, establishes the connection and ringing is started automatically. If the line is busy the selector will not establish the connection, but will give a busy signal to the calling subscriber.

Interesting and Ingenious Apparatus Employed.

Illustrations of the various pieces of apparatus which we have referred to are shown in Figs. 5 to 11. For installations in the largest cities, the "translator," which forms a part of the sender, consists of a selector similar in general to the selectors illustrated.

A detailed description of each unit employed would, of course, be impracticable in this connection, but we will refer very briefly to one or two items of equipment which are of exceptional interest.

Glancing at the photographs of the typical selector frames, Figs. 8 and 9, it will be seen that these frames are made up of "banks" arranged to accommodate one hundred circuits. It will also be noted that five of these "banks" are provided one above the other. Rods are furnished equipped with five "multiple brushes" which travel over the contacts of the "banks," the rods being elevated by means of rollers at the base of the frames. These rods, with their multiple brushes and control mechanisms (see Figs. 10 and 12), constitute what have been referred to as "selectors."

The "banks" shown in Fig. 13 are interesting in that they correspond closely to the multiple in the ordinary manual switchboard. That is to say, lines or trunks are connected to the multiple terminals on the "bank" in much the same manner that they are connected to the multiple jacks in the manual switchboard.

Another very interesting piece of apparatus is the "sequence switch," as shown in Figs. 14 and 15. This switch is probably one of the most ingenious devices involved in the mechanical system and performs in a very simple manner, what had previously been accomplished by the utilization of large numbers of relays. Its use has also made possible a more positive timing of events than could otherwise be obtained. For example, if it were essential for a certain circuit to be closed just before some other circuit, it is simply a matter of cutting the "cams" on the sequence switch, a sample of which is shown in the photograph, in a certain way, and the order of events is assured. By this simple device, therefore, thousands of combinations of operations may be established at will.

It will also be interesting to note that the various machines are not in general "stepped" along by the electrical impulses, but are power driven, the "selectors" being started and stopped at the desired trunk or line, in accordance with the electrical impulses which are always under control of the "sender."

Manual Positions Required in Automatic Offices.

While regular calls between two subscribers will be completed under the new system without the aid of operators, certain classes of calls, such as toll calls to suburban points and calls for discontinued or changed numbers will require the assistance of an operator. Special manual positions will, therefore, be provided in the automatic offices for this service. These positions will also care for cases where subscribers desire, for any other reason, the assistance of an operator. In such cases the subscriber will use the hole of the dial marked "operator." The manual positions will also be used for the handling of traffic from coin boxes when these are operated on a manual basis. In certain of the automatic offices, centralized information desks will be provided for furnishing the various classes of information required by the public. In some machine switching offices, so-called "cordless B" positions will also be provided initially, to care for calls from the existing manual offices as described more in detail later.

The manual positions installed in the automatic offices for handling toll calls to suburban points, as well as for completing connections from pay stations, etc., will in general be operated on a "semi-mechanical" basis, that is to say, the operator will be provided with numerical keys for completing the connection to the mechanical apparatus. By setting up on her keyboard, a

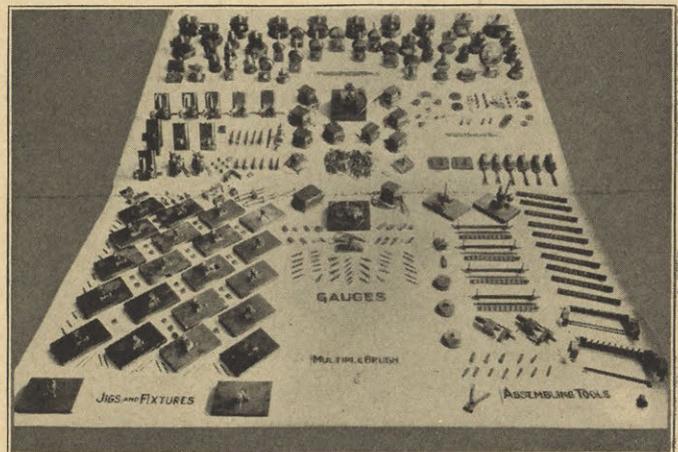


Figure 23. Tools and gauges required for making multiple brushes. One of these brushes appears in the foreground and is also shown in Fig. 24.

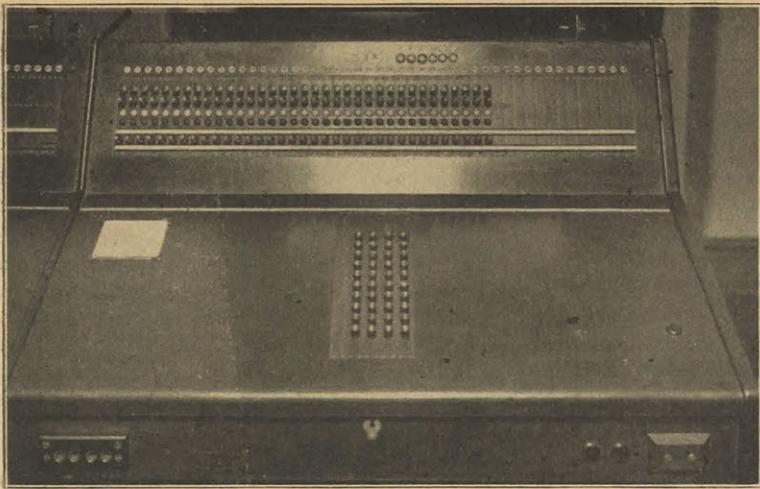


Figure 18. Incoming trunk position ("cordless 'B'") in a machine switching office.



Figure 19. Typical installation of Cordless B positions

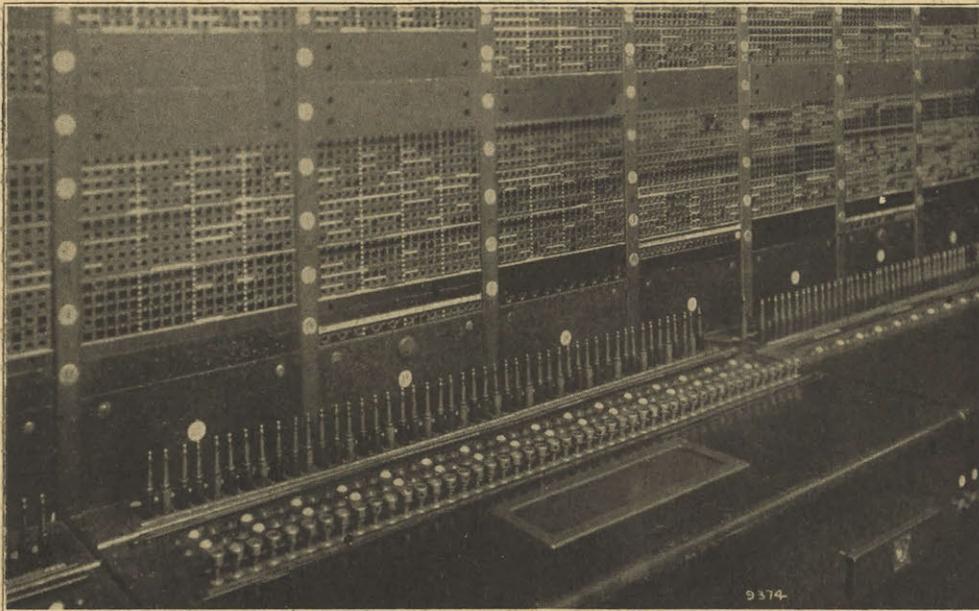


Figure 20. Incoming trunk position in a manual office arranged for "call indicator" operation.

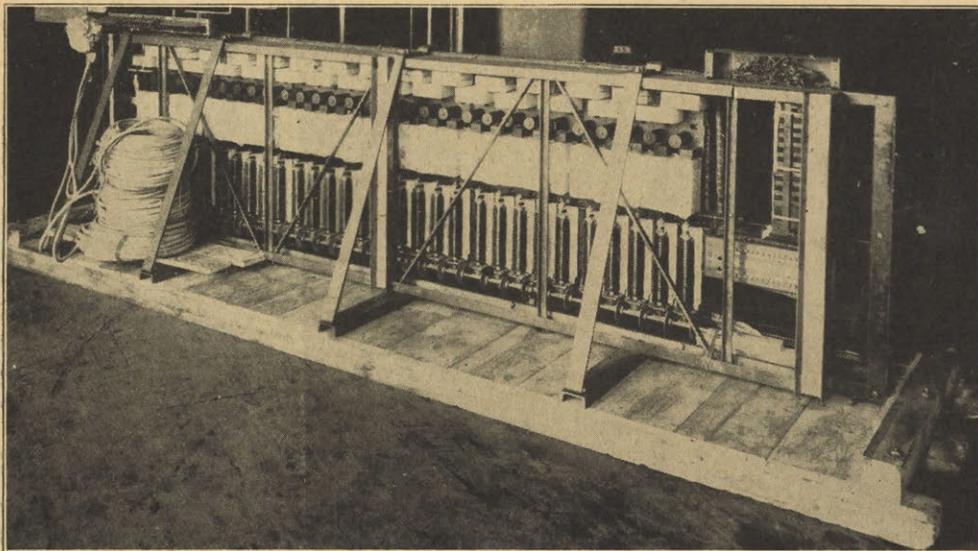


Figure 26. Sequence switch frame completely equipped and braced ready for packing.

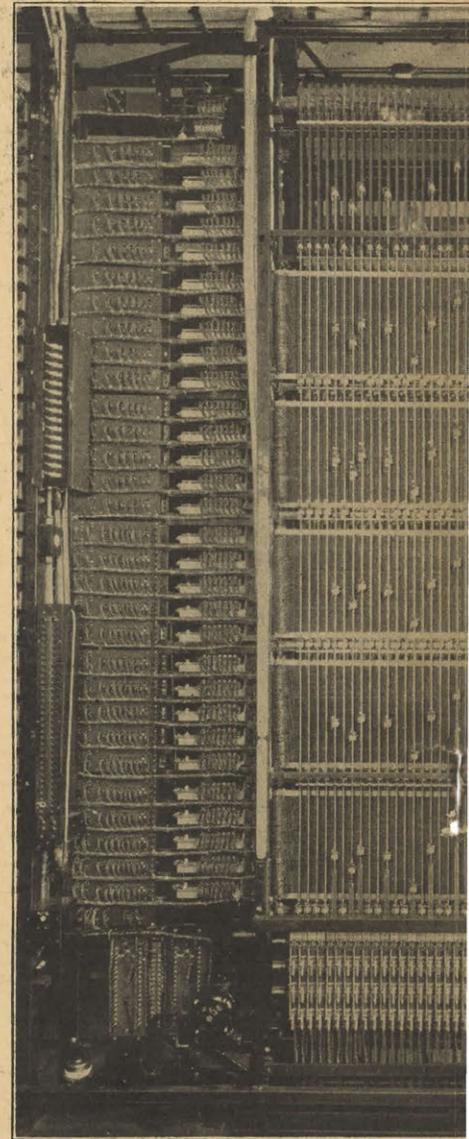
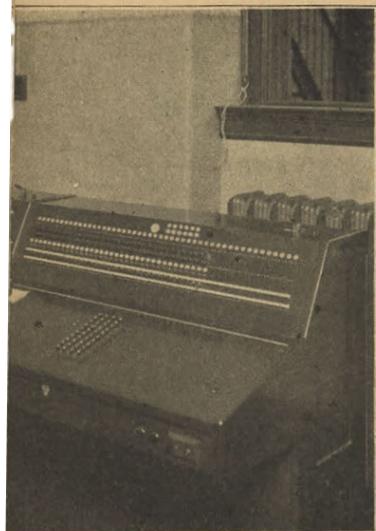


Figure 8. Typical selector frame showing ge... coming and final frames.



a machine switching office.

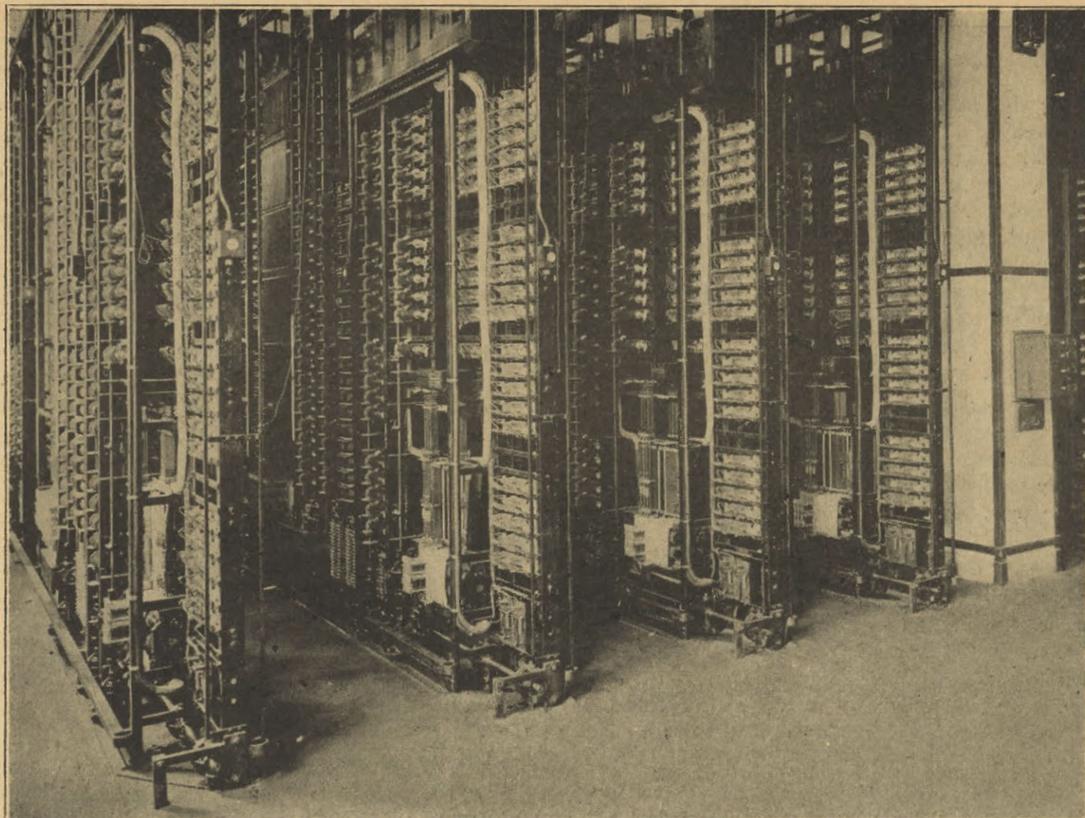
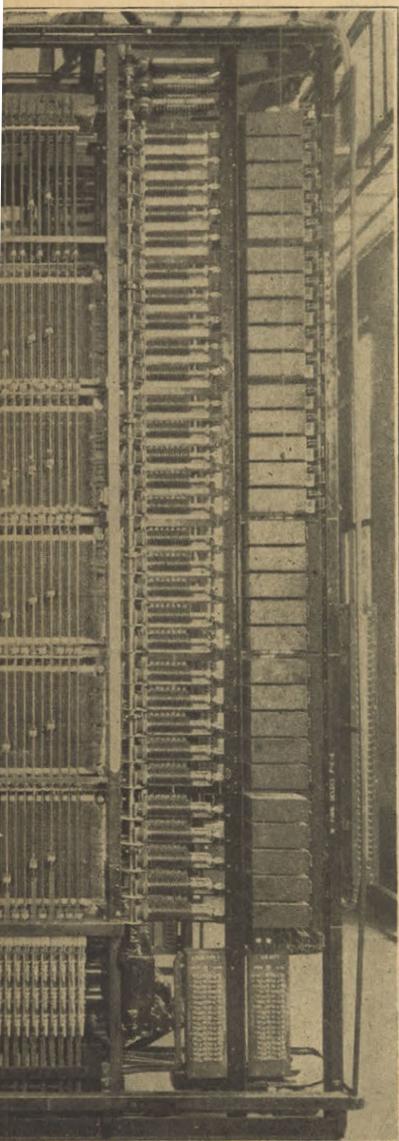


Figure 11. General view of machine switch installation.



General arrangement of district, office, in-

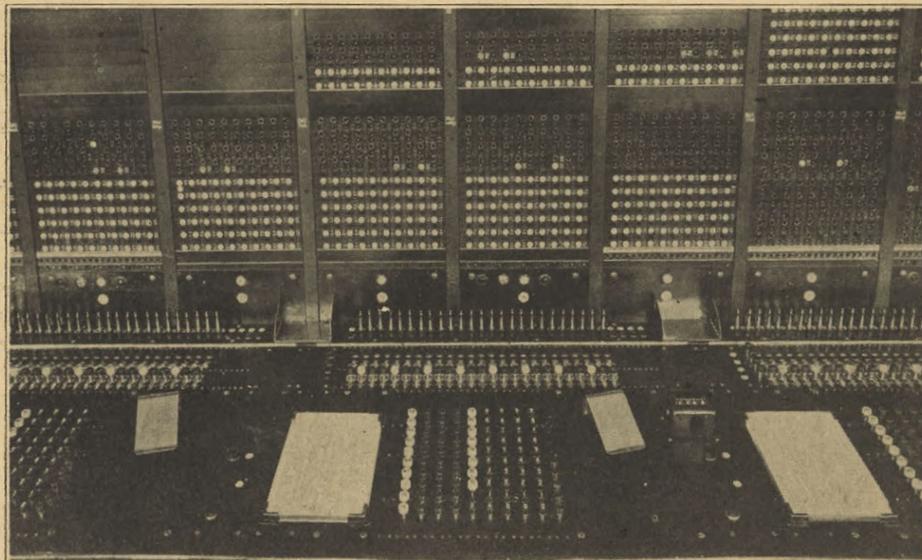


Figure 16. Manual position in automatic office arranged for semi-mechanical operation.

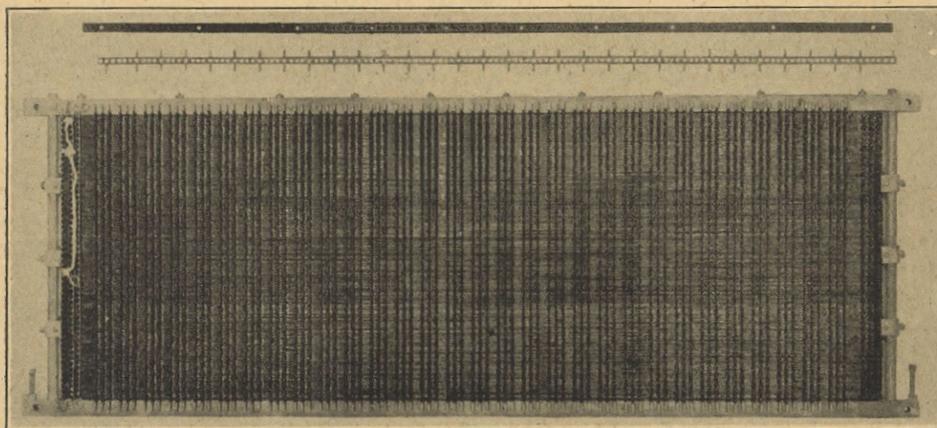


Figure 13. Multiple bank showing individual insulating and terminal strips.

photograph of which is shown in Fig. 16, the first three letters or numerical code of the office desired, followed by the numerals and party-line letter if to a manual office having such party-line service, the call will be completed automatically to the desired office, and if the latter is of the machine switching type, automatically through the switches to the called subscriber's station. If the distant office is operated on a manual basis, the call will appear before an incoming operator at that office on a "call indicator," as described later.

As the semi-mechanical operators will be unable to readily identify the calling subscriber, as is possible today due to his line terminating directly before the operator on an answering jack, a so-called "checking multiple" is provided at the semi-mechanical position. On suburban calls the operator may thus readily check the calling number as given by the subscriber, and insure accuracy in the billing record.

Automatic and Manual Switchboards Interconnect Without Difficulty.

In connection with the introduction of automatic switchboards, the question naturally occurs to one not familiar with the system, as to how calls are to be completed from a mechanical office to a manual office or vice versa. This need cause no concern, however, for the automatic system has been so carefully worked out, and the methods of connecting it with the other types of switchboards have been so perfected, that the different forms of equipment will interconnect without difficulty. In fact, a subscriber connected with one of the new automatic switchboards does not need to know whether the subscriber he is calling is connected with another automatic or with a manual switchboard. Conversely, a subscriber connected to a manual switchboard does not need to know which type of switchboard the party he is calling is connected with.

Considering first calls from a manual to an automatic office, one of two general methods will be employed, depending on the particular conditions encountered. Where the volume of traffic to automatic offices is considerable, or the manual switchboard is to remain in service for a reasonable period, the position will be equipped with a ten button key, as illustrated in Fig. 17, and on receipt of a call, the operator will select the office desired by means of one of the keys formerly used as a calling circuit key. This operation will automatically select a trunk to the automatic office and will indicate the number of the trunk chosen by lighting lamps in the face of the switchboard before the operator. She will then play off the telephone number desired on the ten button key, take up the trunk indicated with the other end of the cord pair with which she answered the calling subscriber and the connection will be completed automatically through the switches at the automatic office to the subscriber's station desired.

In special cases where the volume of traffic to automatic offices is small or the manual switchboard is soon to be replaced due to it becoming inadequate, the operator will complete the call over a calling circuit to an incoming operator at the machine switching office in the same manner as she would to another manual office. The incoming operator occupies what is known as a "cordless B" position, since it has no cords, and she simply completes the connection through the mechanism by playing off the desired number on a set of keys before her, which resemble in some respects the keys of an adding machine. Photographs of typical "cordless B" positions are shown in Figs. 18 and 19.

On calls from automatic to manual offices, the automatic subscriber will dial the number in the same manner as he would in making a call for another automatic subscriber, but the machinery will select a trunk to the manual office (see Fig. 4) and light a lamp associated with the trunk indicating to the incoming operator that a call is waiting. The operator will then depress a key associated with the trunk and the number dialed will be displayed in lamp signals before her. The displaying of

the number will be accomplished by a device known as a "call indicator" corresponding somewhat to a "carriage call," but which differs materially in its arrangement, as shown in the photographs, Figs. 20 and 21. The call is thus received visually and not orally by the incoming operator. Upon noting the trunk selected and the number displayed on the indicator, the operator completes the connection to the desired line in the multiple before her. If the line is found busy, she inserts the plug of the incoming trunk in a busy back jack sending back the busy signal to the calling subscriber. The machinery has been so designed that when more than one call is received at the same time at these incoming positions, the additional calls are stored up in the mechanisms and in turn displayed on the indicator as the operator has disposed of the preceding calls.

Changes Required in Toll Equipment.

The "tandem" toll boards now operating in most of the large cities on a manual basis will be replaced by machine switching equipments. In some instances, the through call will be completed entirely by the automatic equipment, while in other cases the services of an operator will be required for completing the call from the tandem point.

In the case of the toll boards at which calls to long distance or other points beyond the suburban area are completed, no radical changes will be required at the present time. It appears that the only changes necessary will be to modify the recording trunks from the local offices over which the subscribers pass their toll calls, and also to arrange for the toll operators to secure connection with subscribers' lines in the automatic offices. To establish such connections one of the two methods outlined above for handling calls from manual to automatic offices will be employed.

Means No Radical Change in Private Branch Exchange Equipment or Operation.

The introduction of machine switching central offices will not require any radical changes in the equipment or operation of private branch exchanges. The private branch exchange positions must, however, be equipped with calling devices to permit of the operator completing outgoing calls and the circuits must be so arranged as to function properly with the automatic central offices. Furthermore, in some cases the circuits will have to be modified so that private branch exchange stations can call for a trunk and do their own dialing to the central office. These changes in the private branch exchange equipment will, in some instances, be made without removing the switchboards, while in other cases, particularly on the smaller installations, new switchboards having the desired features will be installed and the boards removed will be utilized in districts having manual central offices.

Tremendous Task for the Western Electric Company.

It will be interesting to refer briefly in this connection to the wonderful work which has been and is being carried on by the Western Electric Company in the production of this apparatus.

The engineers of the Western Electric Company have had a formidable task in their work in relation to the design of new apparatus and circuits to meet the requirements of the new system as determined by the engineers of the general staff of the American Telephone and Telegraph Company. Following this work of design, exhaustive tests of all new apparatus have been carried on in cooperation with the American company's engineers. Notable work is also being done in analyzing the detailed requirements for individual installations as ordered by the associated companies and in the preparation of comprehensive specifications for the manufacture and installation of these equipments.

Splendid work is also being done by the manufacturing department of the Western Electric Company at Hawthorne, Ill. To provide the machine switching equipment a large amount of already available space is being utilized and five new buildings

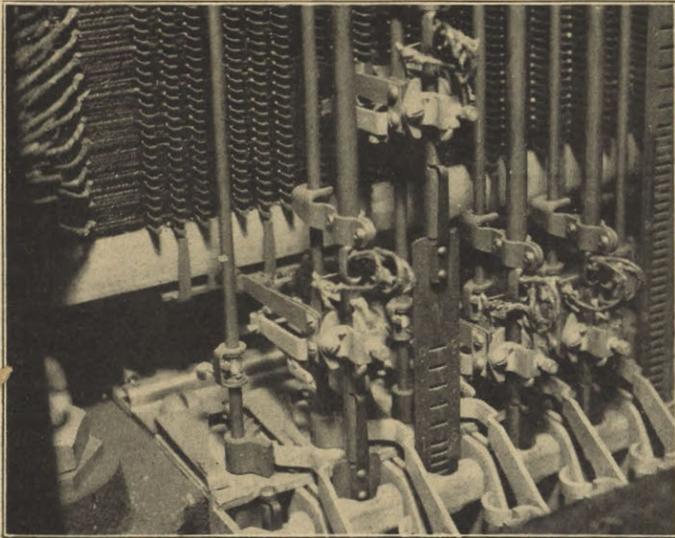


Figure 12. Selector frame showing details of multiple bank, multiple brush, and part of control mechanism.

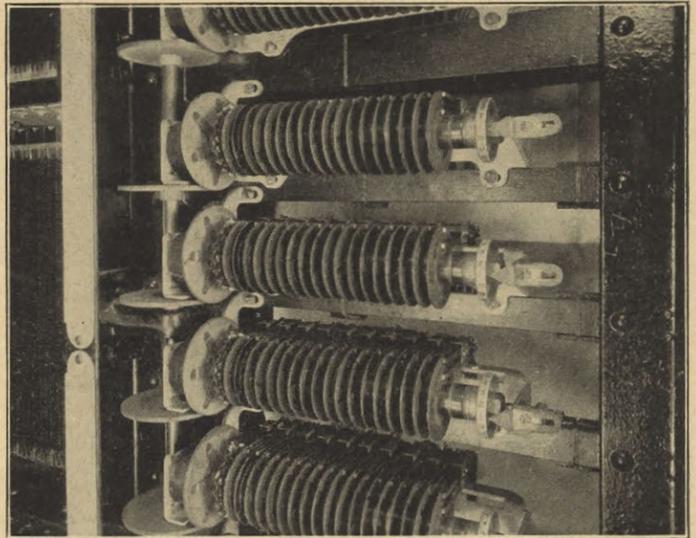


Figure 15. Sequence switches mounted showing constantly revolving drive shaft and magnetic clutches by means of which the sequence switches are revolved.

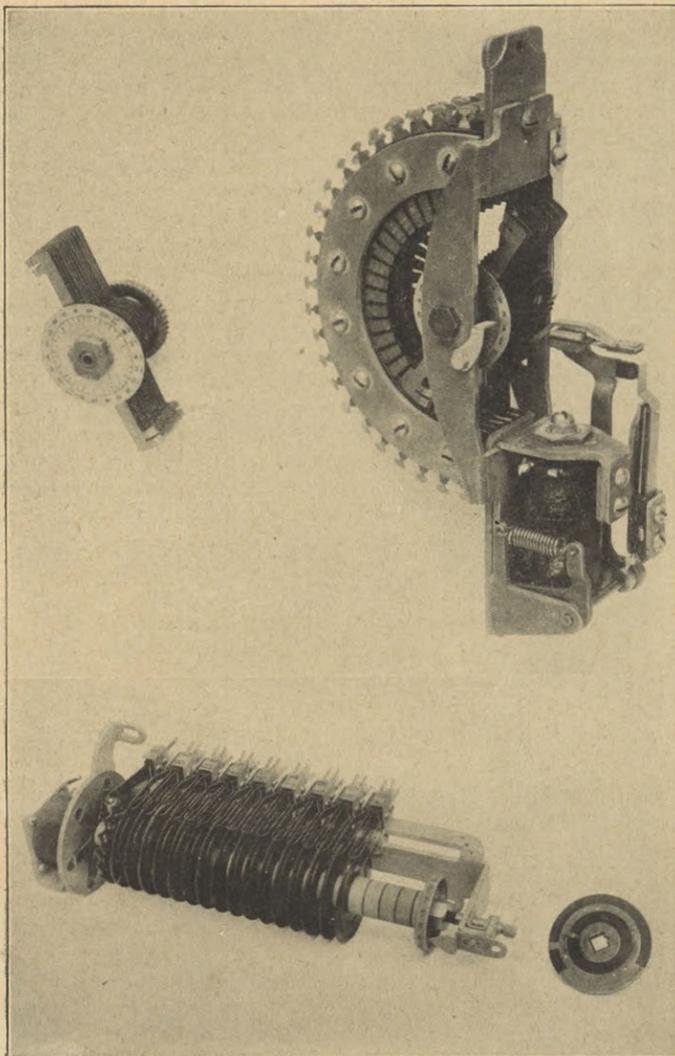


Figure 6. Rotary switch used for sender selectors.
Figure 14. Sequence switch, also showing a typical cam.

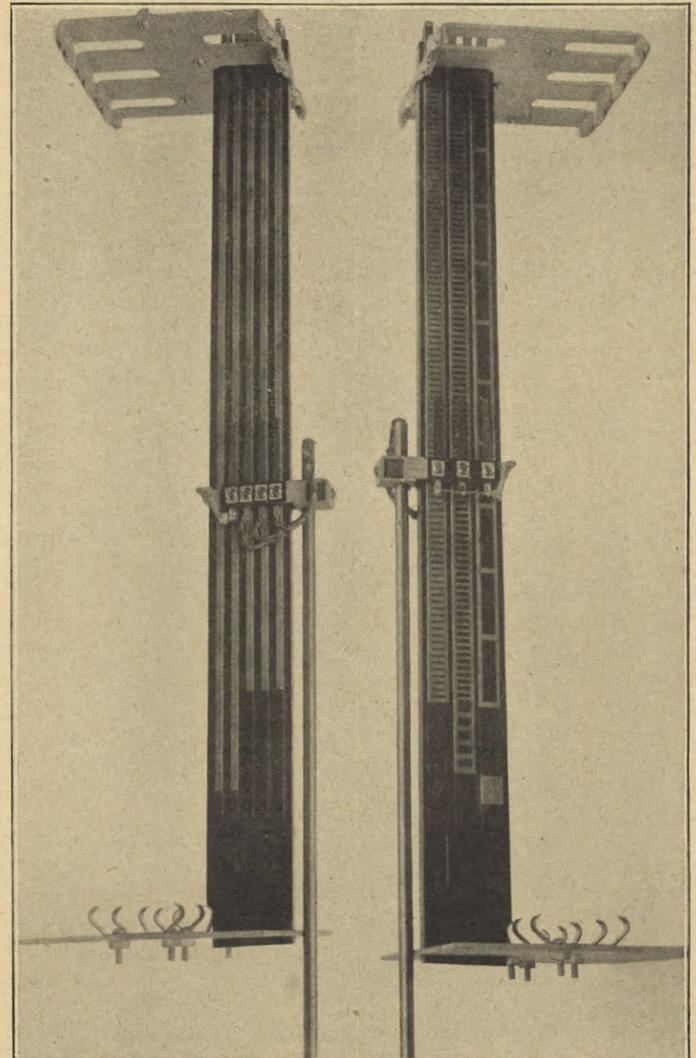


Figure 10. Commutator for controlling vertical movement of selecting mechanism.

(see Fig. 22) are rapidly nearing completion. Three additional six-story buildings will also be added to the main telephone apparatus group in the near future. The gross floor space of these three buildings alone will be 277,640 square feet, or nearly six and one-half acres. These various buildings together with their tools, machinery, furniture, etc., will constitute a very great addition to the manufacturing capacity. As the output of machine switching equipment increases and that of manual switchboards diminishes, many of the existing buildings and machines at Hawthorne will be turned into the production of machine switching equipment.

To produce this new form of apparatus means a tremendous manufacturing task. Three thousand new piece parts involving some thirty-six thousand manufacturing and inspection operations, have had to be made. This means that working drawings had to be prepared, manufacturing methods had to be developed, thousands of new tools had to be designed and built, additional machinery had to be provided, testing gauges had to be devised and thousands of other small but vitally important details had to be taken care of.

There is no more striking way of setting forth the magnitude of this manufacturing problem than to call your attention to the photograph, Fig. 23, showing the tools, test gauges, etc., required to produce the simple "multiple brush" which forms a part of the "selector" referred to above, and which is shown in Fig. 24. A study of these pictures and the recollection of what a small part of the complete machine switching office the "multiple brush" constitutes, it being only about as large as a key, will give a better conception of the problem of manufacturing equipment of this kind than could be obtained from pages of descriptive matter.

To facilitate the installation of these intricate machine switching equipments, the Western Electric Company has given careful consideration to the assembly of the equipment as far as practicable in the factory. Very gratifying results have been accomplished in this direction, and as shown in the illustrations,

Figs. 25 and 26, many of the frames are being assembled and wired in the shop and shipped complete with their cables attached. By shipping the equipment in this manner, the period of installation will not only be reduced, but the work will be greatly facilitated and other advantages will be obtained.

Opens Up New Fields of Endeavor For All Employés.

From the brief description of the machine switching system which we have given, it is evident that the introduction of this new form of telephone equipment and service will involve a vast amount of work on the part of all departments in the associated companies. As with any great project, this cannot be accomplished without a full concentration of effort and all departments must perform their functions in a most thorough and coöperative manner. It will be apparent, therefore, that new and interesting fields of endeavor have been opened up for every employé in the Bell System, for whether a member of the traffic, plant, commercial, engineering, accounting or other organization, the introduction of machine switching operation will present to each some new and interesting problems which must be solved. Although the use of machine switching equipment will not make it necessary to continually add such large numbers of operators to the force as heretofore, the constant growth in the system and the need for operators to cover the special positions in the machine switching offices and in the toll boards will evidently require the services of our operators.

This article could not be considered complete without an acknowledgment of the splendid work already done by the traffic and equipment engineers of the Cleveland Telephone Company in the formulation of plans for specific offices, as well as by the other departments in so far as they have been concerned. Enough has already been accomplished to demonstrate that the introduction of this new system will be carried on successfully in the usual Bell way, that is, in an economical and orderly manner, without inconvenience to the subscriber, and without derangement or interruption of the service.

Hoffstetter Wins Art Popularity Contest

Fred Hofstetter has the honor of receiving the highest number of votes for the most beautiful production in the exhibition of pictures recently held in the Bell Forum. His oil painting "Sunset" carried the day. This picture is one of two purchased by the traffic department for hanging in the traffic rest rooms. The other fortunate artist is Mrs. Jane McBratney, whose "Indian Warrior" has fine decorative quality.

A number of other offerings in the exhibit received votes. Those which ran the highest were "Goose Girl," a water color by Miss Laura Brey; "Lilacs," an oil by Fred Hofstetter; "Winter Day Forest Preserve," an oil by E. G. Drew; "California Scene," a photograph by Miss Etta Dwyer; "Edgebrook," a photograph by J. J. Riddle, and "Baby Girl" in pen and ink by Miss Mabel Svenson.

Mr. Drew was elected president of the Business Men's Art Club in March at a meeting held in the Hamilton Club. T. V. Field, H. C. Howard and V. Ray are charter members of the organization. The club is composed of Chicago business men and is believed to be the only one of its kind in the nation.

Bell Traffic Club

The Bell Traffic Club held its March meeting on Wednesday, March 17th, in the Bell Forum. The dinner and table decorations were appropriate to the day.

Mr. Cloyd of the suburban traffic department read a very interesting paper on "Service Criticism."

After the meeting the members attended the performance at the Palace Theatre.

At a special meeting held March 1st J. B. Davenport of the

city traffic department, J. W. Wolcott of the suburban engineering department, W. R. Hutchinson of the suburban traffic department, were elected to active membership in the club.

The next regular meeting will be held Tuesday, April 20th. C. M. Conway will be the speaker.

Bell Telephone Chess and Checker Club

The tournaments held March 12th resulted as follows:

Class "A"—First, F. J. Golden; second, A. J. Scott; third, G. Lester.

Class "B"—First, J. O'Grady; second, T. Trainor.

Classes "C" and "D"—First, J. Zanrzla; second, D. L. Cowlin and L. A. Gordon, tied.

No chess tournament held. The next tournament will be held April 16th at 6:30 p. m., in the fifth floor clubroom.

Asks Fair Deal for Utilities

In a plea for a fair deal on the part of municipalities toward utilities, Chairman William M. Smith of the Michigan Public Utilities Commission said that when the proper attitude is reached the utilities will not have to pay a high rate of interest because of the low value of the bonds on the market, which will work to the advantage of the people of the municipalities themselves.

Speaking before a large number of business men in Saginaw, he pointed out that the old days of the franchise have expired and that conditions have undergone a change. He said the public utilities must have enough revenue to pay good wages, maintain the plants in good shape, set aside for depreciation and pay a fair return in dividends.


**SAFETY FIRST and
ACCIDENT PREVENTION**


Member National Safety Council

"EVERLASTING WATCHFULNESS IS THE PRICE OF SAFETY. THINK OF THE LOVED ONES AT HOME BEFORE TAKING A CHANCE."

"TO MEET TEMPTATION AND TO CONQUER IT IS THE ONLY TEST OF CHARACTER. TO OVERCOME CARELESSNESS IS THE ONLY GUARANTEE OF SAFETY."

PHYSICAL ENGINEERING

Cut Down the Depreciation

Most of us at some time during our service with the company have spent some time in an exchange, either furnishing service to the public or keeping the equipment in condition to render proper service.

If additional sections of "A" board are installed isn't it a fact that the older sections need considerably more attention than the newer sections? More cases of "trouble" are reported in the older sections by our operators. The repairman spends more of his time in the older sections.

With this in mind you will admit it is logical that the older person needs more attention than is given to the man under forty years of age.

Therefore, don't drag around with a chronic ailment thinking it will eventually "Come Clear." Report it to a medical "repairman" at once to locate the cause of the trouble.

This precaution may add many years to your usefulness, which is a matter so often overlooked.

The personnel and equipment of our Health Department are at your disposal for cases of this kind.

Tell About Dentistry

If you should go to a dentist today, it is almost certain he would find something necessary to do for you.

If a dentist could examine the teeth of every person in a theater tonight, he would find nearly everyone needing dentistry of some kind.

Nine people out of ten never go to a dentist until pain drives them. They neglect their teeth because they do not understand

the relation of good teeth to good health.

The world does not yet realize what dentistry can do for humanity.

Here then is a duty for all of us.

"He who knows not, and knows not that he knows not, is asleep; wake him."

We who know the benefits of dentistry must tell others.

Tell your neighbors, your friends, your own family.

Preach dentistry.

Begin *today*.

A FRIEND OF THE UNDERTAKER



Very much the worse for wear, but still making accidents when discovered by Accident Prevention. But it is no more.

The Automobile Hazard

Last year, 7,600,000 autos, 10,000 deaths.

Last year, maimed and crippled, This year, 9,000,000 autos, ——— deaths.

This year, maimed and crippled ———.

In Chicago, 420 persons were killed in automobile accidents during 1919; in Cleveland 136; in St. Louis 97; in the Borough of Manhattan, New York, 191 children under 15 years of age were killed by automobiles, and in Greater New York 677 persons were killed by automobiles in one year.

The National Safety Council has declared war on the avoidable automobile accident and has enlisted the aid of practically every interest concerned in a comprehensive campaign for the reduction and eventual elimination of that costly casualty breeder. You as an individual can enlist now for accident prevention.

DON'T WAIT FOR THE DAY WHEN YOU WILL BE DRAFTED.

REMEMBER THE DRIVERS ARE NOT RESPONSIBLE FOR ALL THE ACCIDENTS!

Recent Accidents

CHICAGO TELEPHONE COMPANY.

An installer picked up a hot

Just because "the whole blamed world is on the wrong track" is no sign we should go the same way and forget accident prevention.

When preachers really preach
Men really listen—
We want
Preachers for accident prevention.

soldering iron by the metal part and burned the palm of his left hand.

A P. B. X. installer was standing on a ladder testing conductors. The ladder slipped from under him and he fell to the floor, cutting his hands and lips.

A laborer was winding loose cable onto the drum of a winch by pushing the wheel with his hands. The glove which he was wearing caught between the gears and pulled his finger in. His finger was bruised severely.

A collector slipped and fell on an icy sidewalk, causing a fracture of a rib on the left side.

An equipment installer was testing for a ground on a light circuit in a fuse cabinet. The fust melted in his right hand, burning his finger.

A hoe used to remove ashes from a fire box was leaning against the boiler. A janitor stepped on the metal part, causing the handle to fly up and strike him in the face.

An operator was descending a stairway. She missed her step and fell, bruising her side.

An operator when descending stairs, slipped and fell, causing a contusion and swelling of her hip.

An operator, leaving the operating room, slipped and fell on the floor, injuring her spine.

MICHIGAN STATE TELEPHONE CO.

Detroit Construction Department

A gang of men were pulling out an underground lateral. One man was in the manhole, seeing that the cable came out properly. The sleeve of the cable broke in two, striking him above the left eye.

A man was coming down a pole when in some unknown manner his foot slipped, striking against an iron pole step.

A man was helping saw a telephone pole with a cross cut saw. His right knee was injured by being hit with the end of the saw.

An employé hit a lag bolt with a hand axe, and rust from the bolt flew in his eye.

A man was stepping poles when in some unknown manner, his hammer slipped and struck him on the left thumb.

Another employé was handling telephone poles and ran a splinter into the middle finger of his left hand. Blood poisoning set in after nine days. The man did not go to see a physician until the ninth day.

Detroit Equipment Department

An installer, while trying to remove bricks from a wall near the ceiling, in order to run an inside wire, ran a rusty nail into the index finger of his left hand.

A repairman was standing on top of a ladder and the bottom of the ladder slid on the marble floor. He fell from the ladder, injuring his back and spine.

Michigan State Plant Department

A groundman was putting glass insulators in a box. One rolled out of his hand and chipped. A chip flew into his eye.

A digging bar was driven into the ground for a brace used in

erecting a pole. A tree, which was being felled, struck a guy wire fastened to the digging bar, hurling it through the air and hitting an employé, causing a contusion of the scalp and multiple fracture of the skull.

Accident Prevention Trophies

During the month of April, the Accident Prevention Trophies of the Chicago Plant Department will be in possession of Messrs. Corning of Oak Park district, Lovell of Central Construction, and Stone of Austin exchange.

Oak Park district and the Central Construction division are in first place this month. However, Evanston district and the Cable Repair division still retain perfect records; but as they have already held the trophy for three consecutive months, the next highest in turn receives the honor of holding the award.

This is the third consecutive month for Austin. They sure know how to do it.

The standing of the various divisions for the period ending January 31st, is as follows:

Suburban Plant.		
1. Oak Park	5. Hammond	9. La Grange
2. Evanston	6. Waukegan	10. Joliet
3. Harvey	7. Elgin	11. Aurora
4. Wheaton	8. Special Estimate	
Construction.		
1. Central Construction	3. Garage	6. Building Cabling.
2. Cable Repair	4. Supplies	7. South Construction
	5. North Construction	
Maintenance.		
1. Austin	8. Main	15. Yards
2. Stewart	9. Belmont	16. Lincoln
3. Central	10. Hyde Park	17. So. Chicago
4. Wabash	11. Pullman	18. Lawndale
5. Humboldt	12. Kedzie	19. Irving
6. Edgewater	13. Calumet	20. Monroe
7. Oakland	14. Wentworth	21. Lake View

Honor Roll

District.	Division.	Period.
Stewart.....	Maintenance.....	15
Austin.....	Maintenance.....	15
Central.....	Maintenance.....	12
Edgewater.....	Maintenance.....	11
Humboldt.....	Maintenance.....	11
Oakland.....	Maintenance.....	11
Evanston.....	Suburban.....	11
Pullman.....	Maintenance.....	9
So. Chicago.....	Maintenance.....	7
Building Cabling.....	Construction.....	6
Belmont.....	Maintenance.....	6
Main.....	Maintenance.....	6

DO NOT USE IODINE ON BURNS



"EXCUSE IT, PLEASE!"

April, 1920.

"It looks like rain."
"Yes, and tastes like it."

Taking Joy Out of Life.

"The meanest man I know is a young fellow who boards with us."

"What is the matter with him?"

"He is trying 'out an invention to keep subscribers from listening when a party line is being used."—*Baltimore American.*

Auto-Preparedness

"Getting ready for the automobile show?"

"Yes, I'm negotiating a new mortgage on the home."—*Louisville Courier-Journal.*

Not in the Other Place

An Englishwoman who is a medium says that near-beer is popular in heaven. So that's where it's popular.—*Louisville Courier-Journal.*

More Spirit Talk.

Mr. Tilton was surprised one morning by reading the announcement of his own death in a newspaper.

He at once called his friend, Jones. "Hello, Jones. Have you seen the announcement of my death in the paper?"

"Yes," replied Jones. "Where are you talking from?"

The Booms That Bloom in the Spring

Some recent "nominations" for President remind us that the less there's in a drum the louder the boom.—*Boston American.*

Operator: "Number?"

Subscriber: "66, please."

Operator: "Busy."

Subscriber: "Then give me 33 twice."—*Moonbeams.*

Spring Colors, 1920

The "reds" seem blue because America proved to be not as green as they thought.—*Pittsburgh Gazette-Times.*

Up-to-Date Youth

Bobby's father asked him when Moses lived. Bobby said he did not know. His father then read from a book: "Moses 4,000 B. C.," and then asked Bobby why he did not know when Moses lived. Bobby replied: "Oh, I thought that was his telephone number."

Footing the Bill

"Bill's going to sue the Company for damages."

"Why, what did they do to him?"

"They blew the quittin' whistle when 'e was carryin' a 'eavy piece of iron and 'e dropt it on 'is foot."—*Everybody's.*

A Book Worm

"Have you read Scott's novels?"

"All but his 'Emulsion.' I have seen it advertised, but I have never been able to get a copy."

Worthy to Wear a Crown.

"Are you sure you love your neighbor as yourself," asked St. Peter, who was cross-examining a new arrival.

"Yes," answered the applicant for a golden crown. "For ten years he used my telephone to carry on his business, and I never complained."

"Enter, my good man," said St. Peter with much feeling.—*Birmingham Age-Herald.*

College Wit

"Bridget, I don't want you to have so much company."

Why, you have more callers in a day than I have in a week."

"Well, mum, perhaps if you'd try to be a little more agreeable, you'd have as many friends as I have."—*Boston Transcript.*

Dear Eddie:

Have you ever been
In close CONTACT with BELL 'phone men?
No? Neither have I 'till now.
And the things I've heard
And learned, my word,
Have deepened the LINES in my brow.

They all believe in ghosts, I'll say,
For they speak of PHANTOMS every day;
Of course, that stuff is bunk.
And I wonder why
A TELEPHONE GUY
Is talking all times of his TRUNK.

They tell me of SNEAK CURRENTS, too;
I 'spose they sneak on WIRES, don't you?
But where do they sneak to, Ed?
ARRESTER is not
A TRAFFIC cop—
They never buy hats for POTHEAD.

Now HENRY is not a Ford machine
And PLUGS are not a wagon team;
No prisoner is in the CELL.
I'll DROP a LINE
And tell the time
That BATTERY BOXES the BELL.

POLARIZED BELL is not a dame
Who gives cold shoulders to her flame,
Though he has JACK in his jeans.
SPLICING might be
A wedding, but see,
Nothing is just what it seems.

Some men, like roosters, always wear
Big SPURS upon their feet, I'll swear
They look like Bantam games.
I think I'll stop
Before they knock
The block off your old pal James.

OF INTEREST TO OUR GIRLS

Conducted by
Mrs. F. E. Dewhurst

The Poetry of Work

Some people think that work is all prose. "If there is any poetry in life," they say, "it is to be found in the hours when we are off duty."

There are others with the blessed gift of imagination who find beauty even in "the common round, the daily task." As we spend at least a third of our time at the "daily task," it would be fortunate for us if we could have our eyes opened to the poetry of work, if there is such a thing.

A few evenings ago, a little group of people were talking about the part imagination plays in our lives and how the poet can see beauty and value in common things. "For instance," one of them said, "I suppose a poet could write a nice little poem on an old shoe."

"No doubt," said another. "I'm sure I could write one on this old teakettle. It looks battered enough and not a bit poetical, but it has made tea on many a battlefield and General Pershing himself has been refreshed by its steaming comfort."

And then they decided to see what kind of poems they could write on some common and unpromising subjects. The poem which follows was written by one of the party. Can you think of a more unpoetical object—a discarded, soiled, frayed cord!

'What the Cord Said'

"We need a new cord in Position Six," the supervisor said to repair,

As she gave in the number of a threadbare cord battered from constant wear;

The old cord sighed as it said good-bye
To its "buddies" all in a row.

"The span of our life is not very long,
But it's filled with wonder, I know.

Why, I've heard the story of many a youth
As he pledged his vows anew:

'Oh, the wondrous thing I'll do for you, girl,
When God sends me back to you.'

And I've heard the cry of a mother's heart,
As her boy called her up to say,

'We have sailing orders, mother of mine, tomorrow or perhaps today.'

I gave the news to an anxious world,
'The kaiser begs for peace and the roar of cannon and
Boom of guns in far-off France must cease.'

How I thrilled with pride when the boys came home
And the streets were filled with cheers, for I knew that many
a love-lit eye was dimmed with happy tears.

Looking back down the lane of yesterdays, the memory of the
past clings

And I take up the trail in another land,
Through the gate at the end of things."

Mrs. Carroll, now of the Chicago operators' training department, who wrote this, is the same young lady, then Miss Mulligan, who wrote the clever little poem on the "Home Guards" which we published in February, 1918.

In that poem, beginning—

"I've enlisted in an army
That wears no uniform,
But we're always out on duty
In sunshine or in storm"—

she saw something besides a switchboard and girls making connections. She saw the men over there and she saw the girls as a part of that great army—the loyal "home guard."

On this page we reproduce one of our recent advertisements. It is not a poem in words, but it is poetical in thought, for it pictures the beauty of the telephone operator's work. We can imagine an operator feeling proud as she realizes that she is such an important factor in the life of the city. She is only a girl, but by this magic instrument which she holds in her hand—this insignificant little metal plug, she can send messages through space and bring service which means safety, protection and help. In her hand is the key to the portals of speech. She opens the way, and

"The speed of the wind's
Like a snail and its pace
When matched with a word
On its journey through space."

Who can say such work is prose? It is glorious opportunity.



**Guardians of our City-
Protectors of our Homes
Aids in our Business -
Positions now open in this
interesting profession**



Blaisdell Colored Pencils

Smooth writing,
long wearing,
quick sharpening
—the standard
colored pencils
for more than a
quarter century.



Blaisdell
Pencil Company
PHILADELPHIA

M. J. CORBOY COMPANY

**Plumbing, Gas Fitting
Sewer Water Contractors**

178 W. Randolph St. - Chicago, Ill.

CONTRACTORS FOR

Chicago Telephone Co.'s Majestic Exchange
" " " Austin "
" " " Kildare "
" " " West Pullman "

Everstick Anchor Company

ST. LOUIS, MO. LOS ANGELES, CAL.

MANUFACTURERS OF

BLACKBURN'S

NEVERSLIP CABLE RINGS

Harrigan & Reid Co.

HEATING and PLUMBING
ENGINEERS

SHEET METAL WORK

PHONE MAIN 243-244

231-233 First Street DETROIT, MICH.

ATKINS
SILVER STEEL
SAWS

On the Pole or in a Hole
linemen, electrical workers and all those who
have wood or metal cutting to do under the
most difficult conditions, will find that
Atkins SILVER STEEL Saws
can be relied on to do the work easier, quicker,
better than any other saw.
Specify "ATKINS"
We make a better saw for every use—ask for literature—free.

E. C. ATKINS & COMPANY, Inc.
Established 1887
Home Office and Factory: INDIANAPOLIS, IND.
Canadian Factory: HAMILTON, ONTARIO
Machina Kofa Factory: LANCASTER, N. Y.

Branches carrying complete stocks in the following cities:
Atlanta, New Orleans, Seattle
Chicago, New York City, Paris, France
Minneapolis, Portland, Ore., Tokyo, N. S. W.
San Francisco, Vancouver, B. C.



B. Thrifty Says

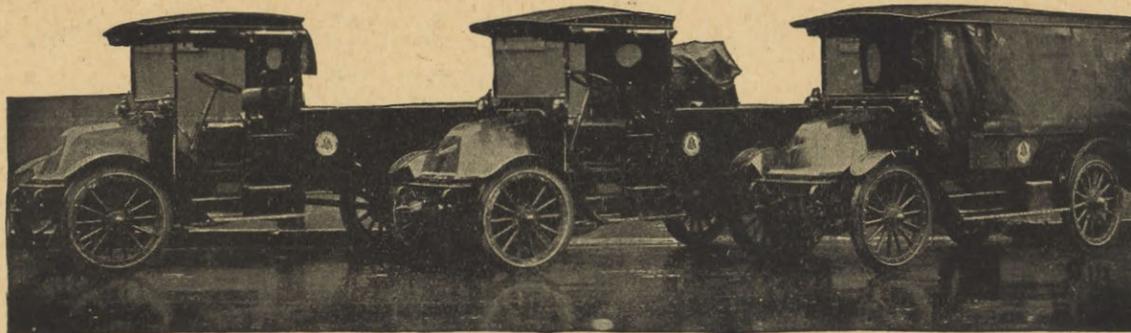
"Let the money you
work for work for you."

Accounts may be opened and
deposits made BY MAIL

THE
**NORTHERN
TRUST COMPANY**
SAVINGS BANK

N. W. Cor. La Salle and Monroe Streets
CAPITAL AND SURPLUS, \$5,000,000

© 1919 T.N.T. Co.



“SERVICE”

The telephone is a symbol of Service. The far-reaching Bell Telephone organization is a creator of service—and is a servant of this same service.

International Motor Trucks, like the telephone, are symbols of Service. The far-reaching sales and distributing organization of the Harvester Company, represented by 92 branch houses and thousands of local dealers, forms a solid service foundation upon which **International Motor Truck Service** attains completeness.

Bell Telephone Service supplemented by International Motor Truck Service spells “Plus-Service.”

You are interested, naturally, in such service. So are we. Do the obvious thing. Investigate.

INTERNATIONAL HARVESTER COMPANY

CHICAGO OF AMERICA, INC. USA

A Justifiable Kick

The manager of one of the offices taken over recently by the Central Union Telephone Company furnished the following letter. It is a typical complaint of the olden days before plant maintenance repairs were made and before rural and urban subscribers understood each other very well:

Dec. 27, '09.
Line 22.

Telephone Company.

As you expect pay for the used of phone.

We expect so we can used it Sunday and today can't get no one.

We don't like to pay for nothing that don't benefit us. As we have payed for days that we couldnt used the phone this summer 2 week altogether and sure you wouldn't like too either, to pay for nothing that didn't benefit you. Remember just count off untill the line is fix.

Country people can wait while the city people is waited upon first. Country people just as good the town people. Wasn't for the country people the town people would starve.

I ain't the only can't used the line.

Bell News Widely Read

The BELL TELEPHONE NEWS is more widely read, apparently, than the publishing and editorial corps have known or believed. Many letters have been received lately from various parts of the middle-west relating to items that appeared in recent issues. The item of news concerning Harry D. Beattie of Grand Rapids, formerly an employé of the company but now out of the service and supporting a family by means of a magazine subscription business, although he is blind and crippled, attracted unusual attention. Mr. Beattie is being given splendid support among magazine readers who work for the company. Several of the newspapers of Michigan have published the item, while others have asked for a cut or picture of Mr. Beattie.

Blankety Blank Service

A lady in Kalamazoo stepped into a store to use the telephone. She rang a short ring and placed the receiver to her ear. There was no answer. This was repeated several times without results. Words failed to express her opinion of the service. The proprietor having had no trouble with the instrument, stepped up to see what the trouble could be. The critic had been turning the handle of a pencil sharpener fastened on a shelf near the telephone.

QUALITY, EFFICIENCY and DURABILITY



Patented
No. 65 Quart Torch
No. 66 Pint Torch

are the three essential points each telephone worker must consider carefully when purchasing tools. Some overlook these points, yet experience has taught many that such an action is unsuccessful. Merely as a suggestion, try the "Always Reliable" when you again need torches, furnaces and braziers. You will then, also, be on our largest list of satisfied users.

Your nearest jobber has our goods in stock, or will stock them for you.
OTTO BERNZ CO., Newark, N. J.

Annual Concert of the Bell Telephone Male Chorus.

The annual concert of the Bell Telephone Male Chorus will be given in Orchestra Hall on Thursday evening, April 22, at 8:15.

The excellent quality of the work at rehearsals has continued and the enthusiasm and interest of the members are apparent from the large and regular attendance which, with an already well-trained chorus, assures a splendid concert. Director Protheroe, under whose able leadership the organization has been steadily advancing for several years, looks forward confidently to the best concert we have ever had.

Chicago Telephone Company employés desiring tickets should make application through their department heads. No charge will be made for the tickets, which will be given out as nearly as possible in the order in which applications are received. Department heads may obtain tickets from O. N. Olson, secretary of the chorus, Room 1001, Bell Telephone Building.

Accurate Testing Service



Weston

(Model 57)

WIRE CHIEF'S VOLTMETER

An Instrument possessing special characteristics and of exceptionally high internal resistance, which is vital in accurate telephone testing service.

It has been found that the use of the Weston Wire Chief's Voltmeter has increased the efficiency of large exchanges 25%. The same or larger increase will apply to smaller exchanges.

Through a series of tests, for which it is specially devised, it affords an incomparable means of determining rapidly the condition of subscribers' lines.

The Wire Chief's Instrument can be put to various uses and the ballistic properties of the instrument are such as to make it particularly adaptable to measuring capacities.

Complete information concerning this and other Weston models will be sent on request.

Weston Electrical Instrument Co.
135 Weston Ave., Newark, N. J.



*Any Door is a Better Door
with a Yale Door Closer*

Correspondence
is
Cordially
Invited

ON every main entrance, library, kitchen, bath and screen door, there is need for a Yale Door Closer.

The Yale Reversible Door Closer comes in sizes and finished to suitably and completely fit every kind of door.

In mechanical construction and design the "Yale" is typical of every other Yale product—and proves itself better in operation and ease of maintenance in hundreds of thousands of installations under all conditions of use and climate.



The Yale & Towne Mfg. Co., Makers of the Yale Locks - 9 East 40th Street, New York City
Chicago Office 77 East Lake Street Canadian Yale & Towne Ltd., St. Catharines, Ontario

**Direct Practical Comparison Tests as
Well as Laboratory Tests**

Have proven

Reilly's Wood Preservative
R.W.P.

the most efficient agent to prevent decay in telephone poles and cross arms.

That is why it is the most widely used.

Penetrates and stays in wood—no tar adulterant to clog pores—no volatile elements to dissolve or evaporate.

Treat by brush or open tank method.

If you've tried the rest—now use the best

THE REILLY COMPANY, Indianapolis, Indiana

Plants: Indianapolis

Minneapolis

Mobile

Seattle

Norfolk

PEERLESS TESTING SETS
TYPES FOR ALL CONDITIONS OF SERVICE



Peerless Testing Sets have been officially approved and adopted by the Postal Telegraph Cable Co., the Western Union Telegraph Co., and American T. & T. Co., and associate Bell Telephone Companies and the largest Independent Telephone Companies in the country.

Without an equal for accuracy of results, Durability in Service, Beauty of Design. Send for Catalogs.

Peerless Plug Type Test Set

Thompson-Levering Company
Philadelphia, Pennsylvania, U. S. A.



REMEMBER

the true sign of
**INSULATOR
DEPENDABILITY**
in your specifications.

THE R. THOMAS & SONS CO.
EAST LIVERPOOL, OHIO

New York Boston Chicago
Canada-Northern Electric Co., Ltd.
Pacific Coast-Western Electric Co., Inc.

**For the
Man
Who Uses
Tools**



It's something of
practical value all
the year 'round.

Genuine Harness Leather Tool Bag
Made in Six Sizes

Catalog No. 17 Describes It

MATHIAS KLEIN & SONS, Canal Station 62, CHICAGO



Herhold Chair Co.

Manufacturers of

Telephone Operator

Chairs

1015-1025 W. Erie Street

CHICAGO ILLINOIS

Write for Catalogue

BURNLEY

SOLDERING PASTE

Is a perfect Flux. Burnley Paste cannot spill out or drip away like liquid.



It stays where you put it and follows closely the hot iron.

Send for free sample.

The Burnley Battery and Mfg. Co., North East, Pa.

WESTERN ELECTRIC COMPANY
Distributors



"AMERICAN BRAND"

Weatherproof and Bare Telephone Wire

A Guarantee for Service and Quality

AMERICAN INSULATED WIRE & CABLE CO.

OFFICE: 954 W. 21st STREET, CHICAGO, ILL.

LOSS BY BURGLARY

may be avoided by securing
a Burglary Insurance Policy
issued by the
**American Surety Company
of New York**

CHICAGO BRANCH OFFICE

Continental and Commercial Bank Building

J. L. MAEHLE, Manager

Fidelity Bonds Burglary Insurance Surety Bonds

**"RED DEVIL" Extra Heavy
Linemen's Insulated Side Cutting Plier**

Sizes 6-7-8-9"



Forged from a special high-grade tool steel—hand-honed knives—for linemen handling live wires. It is scientific in shape and is the finest plier ever made for heavy line work. The insulation is tested to stand 7,500 volts.

SMITH & HEMENWAY CO., Inc. 125 COIT STREET
IRVINGTON, N. J.

Manufacturers of "RED DEVIL" Pliers,
Electrical Tools, Auger Bits, Screwdrivers, Etc.

ON ALL FORMS OF
TELEPHONE and TELEGRAPH
MOTORS AND GENERATORS
MORGAN CRUCIBLE CO.
519 WEST 38th STREET
NEW YORK CITY

-to use

MORGANITE Brushes

BAYLEY & SONS, Inc.

LIGHTING FIXTURES

105-109 VANDERVEER STREET
BROOKLYN, N. Y.

QUALITY CORDS

"We Make 'Em"

For
SWITCHBOARDS
and
TELEPHONES

Runzel-Lenz Electric Manufacturing Company
1751-53 No. Western Avenue, Chicago

A NEW
**Box Joint Long Chain Nose
Side Cutter**

For the Telephone and Switch-
board Repair Man

The long, slender nose will let you reach into deep, narrow places that you cannot reach with other pliers.
May we put you on our mailing list for Plier Pointers? There's no charge to you.

Utica Drop Forge & Tool Co.
UTICA, N. Y.

UTICA No. 55
6 1/2 inches

TRADE MARK
HEMINGRAY
REGISTERED.

STANDARD GLASS INSULATORS

Used for Years

Specify Hemingray for Best Results

HEMINGRAY GLASS COMPANY
Incorporated 1870
Office—Muncie, Indiana

Telephones { Superior 207
Superior 2049

Lanquist & Illsley Company

BUILDERS AND
GENERAL CONTRACTORS

1100 No. Clark Street CHICAGO

THE
Improved Metal Snatch Block

is another style of
"ANVIL BRAND" BLOCKS
in favor with the Linesmen.

We make a full line of Blocks for all purposes

WESTERN BLOCK CO.
Market Street
LOCKPORT, N. Y.

NEW YORK CITY CHICAGO
74 Murray St. 34 N. Clinton St.

Adopted as Standard by Bell Telephone Companies

Poles

FROM THE
Stump
TO THE
Line

Largest Stocks
Finest Quality
Promptest Shipments

Yards from Maine
to Washington

**National Pole
Company**

Escanaba, Michigan

When you want a Lock
you want the best.

**EAGLE
LOCK
CO.**

MANUFACTURERS OF

LOCKS

for all purposes.

WOOD SCREWS

Factories
TERRYVILLE, CONN.

Warehouses
**NEW YORK
CHICAGO
PHILADELPHIA**

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O. K.
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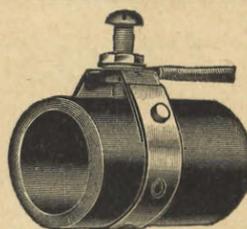


10-Inch Clipper Cut Jaws, for 3-16 in. annealed bolts in the thread, or 3-16 in. soft rivets.
Center Cut Jaws, for 3-16 in. soft rods.
14-Inch Clipper Cut Jaws, for 1-4 in. annealed bolts in the thread, or 1-4 in. soft. rivets.
Center Cut Jaws, for 1-4 in. soft rods.

Insulated Handles if desired.

H. K. PORTER, EVERETT, MASS.

"Easy," "New Easy" and Allen Randall Bolt Clippers.



**BLACKBURN
GROUND CLAMPS**

Approved by Underwriters.

Adopted as standard by the

BELL TELEPHONE COMPANIES

No. A1 Clamp

Millions in Use

Why experiment with others when you can get a proven and dependable clamp for less money? It is made of copper and can be attached to any size of lead or iron pipe in less than one minute.

BLACKBURN SPECIALTY CO.

Perkins Avenue

CLEVELAND, OHIO

SERVICE IS THE TEST



A Joint, stronger than the wire itself, one that is absolutely moisture proof, one that has more than ample current carrying capacity and is 98% or better in conductivity, an ideal splice, but just the average joint made every day by linemen with

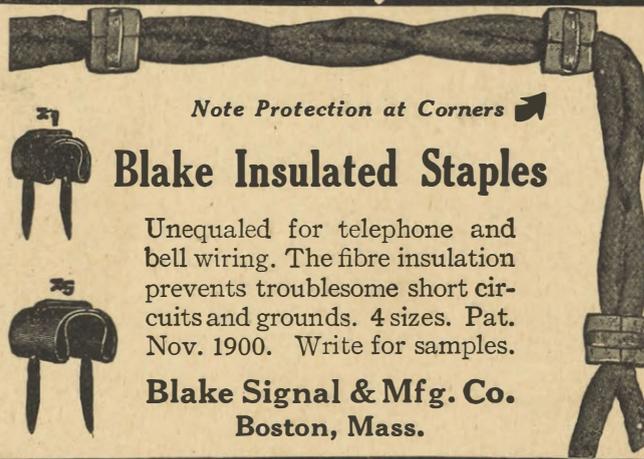
NATIONAL DOUBLE TUBE CONNECTORS

MILLIONS NOW IN USE

THE NATIONAL TELEPHONE SUPPLY CO.

5100 Superior Ave.

CLEVELAND, OHIO



Note Protection at Corners

Blake Insulated Staples

Unequaled for telephone and bell wiring. The fibre insulation prevents troublesome short circuits and grounds. 4 sizes. Pat. Nov. 1900. Write for samples.

Blake Signal & Mfg. Co.

Boston, Mass.

ELECTROSE
TRADE MARK
REG. U.S. PAT. OFF. & FOREIGN COUNTRIES.
INSULATION
MADE IN AMERICA
Louis Stintzinger's Patents

JACK PANEL
ELECTROSE MFG. CO. NEW No 10
60-82 Washington St. BROOKLYN, N. Y. AMERICA
66-76 Front St.
ALSO FOR SALE BY
Western Electric Company.
INCORPORATED
NEW YORK and Branches

Telephones: Main 2010—2011

Experience 40 Years

References:

Chicago Telephone Co., Chicago
Nebraska Telephone Co., Omaha

Mehring & Hanson Company

Heating, Cooling and Ventilating Systems
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118-120 NORTH FRANKLIN STREET
Near Washington Street

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Use this bank to save money!
Use the mail to save time!

We pay 4% Interest

Men and women in all parts of the
country bank with us by mail.

Send for our booklet
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FIRST TRUST & SAVINGS Co. NATIONAL BANK

247-303 Euclid Ave - near the Square

CLEVELAND, OHIO

Combined Resources, \$125,000,000

A. B. See

Electric Elevator Co.

Makers of

Electric Passenger and Freight Elevators

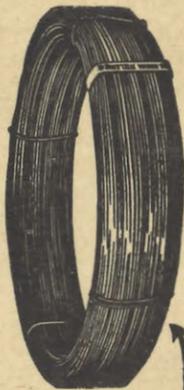
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St. Paul Building
220 Broadway, New York

OFFICES

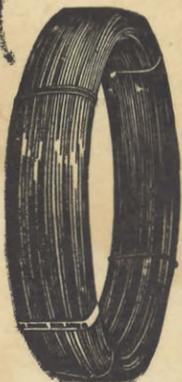
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Philadelphia Cleveland Montreal Toronto

TELEPHONE WIRE

We Guarantee
Greatest Efficiency
Longest Life
Most Satisfactory Service
Lowest Cost of Up-keep
in the Use of our wire.



Write for FREE SAMPLE
Make Test and Comparison



Approved by Leading Institu-
tions of Technology and Tele-
phonic Science. Handled by
most representative Jobbers
and Supply Houses.

Indiana Steel & Wire Co.
Muncie, Indiana

DIAMOND GUY ROD HEAD

Weldless Threadless Thimbleless



Patented
March 5, 1918

A square-headed rod or machine
bolt is easily passed through the
open side of the guy head as
shown in cut, until the head is
seated upon the base of the guy
head. The Diamond Guy Head
is of high quality malleable iron,
and in the 5/8" size is capable of
sustaining a breaking load of
30,000 pounds, or more than
double the ultimate tensile
strength of 5/8" rod. Other sizes
in proportion.

The advantages of the Diamond
Guy Rod are:

1. No threads above ground.
2. No welds in the eye.
3. The upper yoke portion, through
which the wire strand is passed, is
formed in the shape of a wire rope
thimble, and eliminates the use of
a thimble commonly used on welded
guy rods.

Diamond Guy Rod Heads are furnished separately or
complete with bolts.

DIAMOND EXPANSION BOLT CO.

Manufacturers of Diamond Specialties

90 West Street, Cor. Cedar, New York City



Where Dependable Service Is Needed

The record that the GMC truck used by the Mountain States Telephone Company of Arizona, is making in daily work is duplicated in many other sections of the country.

For some time now there has been a disposition upon the part of many of the telephone companies allied with the American Telephone and Telegraph Company, to standardize upon GMC equipment.

To the makers of GMC trucks this is a grat-

ifying endorsement of GMC ability and stability.

There is no need to tell anyone in the telephone industry that this business demands a truck of sound, solid construction and unfailing ability to endure day after day of hard travel.

GMC trucks perform this work faithfully just as they do every other kind of hauling for thousands of users.

Let Your Next Truck Be A GMC.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

Pontiac, Michigan

Branches and Distributors in Principal Cities

GMC TRUCKS