

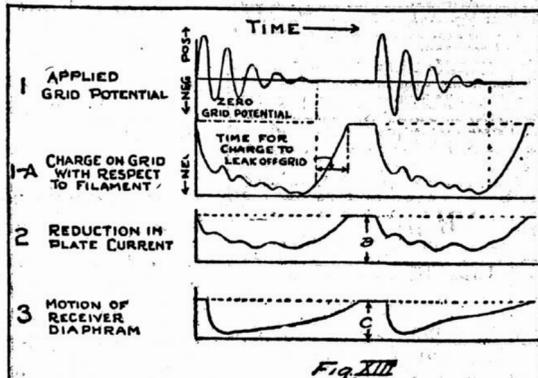
RADIO

CIRCUIT WITH GRID LEAK RESISTANCE

Takes Place of "C" Battery—How Impedance of Flow Is Determined.

Fig. 13 shows a set of curves for a three-electrode vacuum tube circuit containing a grid leak resistance as shown in Fig. 11 instead of a "C" battery with the same symmetrical alternating difference of potential applied to the grid circuit.

There being no "C" battery potential applied to the grid, the grid in Fig. 11 is normally at zero potential with respect to the filament. As the positive half of the first cycle of the alternating difference of potential is impressed upon the grid circuit—see Fig. 13—the grid is made positive



with respect to the filament. Being positive with respect to the filament, causes a certain number of electrons, which are negative charges, to be attracted and caused to give up their negative charges to the grid. During the next or negative half of the cycle of the applied grid potential the grid is made negative with respect to the filament but does not lose the electrons again. Thus a negative charge is built up on a grid during the positive portion of each cycle, the cumulative effect of which is to produce a decrease of the plate current, during the period that the alternating difference of potential called a wave train is applied to the grid.

After the alternating difference of potential applied to the grid has ceased, the grid does not immediately lose its negative charge. The grid leak forms a high resistance path for the negative charge of the grid to leak off down to the filament slowly. If no grid leak were used, the grid

would soon collect a sufficient negative charge to reduce the plate current to zero and the tube would cease to function.

A grid leak having too low resistance will not allow a sufficiently high negative charge to collect on the grid, resulting in a very small plate current reduction and weak response in the telephone receivers.

On the other hand, if the grid leak is of too high resistance, too high negative charge will collect on the grid and the condition of no grid leak will be approached.

In any electrical circuit that has a difference of potential applied to it, the current that will flow depends upon the "impedance" of that circuit; just as in the flow of water through a pipe, the quantity of water that will flow when any given pressure is applied depends upon how much the flow through the pipe is impeded by the friction of the particles of water against the sides of the pipe and against one another.

In the electrical circuit, the relation between these three quantities is that the current which will flow is equal to the applied differences of potential divided by the impedance, where the current is in amperes, the applied difference of potential is in volts and the impedance in ohms. On

transposing this equation the impedance is equal to the applied voltage divided by the current. The impedance of a vacuum tube plate circuit, internally between the filament and the plate, when the grid is at zero potential, is an important constant of a vacuum tube and is called the internal plate impedance.

The internal grid impedance of a vacuum tube used in a radio set as a detector determines the impedance of the telephones that will give best results when connected in the plate circuit of that particular tube.

It is then not only the resistance of a pair of telephones, but also the inductance and the distributed capacity of the winding that cause the maximum current to flow in the telephones for a given change in grid potential. The internal plate impedance of a vacuum tube varies only slightly with different plate voltage. It is more an inherent characteristic of the tube which is determined by the design.

STORIES OF GREAT INDIANS

By Elmo Scott Weston
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SCAR FACE CHARLEY, LEONIDAS OF THE MODOC

ONE April day in 1873 a party of 70 soldiers commanded by Capt. Evan Thomas suddenly found themselves in a death trap in the lava beds of northern California. Within a few minutes the murderous fire from a hidden enemy had disabled more than half of the command.

As suddenly as the Indian fire had begun, it stopped and the survivors heard a voice shouting to them: "You who are not dead had better go home; we don't want to kill you all in one day!" It was the voice of Scar Face Charley, the leader of a Modoc war party. With a force of only 21 warriors he had killed 32 and wounded 18 of the soldiers. Wary of the slaughter, he allowed the remainder to escape. Afterwards he said: "My heart was sick at seeing so many men killed."

The career of Scar Face Charley (Chikhekam Lupalkuelatko—"Wagon Scar Faced"), called the "Leonidas of the Lava Beds," in the Modoc war, was one of strange contrasts. At the opening of the conflict he had visited the homes of many settlers and, warning them that war was coming, told them to stay quietly in their homes and the Modocs would not molest them. He had fired the opening gun of the war when soldiers "jumped" the Modoc camp in November, 1872.

When Captain Jack, the chief, wanted to make peace Charley was one of the warriors who taunted him and forced him to continue fighting. Then he protested against the murder of General Canby and Doctor Thomas calling it "unworthy of the hearth of a Modoc." When he saw that the Modoc cause was hopeless he surrendered to the military and enlisted as a scout.

One night Black Jim and Curly-Headed Doctor, two of the most warlike Modocs, denounced him as a traitor and threatened to kill him. Walking over to the fire and standing there in the full blaze of the burning logs, he said: "Men, put on some more wood for I want Black Jim and the Doctor to have a good light to shoot me by." His bluff was not called.

Charley continued in the service of the soldiers until they had run Captain Jack to earth. When the chief and five others were tried before a military court for murdering the peace commissioners, he was one of the witnesses who spoke most earnestly in behalf of the condemned men.

At the close of the Modoc war Charley with his people as military prisoners were deported to Oklahoma where the "Wagon Scarfaced" died December 3, 1896.

NEW RADIO FILTER A MARVEL

Campbell Device That Separates Telephone and Telegraph Messages.

Although much has been said and written about the remarkable filters employed by the telephone lines and by advanced radio workers for the separation of telephone and telegraph messages, says the Scientific American, it remained for Dr. Frank B. Jewett, chief engineer of the Western Electric company, to demonstrate how the filter permits of transmitting radio telephone and telegraph messages simultaneously, and of separating these messages at the receiving end, at a meeting of the American Institute of Electrical Engineers.

The present electrical filter is the invention of Dr. G. A. Campbell, a telephone engineer, and makes it possible to separate the various frequencies at which the individual telephone and telegraph messages are carried. The detected electrical current in a radio-receiving set is passed through the filter which separates the frequencies of the telegraph message from those of the telephone.

The filter differs materially from the ordinary tuned circuits familiar to the radio enthusiast, since it separates not single frequencies but bands of frequencies of any predetermined width. The filter makes it possible to separate the band of frequencies comprising the telephone message from the band comprising the telegraph message. It can also separate one telephone message from another.

"Ground Antennae."
Some relief from bothersome radio "strays" in summertime can be obtained with sets having good amplifiers by using a "ground-antennae." This is a long insulated wire run in a shallow trench or on the surface of the ground. The ground wire should be run in the direction of the station from which the most signals are to be received, and should preferably be several hundred feet long.

To Regulate Wave Lengths.
A variable condenser when properly connected in the antenna circuit may be used either to lengthen or shorten the wave length range. Besides this, the degree of regulation is much finer, for at least the loading coil can tune in only to within a single turn, if a loading coil of the tuning coil type is used.

DELIVERED FINE SERMON

The Rev. A. F. Wittenberger of the Knox Presbyterian church of St. Paul delivered a very instructive and effective sermon Sunday evening at the First Presbyterian church of Willmar. His theme was "Christ and His Influence upon Mankind." The great philosophers of the times have conceded that of all men born Christ was the leading figure of them all. Yet they will not concede the Deity or divinity of Christ, the speaker declared. The pastor shows a studious and practical knowledge of the philosophies of the ages and the history of the great philosophers and various religious creeds.

He will preach here two weeks from last Sunday.

PROGRAM AT SVEA CHURCH

The Ladies of the Lutheran church will give an ice cream social at Svea Friday evening, August 18. The following program will be rendered: Song, Audience. Scripture reading and prayer, Rev. Sorenson. Trombone solo, Hulda Skoglund. Reading, Mrs. Gust Pheline. Song, Ladies Chorus. Reading, Mrs. Ernest Swanson. Instrumental solo, Hazel Swenson. Talk, Rev. J. H. Ford of Scandia Grove. Song, Audience. Benediction.

NEW SCHOOLHOUSE

A new schoolhouse is being completed, some four miles north of Willmar. This is District 76 schoolhouse which will cost some six thousand. John Nelson of Willmar is doing the construction work. The building will be partly brick. It will contain one large room which may be partitioned into several smaller rooms. The seating capacity for pupils will be forty. The building will have inside chemical toilets. Building work began last spring and the building will be completed in the near future.

ATTENDED BANQUET

John Olson, Carl Erickson, A. H. Brown and A. A. Anderson motored to Marshall Wednesday evening to attend a land man's banquet given by the Lyon County Real Estate Board. They returned after the banquet to Willmar. Among the speakers were Congressman A. J. Volstead and Editor Bjornson. The state bank examiner also addressed the banquetting land men.

LEFT FOR CHICAGO

Mr. and Mrs. Carl Christanson and daughter Evelyn of Chicago who have been visiting for two weeks at the home of Rev. and Mrs. G. A. Youngstrom of this city left on Saturday for their home.

HOUSEKEEPERS CLUB TO MEET

The Housekeepers club will meet Monday afternoon, August 21, at 3:00 o'clock at the public Rest Room. All members are requested to be present as this will be an important business session.

CLUB PROGRAM

The Sunnyside Farmers Club will give a musical program and ice cream social Thursday evening, August 17. Cake and ice cream, 15c. Everybody welcome.

ENTERTAINED

Judge and Mrs. F. L. Hessel of Ft. Dodge entertained Sunday at the Green Lake Country club. The invited guests were Mr. and Mrs. George H. Otterness and Mr. and Mrs. R. W. Stanford.

VISITED DAUGHTERS

Mrs. Caroline Anderson and daughter Gladys returned to Oakland, Neb., this afternoon after a visit with Mrs. Anderson's daughters, Mrs. O. V. Nelson and Mrs. John L. Nelson.

SERIOUSLY ILL

Mrs. Christine Erickson, who is making her home at the home of her daughter, Mrs. Andrew Ray, is at present seriously ill.

MOVED TO LITCHFIELD

Mr. and Mrs. Englin moved last week from this city to Litchfield where they will reside. Mr. Englin had charge of the Great Northern telephone and telegraph systems here.

NEW MUSIC TEACHER

Miss Hattie Penrose of Louisville, Ky., is the new music teacher engaged by Supt. Brohaugh to fill the vacancy caused by the leaving of Miss Nell Robbins. Miss Penrose comes highly recommended and has a good musical education.

ON AUTO TRIP

Miss Ruth De La Hunt left last Saturday for Walpoleton, N. D., where she will join her friend, Miss Helme Thomas for an auto tour to the northern part of Minnesota and other points.

GUESTS FROM CHICAGO

Mrs. Emma Johnson and daughter Effie of Chicago arrived Saturday for a week's visit at the home of Rev. and Mrs. G. A. Youngstrom.

BORN

The home of Mr. and Mrs. Ben Schamp was gladdened by the arrival of a baby boy on Saturday, August 12.

GUEST FROM S. DAKOTA

Mrs. M. Ostund returned to Strandburg, S. D., this afternoon after a visit with her son Carl at Eagle Lake.

ENGLESON-GILBERTSON

Miss Irene La Vina Gilbertson of Benson, sister of Elbert Gilbertson of this city and Leo Edward Engleson of Swenoda, were married last Wednesday evening at the home of the bride. Mr. and Mrs. Carl Gilbertson of Benson. The ceremony was performed by Rev. O. J. Kvale. Mr. Engleson is a graduate of the Willmar Seminary. They left on a motor trip to Minneapolis, Duluth and Inasca State Park. Mr. and Mrs. Engleson will reside at Benson where he has a position as Deputy County Auditor.

JUDGE VISITED HERE

Judge F. L. Hessel of Fort Dodge, Iowa, is spending several days at the Interlachen Hotel at Spicer. While there he motored to town and visited at the R. W. Stanford home in Willmar. Judge Hessel is intensely well pleased with Green Lake. He declared it was the most beautiful lake he had seen which he declared meant a good deal as the judge has traveled quite extensively thru scenic parts of the northwest.

RETURNED TO MINNEAPOLIS

Miss Anna Knutson who is taking a course in nursing at the Deaconess Hospital in Minneapolis returned on Saturday after spending her vacation visiting her parents, Mr. and Mrs. Wm. Knutson south of this city.

CARD OF THANKS

We hereby wish to express our sincere thanks to all those who showed us their sympathy in our recent bereavement, in the death of our darling son and brother, Lester Winston. Thanks to all the donors for the many beautiful flowers.

Mr. and Mrs. James Matson and Family.

VISITED AT WHITE BEAR

Mrs. Wm. Nelson and daughters Beatrice and Bernice enjoyed several days visiting at White Bear. They returned Saturday evening.

ENTERTAINED

Mrs. A. H. Okerman and son are at Atwater this week assisting her folks with the threshing.

TIRE SALE

We have been obliged to take over a stock of new and rebuilt tires, standard makes, which we will sell out at very low prices. Come in and pick out what you want and save money.

We are offering them at low prices.

The Gilbert Insurance Agency

(INCORPORATED)
Corner 5th St. & Pacific Ave.

"YOU ARE INVITED TO VISIT OUR NEW HOME"

We have now moved into our new building fronting on Litchfield Ave., next to the Palace Grocery. You will be delighted with the well lighted roomy store and the attractive stock arrangement made with your convenience in mind.

BETTER SERVICE

can now be given by us than ever before. Come in and see us at the first opportunity.

Our stock is complete. Select your shells for the duck season. A new stock of guns are on the way.

For the ladies a special stock of enamel and aluminum ware for the coming season, very reasonably priced.

HOGLUND HARDWARE CO.

WILLMAR, MINN.

Announcement TO MY PATRONS

I am no longer associated with the Manufacturers Outlet Store of Willmar, and am now the representative in Kandiyohi, Meeker and Wright Counties of the Nash Clothing Co. of Cincinnati, Ohio.

I am selling tailor-made 100% wool suits at \$18.50 and \$23.50; and wool overcoats at \$16.50. An absolute guarantee accompanies each garment. Patrons Who desire to see samples will kindly call Phone 180 J.

I. RUBEN

WILLMAR MINN.

EAT AT THE NEW SAVOY CAFE Willmar Pacific Ave.