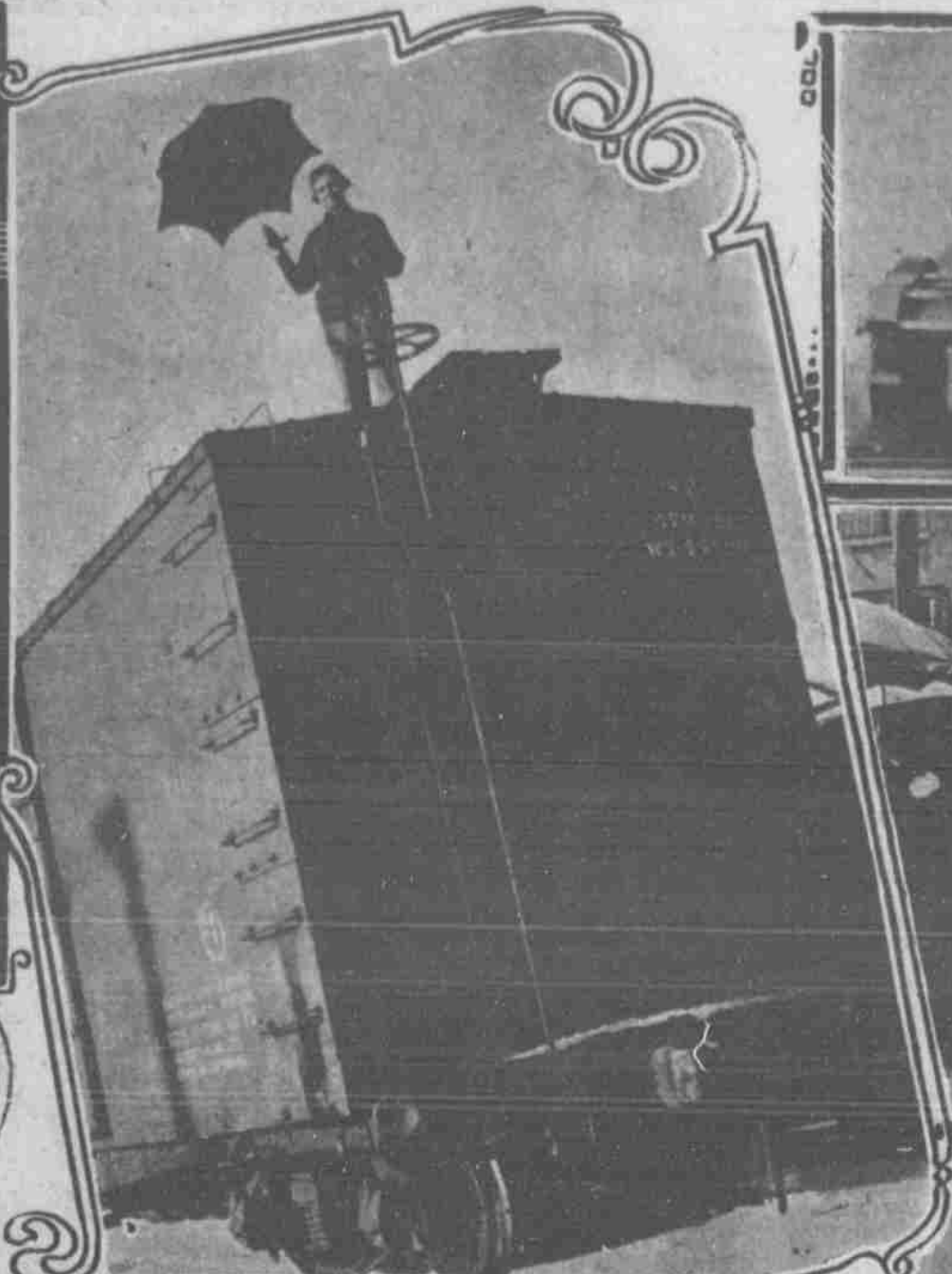


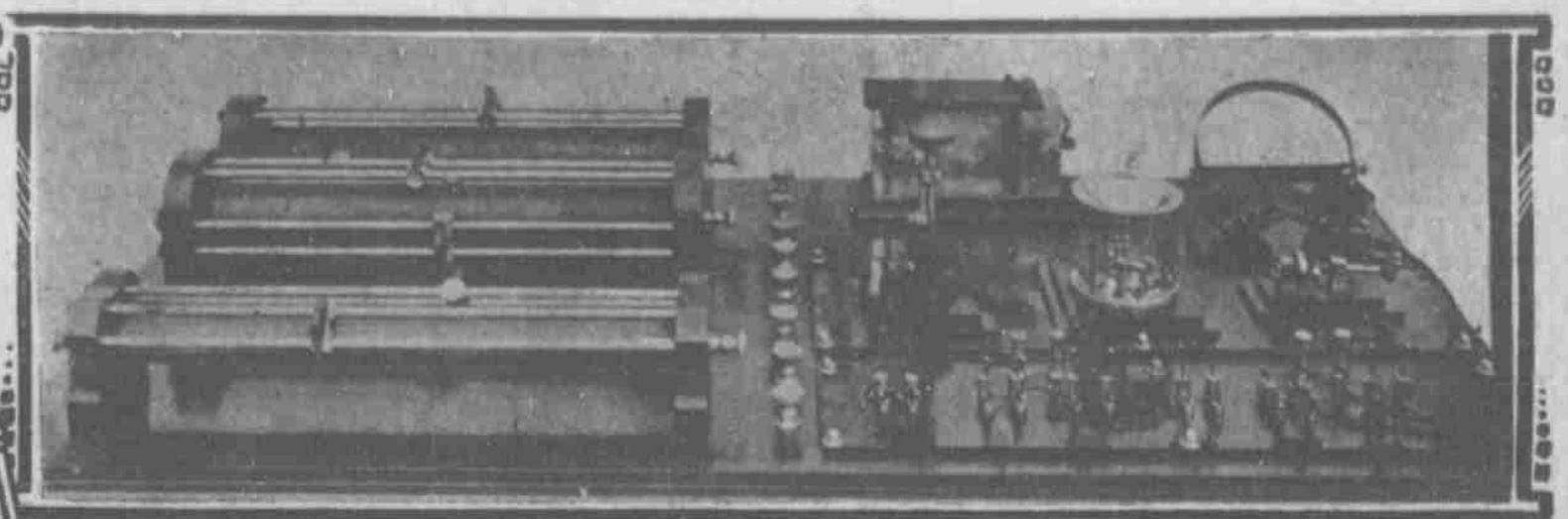
Union Pacific to Order Train Service by Wireless 'Phone



DR. FREDERICK H. MILLENER



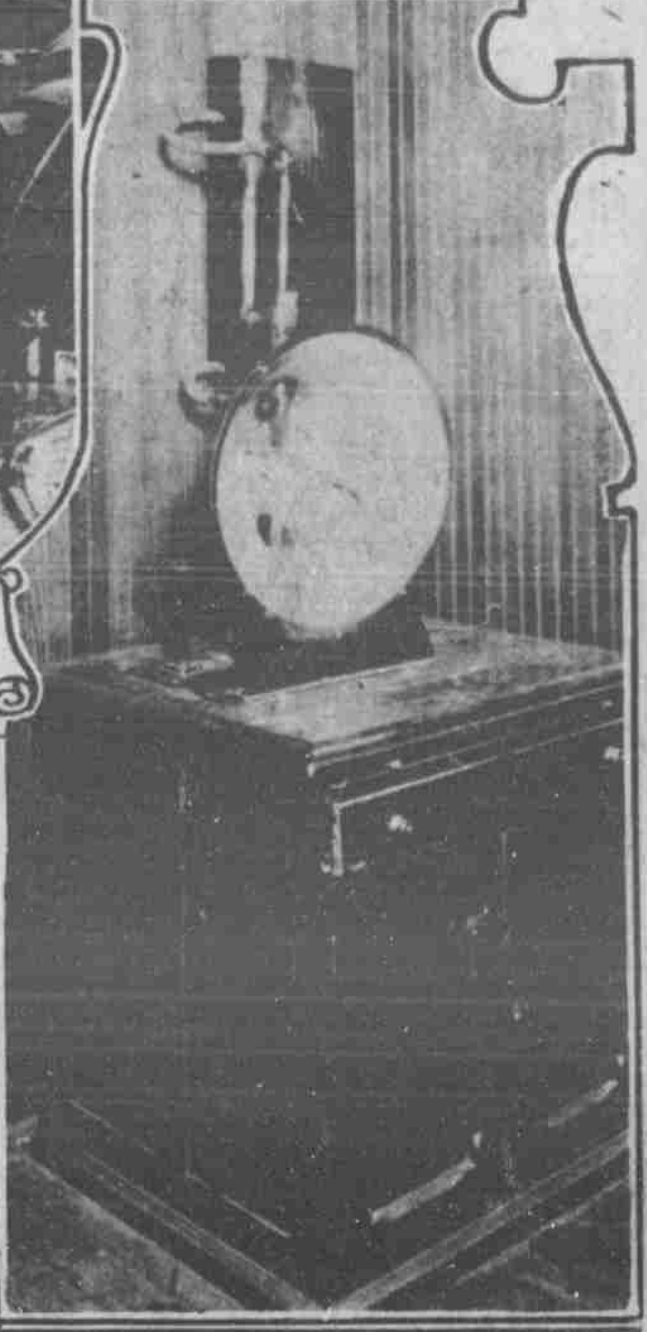
RECEIVING WIRELESS TELEPHONE MESSAGES OF A MOVING TRAIN THROUGH THE RIBS OF AN UMBRELLA



WIRELESS TELEPHONE RECEIVING STATION COMPLETE. 60 CYCLES



A RAILROAD CAR BEING MOVED BY WIRELESS WAVES



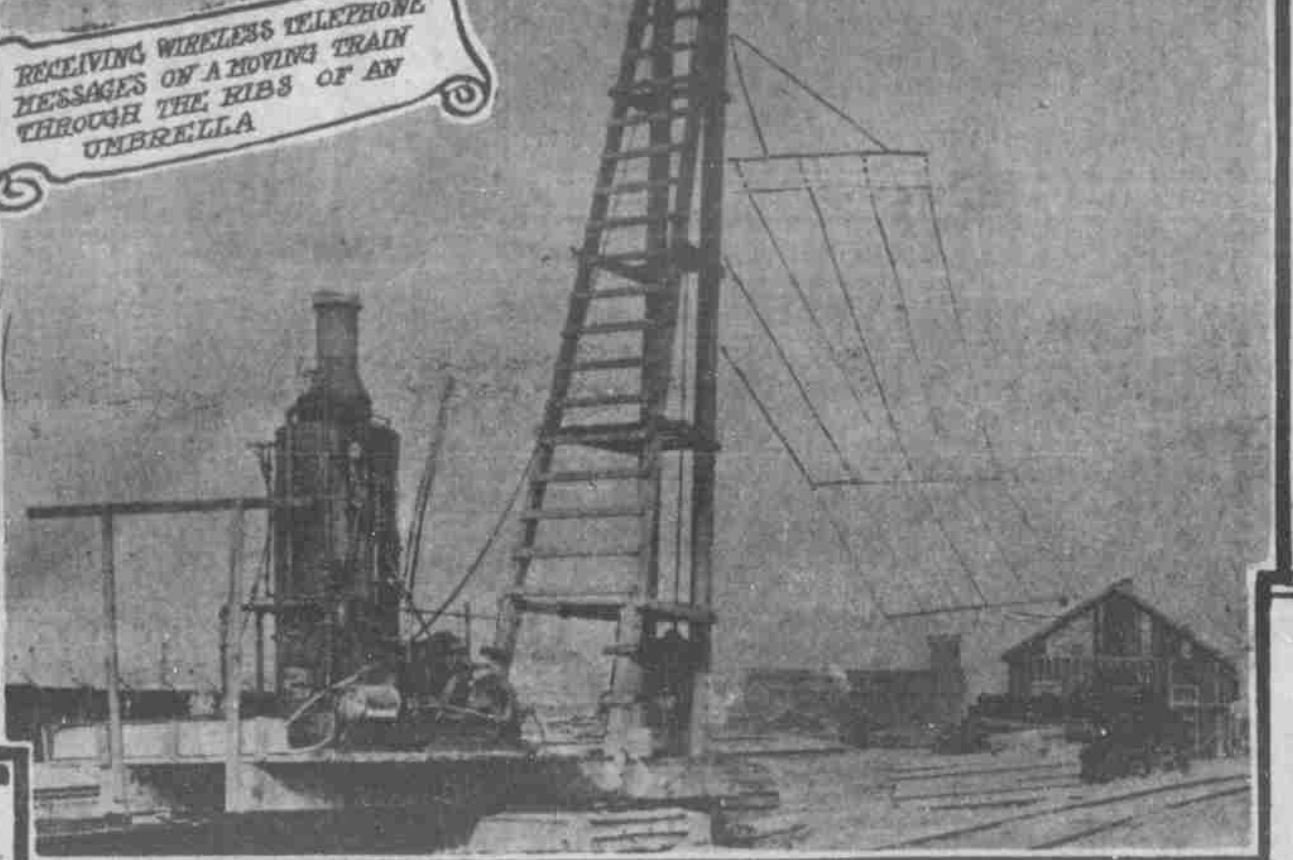
THE SPEAKING ARC

POSSIBLY before the close of the present year the Union Pacific railroad will have its wireless telephone system working along the line on all trains. The railroad officials will not say this, and they do not care particularly to have others say it, for a sure thing. Neither will Dr. Frederick H. Millener, who has for four years been experimenting and working out the details, make the positive statement. He has all the conservatism of the earnest scientist and is very careful in outlining what he expects to do; but in a lecture before the New York Railway club in New York City on February 17 Dr. Millener did say:

"Wireless telephony from a moving train is more than a practical probability, and I may say that within a year or so from now it will be a feature of the daily operation of trains on the Union Pacific railroad." It has been a long, carefully conducted work that has brought the results predicted by Dr. Millener. No labor or expense has been too great to stand in the way of whatever experiments have been carried to the point where they may be pronounced successful. With this accomplished, one of the greatest and most unique forward steps in the history of railroading will have been taken. Both the Union Pacific and Dr. Millener will have won for themselves undying glory. Sidney, Neb., and Cheyenne, Wyo., have been selected by Dr. Millener as the points at which two wireless stations will soon be erected for the actual test of the new development in the quick control of trains. These stations are 103 miles apart, on a single track.



RECEIVING WIRELESS TELEPHONE MESSAGES THROUGH THE RIBS OF AN UMBRELLA WHILE WALKING ABOUT OF THE RAILROAD YARDS AT OMAHA



A TUNED TEMPORARY WIRELESS TELEPHONE STATION

The Inventor Talks of His Plans. "We expect to keep up communication with moving trains between these stations and others that are to be established," said Dr. Millener in his New York lecture. "These wireless stations will be close to the train dispatchers' offices, so that communication may be established quickly whenever it is necessary. We have discovered through our experiments that wireless waves will follow the direction of the rails farther than in any other direction, and more closely. It is well known that they will follow a stream of water or metallic conductors better than they will pass over a wooded country or even a treeless plain, and that these waves work better in stormy weather than when the skies are clear." The wireless telephone already devised by the inventor, and which he has been using in Omaha, is sufficiently powerful that messages may be received from a considerable distance. Note in the illustrations the man on the freight car and the man on the ground with umbrellas raised. The first is receiving a wireless message while the train is moving, and the other is receiving a similar message while walking about the yards attending to any little duty that demands his attention. In each case the receiving apparatus is attached to an ordinary umbrella, to be held over the head of the person receiving the message.

Umbrella Ribs as Wires. Through this umbrella telephone the tones of the human voice are reproduced perfectly; far better, Dr. Millener says, than by the ordinary business telephone. The man under the umbrella uses the ordinary "head set" worn by the office operators. How does he get a message? Why, through the ribs of the rain stick, which are utilized as the corresponding antennae or aerials of the fixed telephone plant. The umbrella itself is cheap, but the inventor will tell you that it is very wasteful to use an umbrella for this purpose, because it requires more electricity; and this precious fluid must not be wasted. So you need not expect to see trainmen sashaying along the rocking tops of trains with umbrellas for balancing poles, catching wireless messages. The railroad will not invest in umbrellas for this very laudable purpose; they will buy something more solid, stable and expensive. Dr. Millener simply used the handiest available instrument to demonstrate his very practical experiment. In another of the illustrations is shown an ordinary flat car being moved along by wireless waves, and the men surrounding the car are watching the making of remarkable history in the field of telephony. Dr. Millener's ingenuity has another effective illustration in the rigging he has made for a stationary engine, a derrick and a shanty. The wires running from the derrick to the shanty show how the connection is made; and another illustration shows the man inside a shanty taking the message, just as he would take any other message over the 'phone. The engine, derrick and shanty, with the connecting wires, form what Dr. Millener calls "a tuned temporary wireless telephone station." It is not very pretty, but it has proven to be tuned all right, and through it results have been secured that are not to be discounted. What of the practical, every-day usefulness of the

wireless telephone system? It is manifold and its possibilities hard to realize. Says Dr. Millener: **Great Usefulness Assured.** "On a railroad an electrically-controlled automatic block signal must work at least 100,000 times without a failure. The hundred thousandth time, perhaps, it may go wrong. The lighting of an arc lamp or some atmospheric disturbance may cause the signal arm to fly up and the signal to be set at 'danger.' The engineer of the train that halts has to wait until he gets orders to proceed. On these rare occasions when the signals go wrong the track may be clear, but the engineer does not know anything about what is ahead of him except what the signal tells him. Therefore he waits. "The delay may be so long that traffic may be delayed in an ever lengthening line from the point where the signal has stopped the movement of the trains. This costs the railroad more or less money;

it means the loss of the productive labor of a great many employes and the idleness of a lot of rolling stock, as well as annoyance to travelers and shippers. "Now, the Union Pacific has the finest system of block signals of any railroad in America; they make travel safe and expedite it. Perfect as it is, however, there is this remote but possible element of delay—of loss in the battle against time—that must be eliminated. The Union Pacific decided that the only way to do this was to devise some means by which an engineer in his cab could, either while the train was in motion or, if it was stopped anywhere on the line by some inexplicable danger signal from the automatic devices, 'call up' the train dispatcher's office and find out what was wrong—whether to stay where he was or to go ahead. Therefore, about four years ago, I was asked to devise a means of overcoming this difficulty. The solution seemed to be in wireless communication by telephone. "We have been prosecuting these researches ever

since then. The conclusions we have reached have been satisfactory. We are not prepared to state in detail the methods we have followed, for the work is not yet absolutely completed. **Cost Can Easily be Saved.** "If we save one fruit train from freezing it will pay for the cost of practically the whole installation. More than that, however, it will make travel by rail even safer than it is now on the safest railroads. With properly constructed wireless stations there is no chance of failure. There will be no more trouble with the block signals; no delays or annoyances because wires have been blown down by storms, or anything of that sort. "During our investigations in wireless telephony we made a thorough study of what is called the 'speaking arc' in connection with generators capable of producing currents of as high as 350,000 alterna-

Queer Bills in State Legislatures

AMONG a job lot of "freak" legislation noticed by various papers throughout the country is mentioned the nine-foot bed-sheet bill of Representative John Sink of Grand Island. Mr. Sink insists that his law is health legislation and necessary, but so much cannot be said for some other specimens. Indiana has furnished one of the most recent samples; it is a bill requiring every person wishing to take a drink to take out a license. Representative Colvert prepared the bill. "We have personal licenses to hunt and fish and do other things and follow out certain occupations," said Colvert in an interview. "so why not a license to drink? It would be a source of heavy revenue to the counties and all money derived from the sale of licenses could be turned over to the educational fund. Licenses could be issued in the form of small pocket card permits reading that the holder has been licensed to drink." In Colorado a bill is introduced in the legislature providing that any surgeon who shall perform an operation for appendicitis and thereafter be unable to prove that the appendix was in a diseased condition shall be guilty of malpractice and punishable under the penal code. Iowa's contribution is a bill making it unlawful for you to put your feet on your desk—that is, if you happen to be a legislator. A resolution has been introduced in the legislature prohibiting legislators from smoking in chambers and from putting their feet on desks while dictating to feminine committee clerks and stenographers. That much abused class, the poor bachelors, are being abused once more, this time in New Mexico, where a bill has been introduced in the legislature providing for the classification of bachelors and widowers and the levying of a tax against them. Bach-

elors between the ages of 25 and 45 are to pay \$10 annual tax. As for Texas, not content with making drastic prohibition laws which forbid you from taking a drink of your own whisky out of your own flask on a railroad train, or in sight of a residence, the legislature is now seriously considering the enactment of a law to put in jail those who use bad language to the telephone receiver. The bill has already been reported favorably from the house committee on criminal jurisprudence. The tongue of the railway station agents in Missouri may be loosened if a bill now pending is passed. It provides a fine of from \$25 to \$50 for any agent who refuses to answer questions put by travelers. Representative Tuggle, the introducer, said years of rebuffs by country agents, of whom he had inquired if trains were on time, had aroused in him a lingering longing to one day "get back" at the sphinx who hides behind the wicket. Washington is catering to its lady voters. "Polling places are going to be made very attractive for them. The city council of Seattle started the ball rolling with the introduction of a resolution prohibiting smoking in polling places at elections. This is the first legislation resulting from the adoption of the woman suffrage amendment to the Washington constitution. It is proposed to make the election booths very pretty with decorations, flowers, easy chairs and polite attendants. The senate of Oregon has unanimously passed a bill requiring that applicants for marriage licenses be provided with a certificate of good health from a licensed physician. Kansas and Illinois are after bachelors and married men who pose as bachelors. Representative Cron of Topeka introduced a bill in the legislature to tax bachelors over 45 years of age to the tune of \$25 a year. State Senator Samuel A. Ettelson of Illinois favors the passage of a bill to differentiate juris-

prudence. The conclusions we have reached have been satisfactory. We are not prepared to state in detail the methods we have followed, for the work is not yet absolutely completed. **Cost Can Easily be Saved.** "If we save one fruit train from freezing it will pay for the cost of practically the whole installation. More than that, however, it will make travel by rail even safer than it is now on the safest railroads. With properly constructed wireless stations there is no chance of failure. There will be no more trouble with the block signals; no delays or annoyances because wires have been blown down by storms, or anything of that sort. "During our investigations in wireless telephony we made a thorough study of what is called the 'speaking arc' in connection with generators capable of producing currents of as high as 350,000 alterna-



TELEPHONING FROM THE FLAG SHANTY TO A MOVING TRAIN

tions per second. As a result of these researches we developed a bank of six arc lights which we caused to talk and give forth musical sounds when persons spoke or instruments were played into the telephones transmitter. At the Land show in Omaha recently we lighted these arcs first by wireless. Some of them we placed in a reflector of a locomotive headlight. This greatly increased the range of distance through which they could be heard. This 'speaking arc,' however, seems destined to be nothing more than a scientific toy. "Another thing that we did in the course of our research work was to take an electric truck weighing 5,500 pounds and run it around the shop yards at Omaha by wireless waves. The car was equipped with an aerial, and we ran it at four different speeds, forward or back, under perfect control." **Dr. Millener a Student.** Dr. Millener, the inventor, has been in the employ of the Union Pacific as an electrical expert for the last five years. He is now about 35. Prior to his going with the Union Pacific he was a practicing physician in Buffalo, N. Y., and distinguished himself there by his research work in the field of X-rays and other electrical phenomena. He is a graduate of the Jefferson Medical college of Philadelphia. He has given several most interesting demonstrations of his work at various exhibitions held in the Omaha Auditorium, the latest during the Land show held in January. Dr. Millener has also demonstrated his discoveries for different clubs and organizations at home and elsewhere and his work has not only astonished, but pleased, all who have witnessed it.