

Fig. 1.

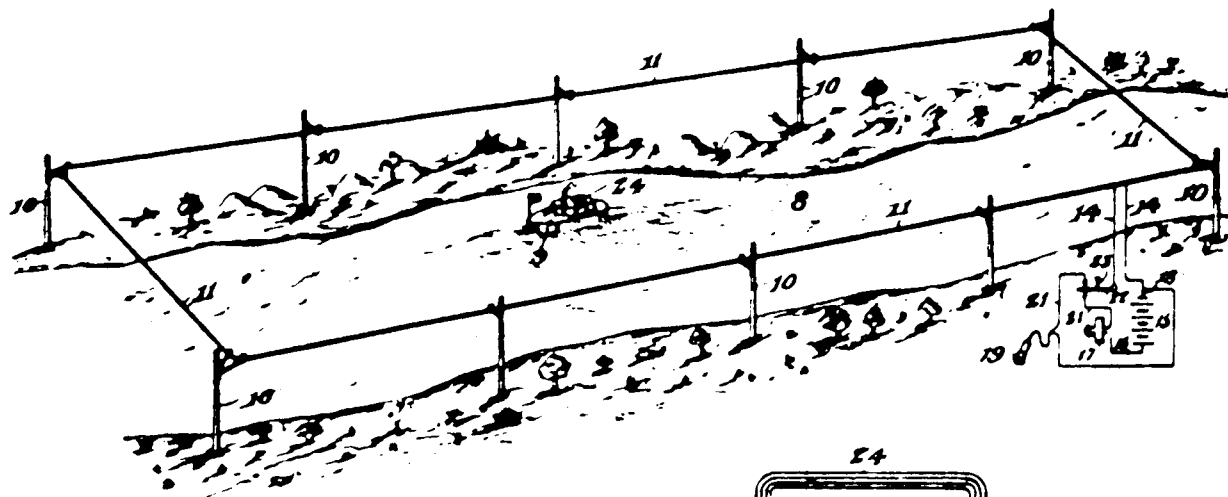
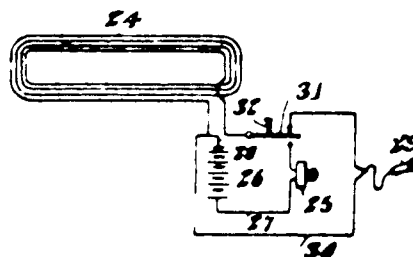


Fig. 2.



SPECIAL HISTORY ISSUE

These drawings are from U.S. patent number 887357 for a wireless telephone, issued in 1908 to Nathan B. Stubblefield of Murray, Kentucky. Stubblefield pioneered principles now used in "cave radio."

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GREAT MOMENTS IN EARLY CAVE RADIO EXPERIMENTS

by
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INTRODUCTION

The following chronology is part of on-going history research in early radio reception and broadcast from caves. At present, I have found no early examples of wireless broadcast from caves. Induction cave radios made their appearance in the latter quarter decade of the 1950s. Even with cave radios, there has not been any commercial radio broadcast from a cave without the aid of telephone lines. Nor have there been any satellite up-links from caves.

I am especially interested in receiving information on the pre-1926? engineers' experiment in Endless Caverns. Any information on radio experiments conducted in Howe Caverns and Carlsbad Caverns would also be most welcome.

RECORD OF CAVE RADIO RECEPTION EVENTS

- 19 August 1922 Mammoth Cave (Frozen Niagara Ent.): Roosevelt's Dome
Received WHAS and other eastern radio stations. First radio reception in a cave.
- Fall 1922 L&N Rail Road Tunnel, Kentucky(?)
Experiment not conclusive.
- 21 July 1923 Mammoth Cave (Historic Ent.): Echo River
Received WHAS.
- 1924? Hudson River Tunnel, New York City
- 14 July 1924 Mammoth Cave (Frozen Niagara Ent.): Radio Room
Received WHAA, WOS, WLW.
- 19 July 1924 Mammoth Cave (Historic Ent.): Rotunda
Re-enactment of the 21 July 1923 radio reception. Antenna wire strung from radio to entrance of cave. Not true radio reception.
- Late (?) April 1925 Endless Caverns: Arctic Circle and Ball Room
Merl La Voy radio reception in cave.
- Pre (?) 1926 Endless Caverns: Arctic Circle
Radio engineers testing radio reception.
- 1926?-1927? Wyandotte Cave: Throne and Canopy
Received WHAS.
- June 1929 Mammoth Cave (Historic Ent.): Rotunda, Audubon Avenue, River Hall etc.
Eve and Keys watershed induction radio experiments.

- 20 February 1930 Carlsbad Caverns
Eric Palmer radio wave penetration experiment.
- 3 March 1931 Mammoth Cave (Historic Ent.): Mammoth Dome
Received KDKA via WHAS, a CBS affiliate.
- 1930?-1940? Howe Caverns
Radio experiment, no information.

RECORD OF RADIO REMOTE BROADCAST FROM CAVES

- 8 July 1935 Mammoth Cave (Carmichael Ent.): Snowball Dining Room
First live radio broadcast via telephone hook-up by WHAS.
- 13 September 1939 Mammoth Cave (Frozen Niagara Ent.): Onyx Colonnade
A walking tour from the Frozen Niagara Entrance to Onyx Colonnade by WHAS. Remote broadcast over telephone lines.
- 30 October 1940 Endless Caverns
Suspected remote interview and broadcast over telephone lines with Explorers Club members by Lowell Thomas.
- 7 July 1940 Mammoth Cave (Carmichael Ent.): Snowball Dining Room
Remote broadcast over telephone lines by WLW.
- 24 August 1940 Mammoth Cave (Frozen Niagara Ent.): Frozen Niagara Formation and Echo River
Remote broadcast by WGRC over telephone lines.
- 27 July 1940 Great Saltpetre Cave
WHAS live broadcast over telephone lines.

ACKNOWLEDGMENT

Ms. Judith Campbell Turner, Museum Librarian, Milwaukee Public Museum proved invaluable in supplying information on the museum expedition to Endless Caverns. Mr. Russell Gurnee produced a number of items on the Explorers Club expedition in Endless Cavern and back ground on Merl La Voy. Mr. Gordon L. Smith shared his knowledge on post card views and his collections on Endless Caverns. Ms. Emily Davis-Mobley supplied the radio post card by Merl La Voy.

1990 NSS Convention Electronics Session abstracts:

ERROR SENSITIVITY OF CAVE-RADIO DEPTH MEASUREMENT

Frank Reid NSS 9086

Methods for measuring the depth of a magnetic-induction "cave radio" transmitter are reviewed. The slope of the depth function is determined and used to establish criteria for acceptable error sensitivity: Vertical-null angles between 17 and 70 degrees appear to yield best depth accuracy.

AUTOCORRELATION TECHNIQUES FOR CAVE RADIO

Frank Reid NSS 9086

Autocorrelation is a weak-signal recovery technique which should improve the range of low-frequency cave

radio, and can be used for data communication. Autocorrelation requires extreme frequency stability which is difficult to achieve underground where standard-frequency broadcasts are unavailable. Autocorrelation theory is reviewed, and simplified techniques applicable to caving are presented.

Brian Pease has independently developed a working autocorrelation cave-radio system which has capabilities beyond those of conventional cave-radios. Brian will tell us about it at the 1991 NSS Convention, and hopefully in these pages!

Bob Buecher reported further on his last year's presentation on instrumentation at Kartchner Caverns, Arizona. He reviewed many inexpensive electronic thermometers.