# LA TRASDUZIONE SONORA DA RICE AND KELLOGG AI MODERNI LINE ARRAY

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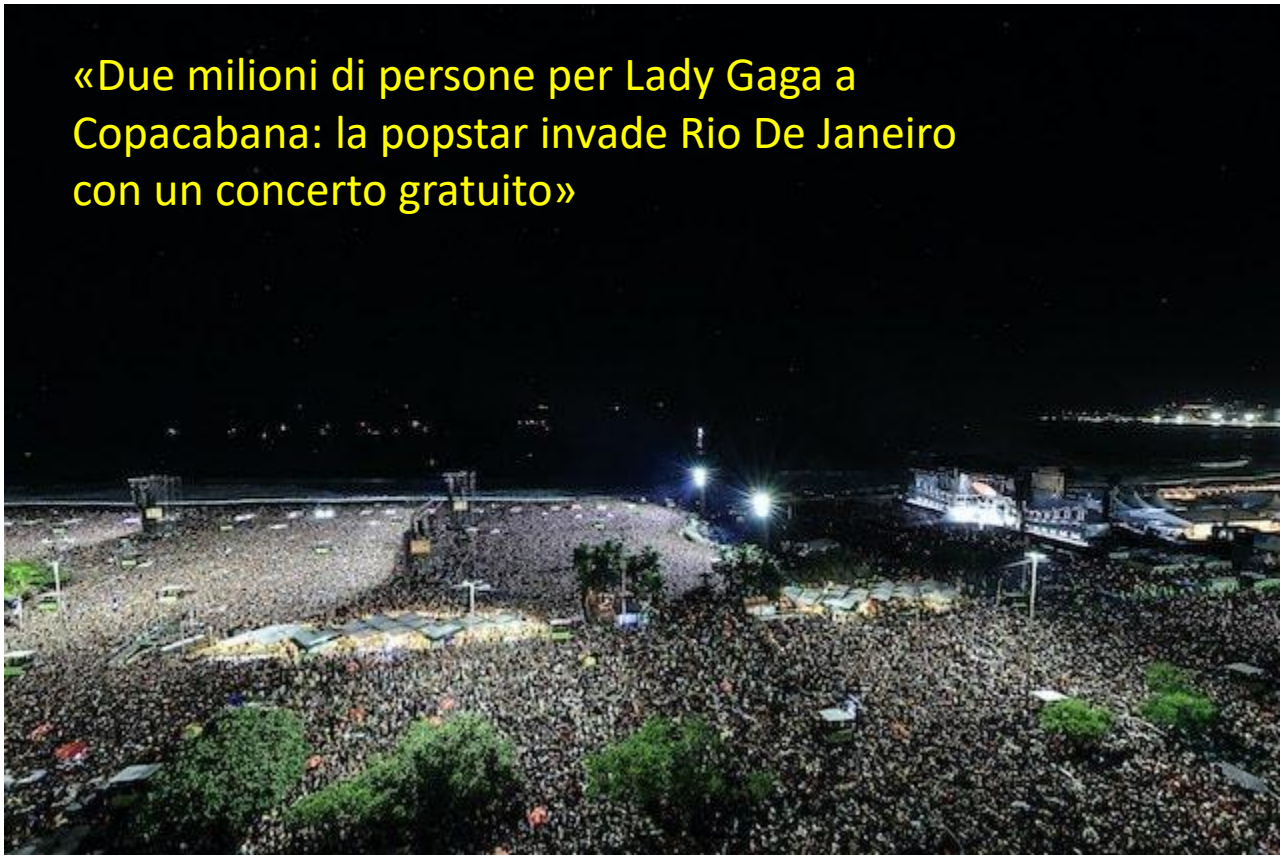
AES Italian Section
Materiacustica Srl

52° Convegno Nazionale AIA
Perugia, 10-12 Giugno 2026

AUDIO ENGINEERING EVOLUTIONS
Storia ed innovazione nella trasduzione sonora

# Come si è arrivati a questo?

# … o a questo?


«Due milioni di persone per Lady Gaga a Copacabana: la popstar invade Rio De Janeiro con un concerto gratuito»

# Storia …

Anno 55° TORINO, Mercoledì 6 Ottobre 1926 Prima Edizione MATTINO Num. 236

# LA STAMPA

Pilsudzky al governo

(Dal nostro inviato)

VARSAVIA, sistem.

Mussolini a Perugia

Il discorso sul fascismo alla folla — La prolusione universitaria ai corsi per gli stranieri

PERUGIA, 5, sera.

«Roma antica sul mare»

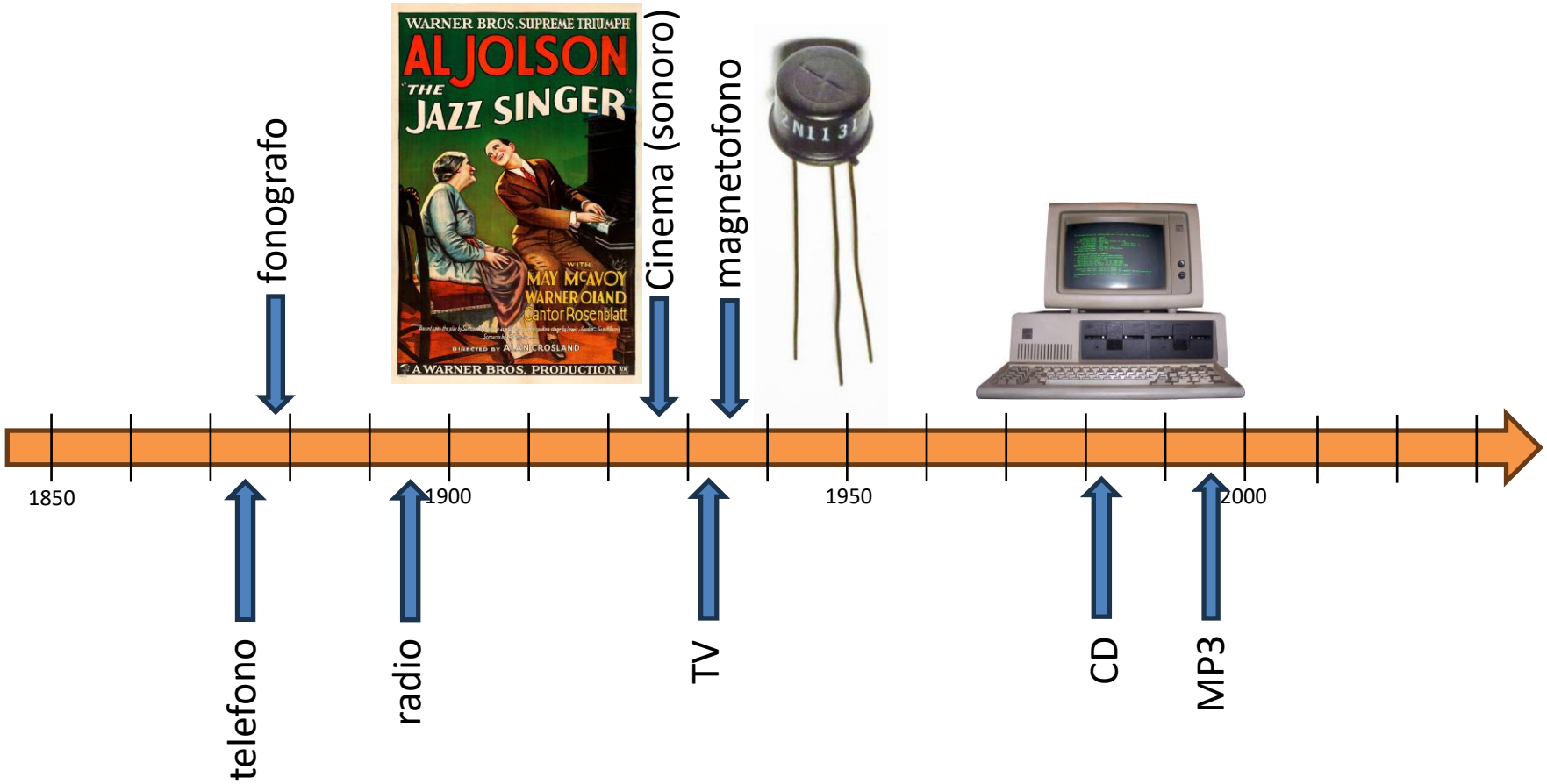
**Perugia, 6/10/1926**

«…egli ha parlato per una ventina di minuti, a voce alta; e perché da tutti i punti principali della città le sue parole potessero essere udite, erano stati impiantati vari apparecchi altoparlanti, dinanzi ai quali pure stazionava folla entusiasta.»

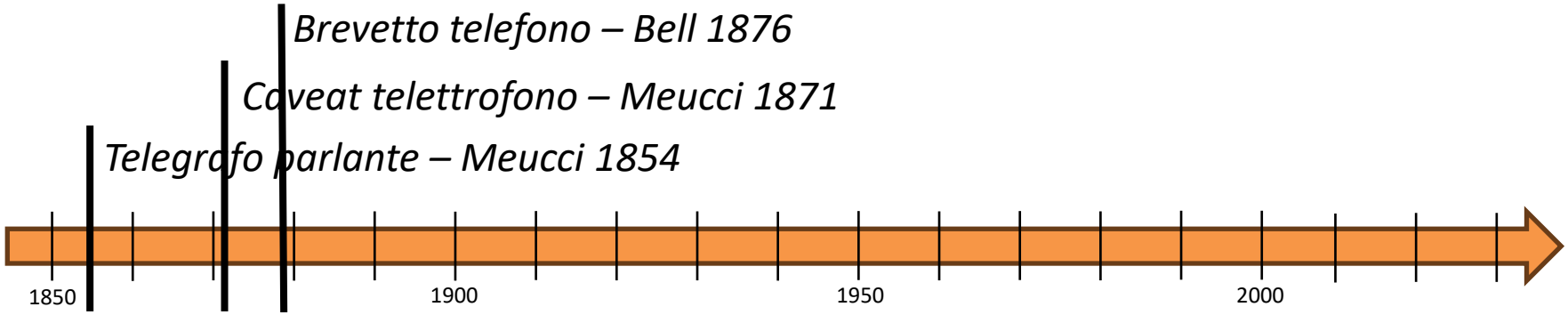
# Fiato alle… trombe

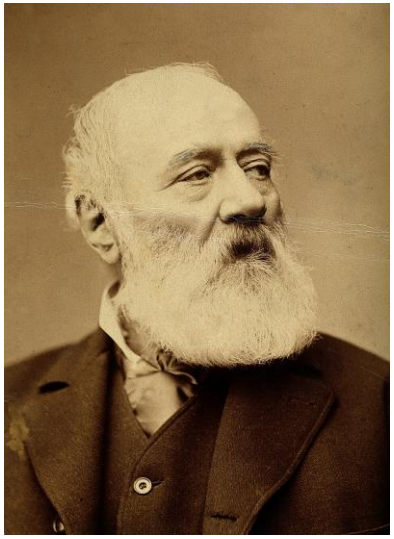
Attanasio Kircher studioso gesuita
“inventa” il megafono (circa 1600)

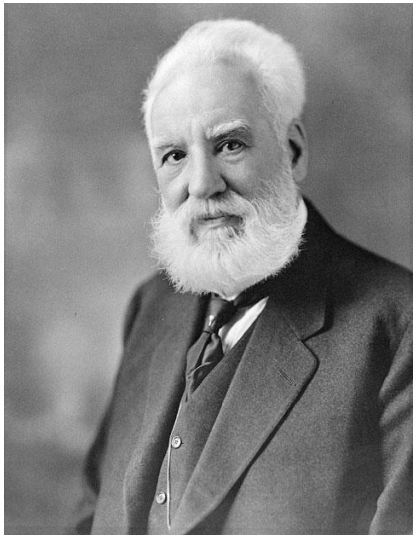
# Storia… dell'Audio



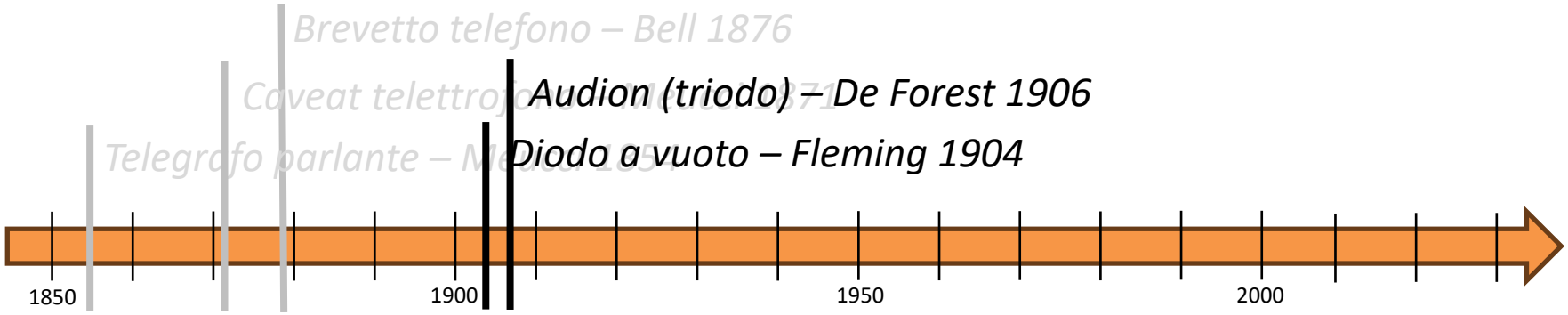
# Meucci-Bell

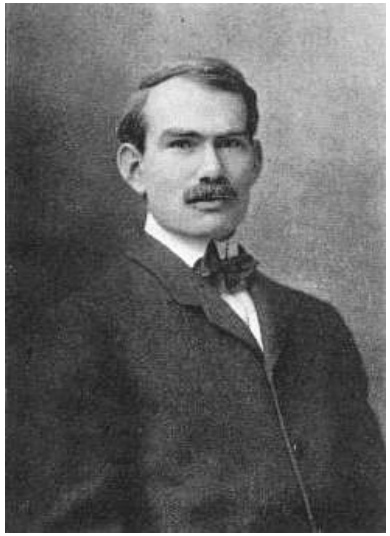

Brevetto telefono – Bell 1876
Caveat telettrofono – Meucci 1871
Telegrafo parlante – Meucci 1854
1850
1900
1950
2000

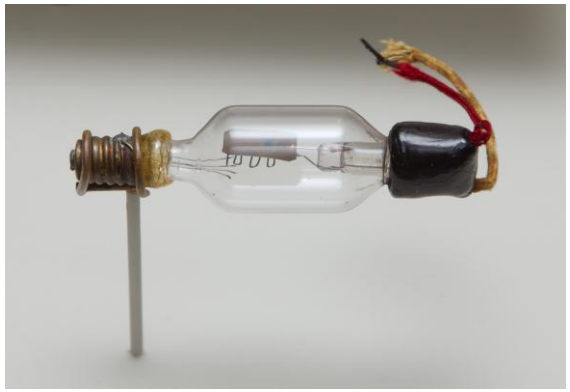




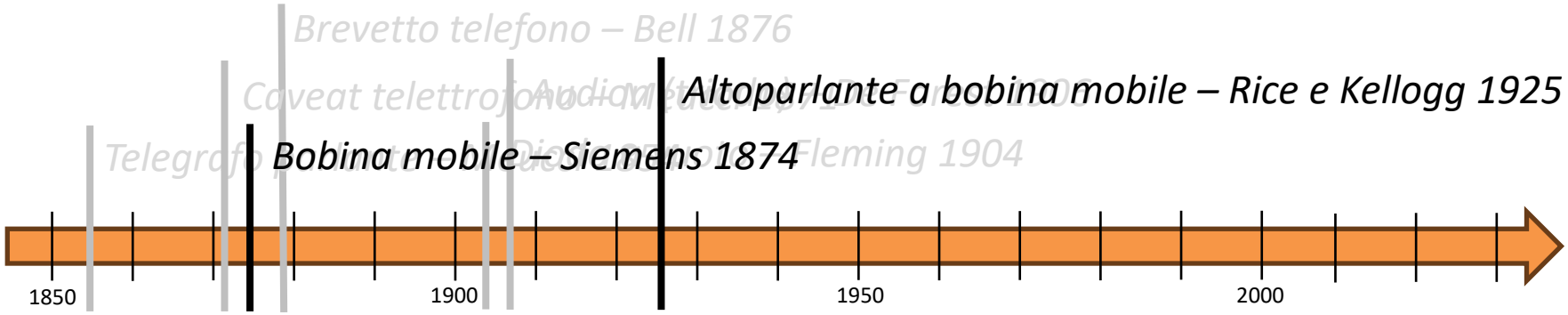
# Fleming-De Forest

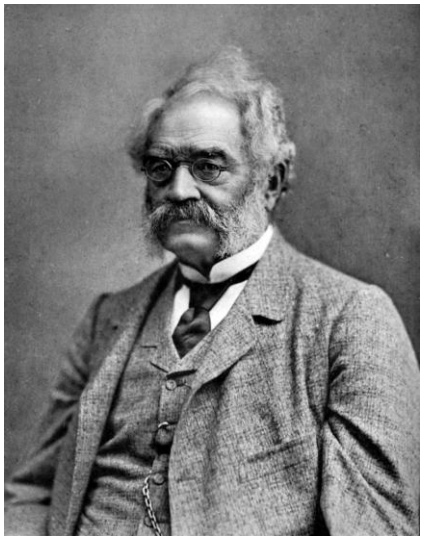






# Siemens-Rice e Kellogg



# Brevetto Rice e Kellogg

April 2, 1929. C. W. RICE 1,707,570

LOUD SPEAKER

Filed April 20, 1925

Fig. 1.

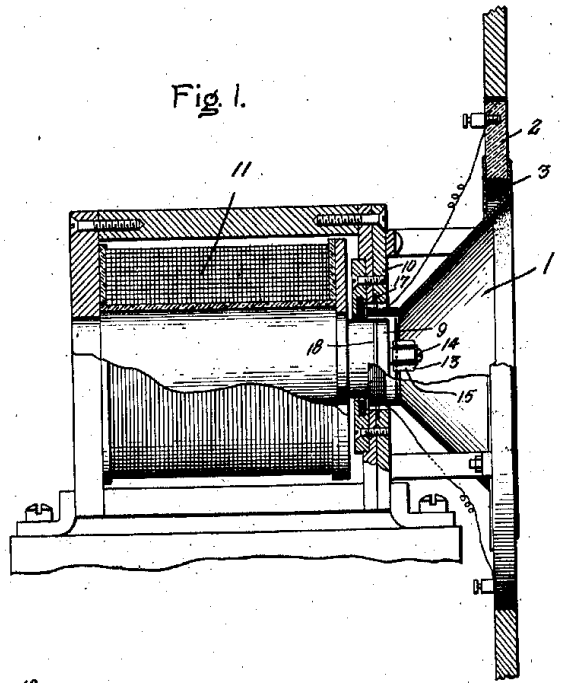


Fig. 2.

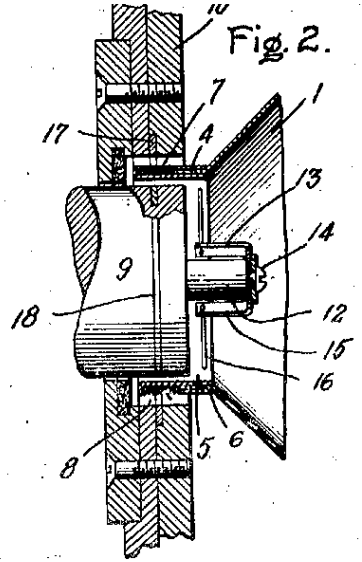
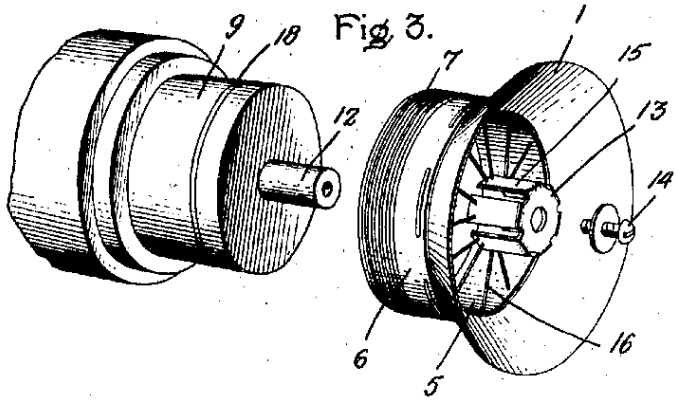
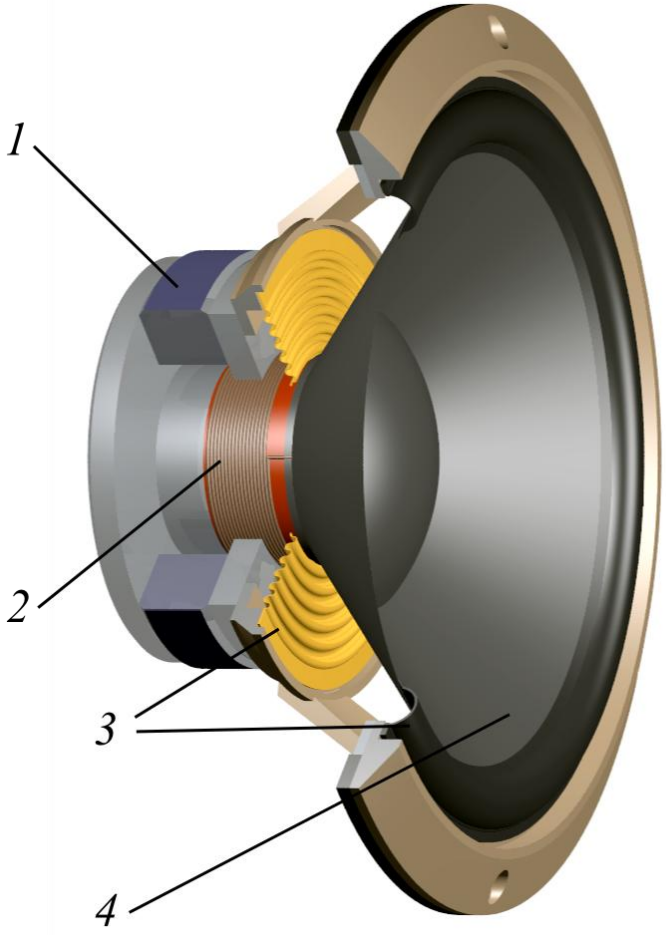


Fig. 3.



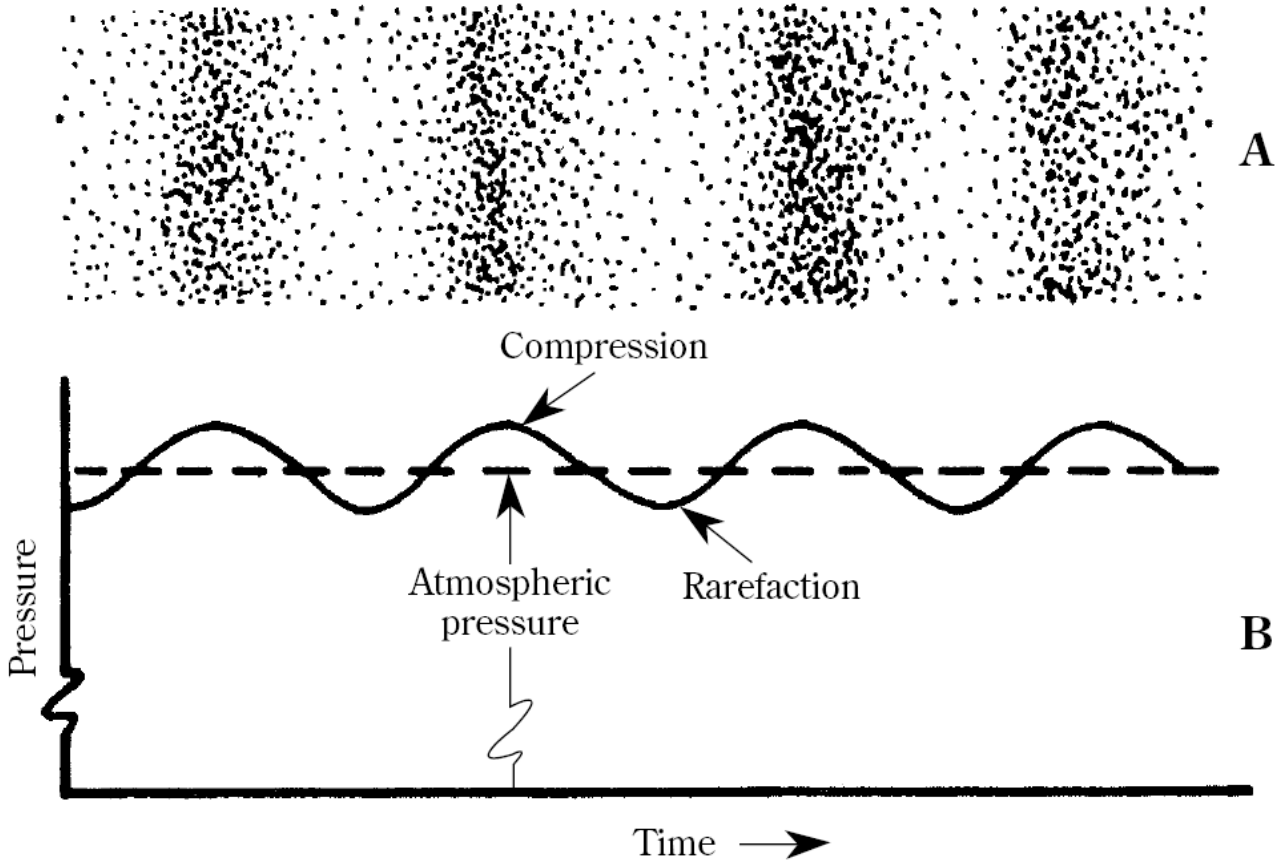
Inventor:
Chester W. Rice,
by Alexander S. Lunt.
His Attorney.

# Moderno Altoparlante



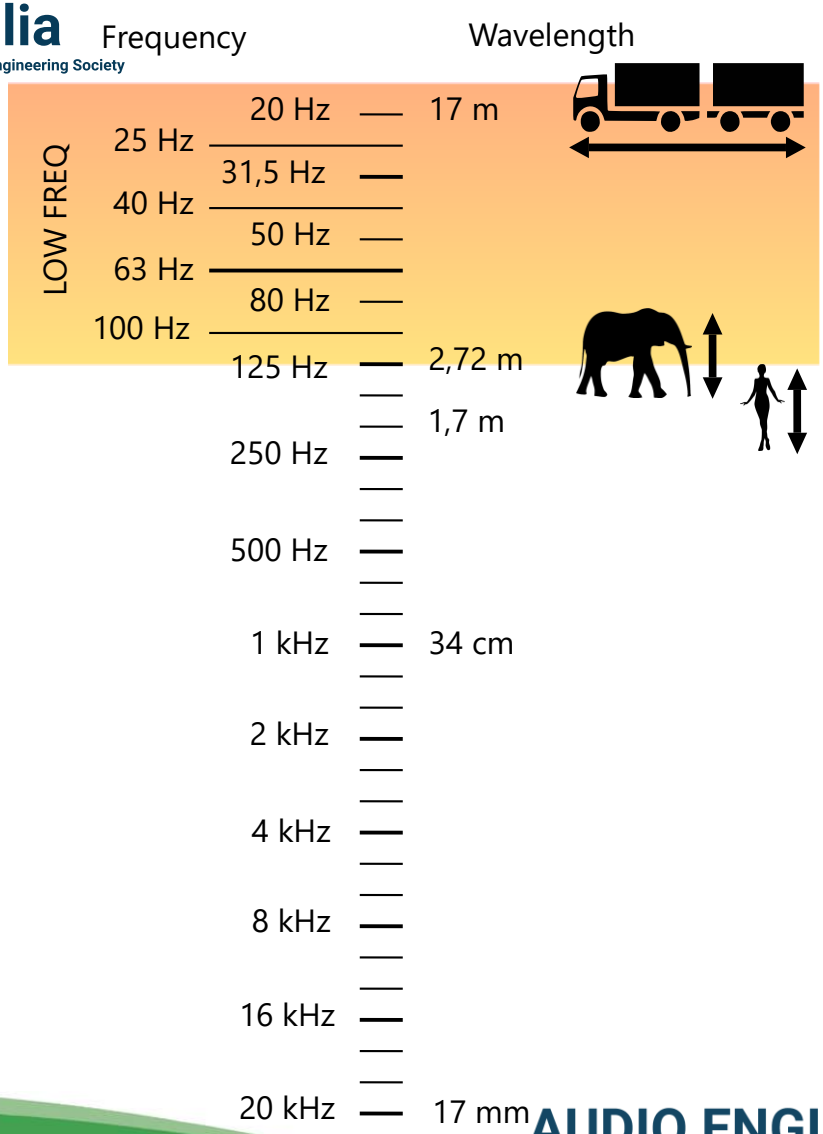

(1) magnete
(2) bobina mobile
(3) sospensioni
(4) cono
(5) cestello

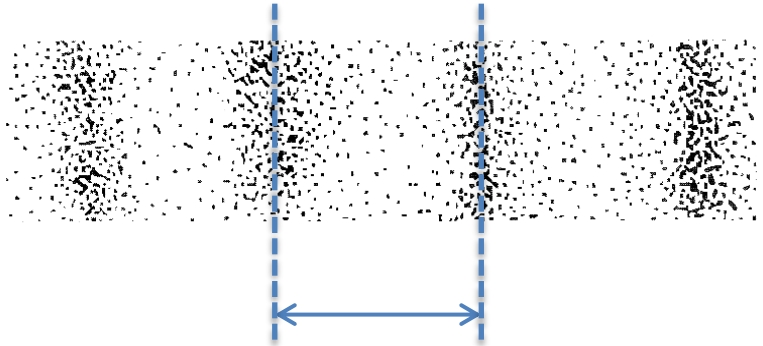
# Alla fisica non si sfugge…




Da Alton Everest “Master Handbook of Acoustics”

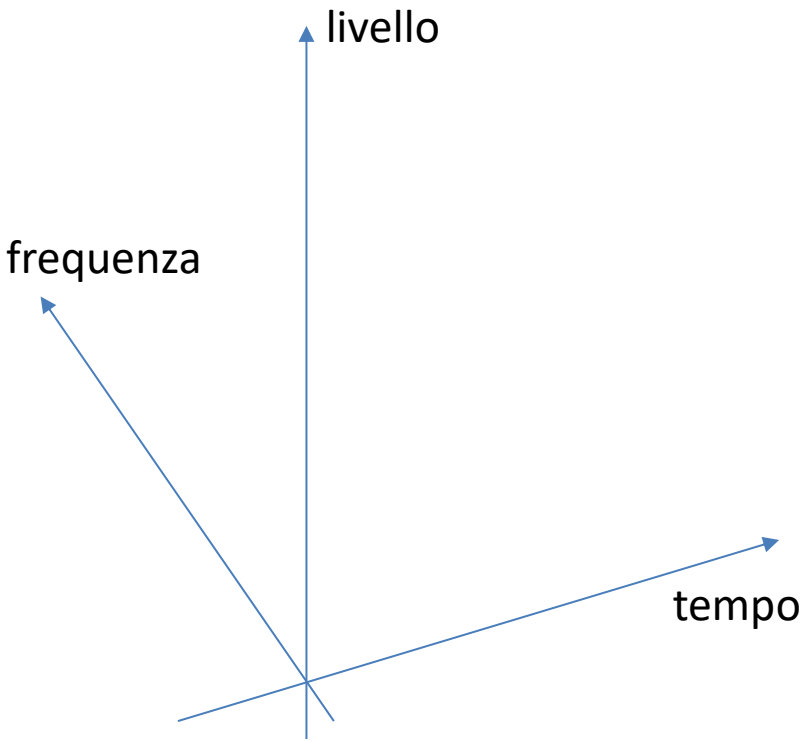
# 10 ottave (!)

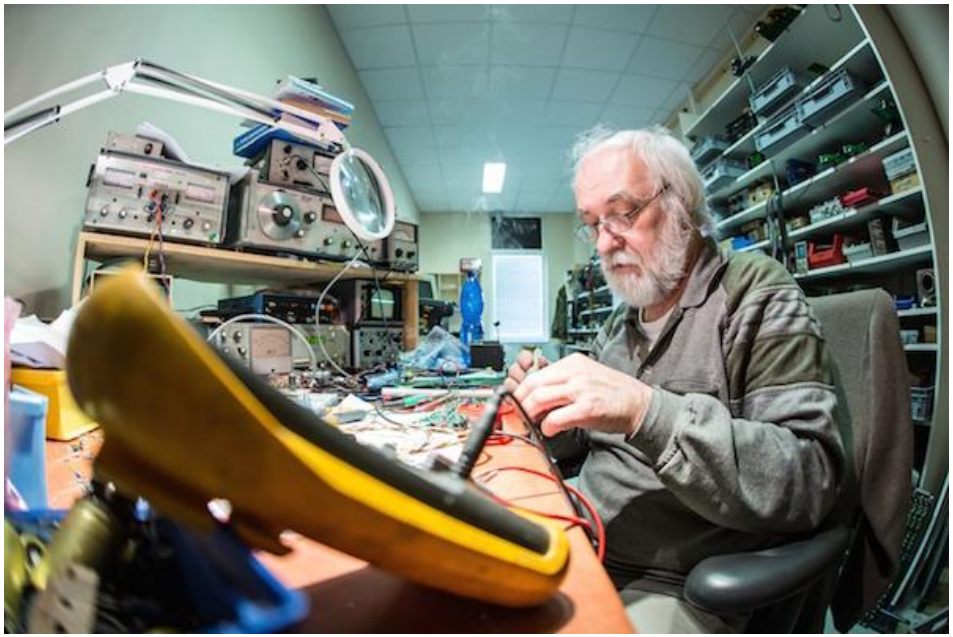


$$\lambda = \frac{c}{f}$$

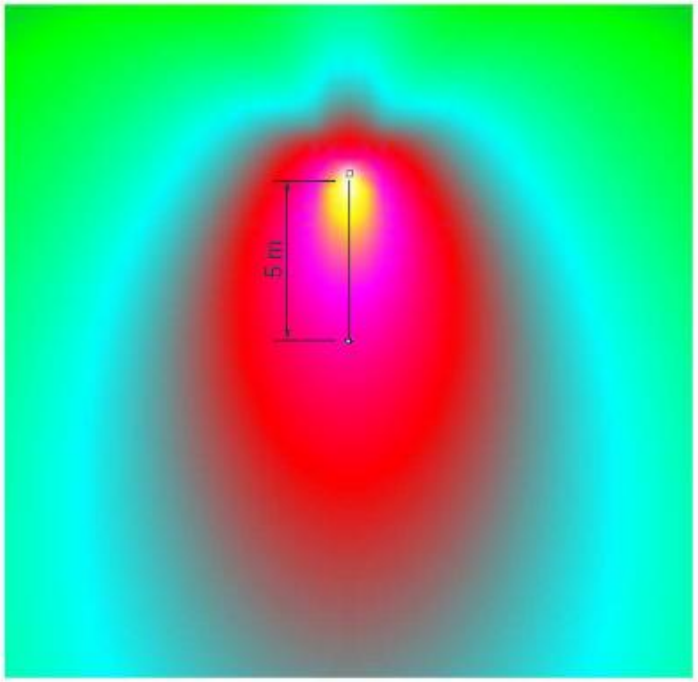
# Le dimensioni del suono

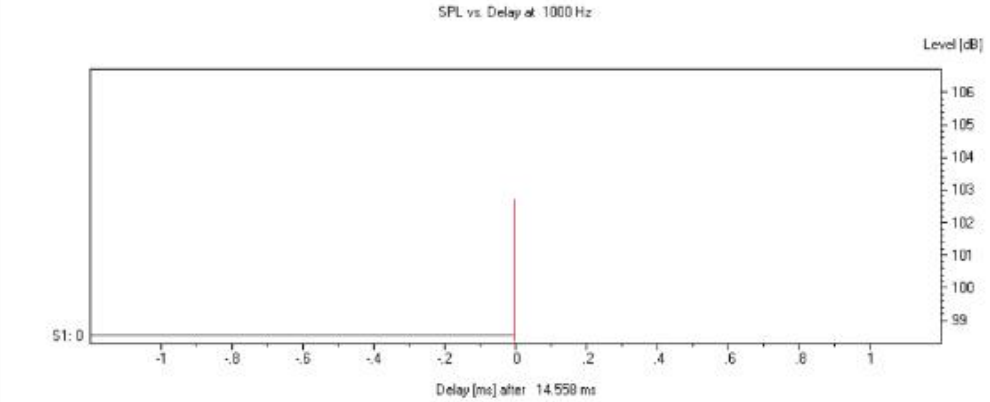


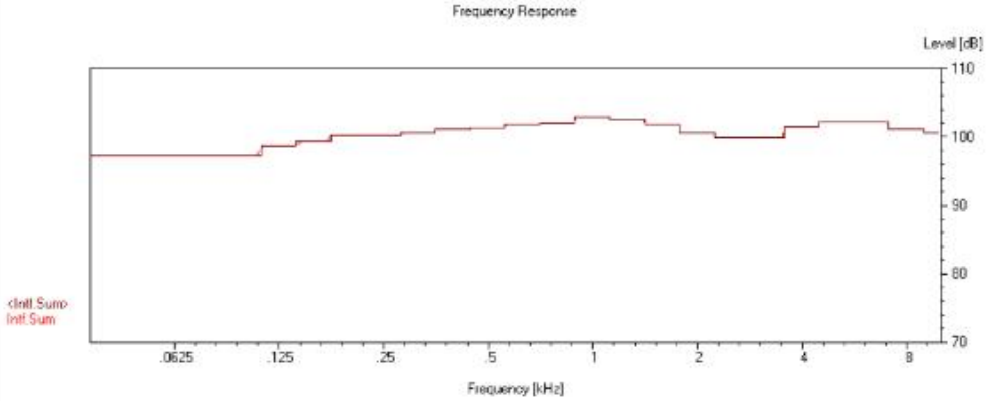



George Krampera

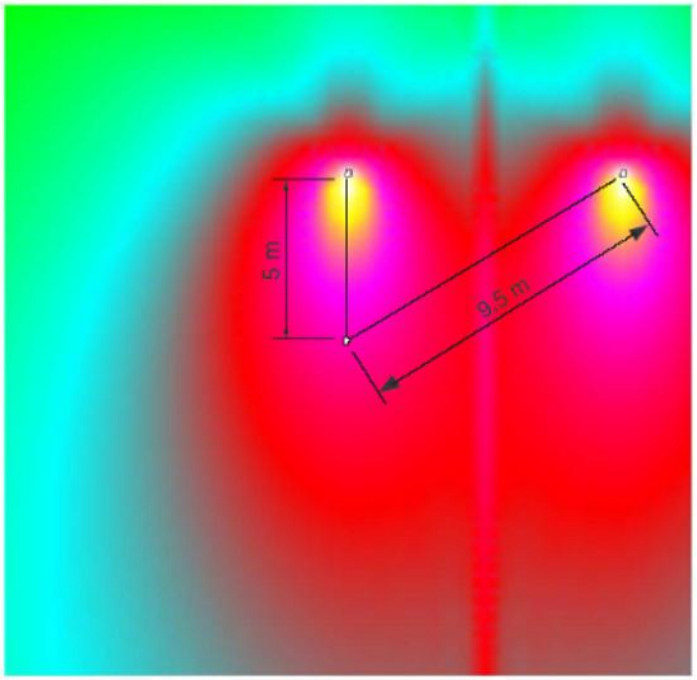
# Un problema, un’opportunità

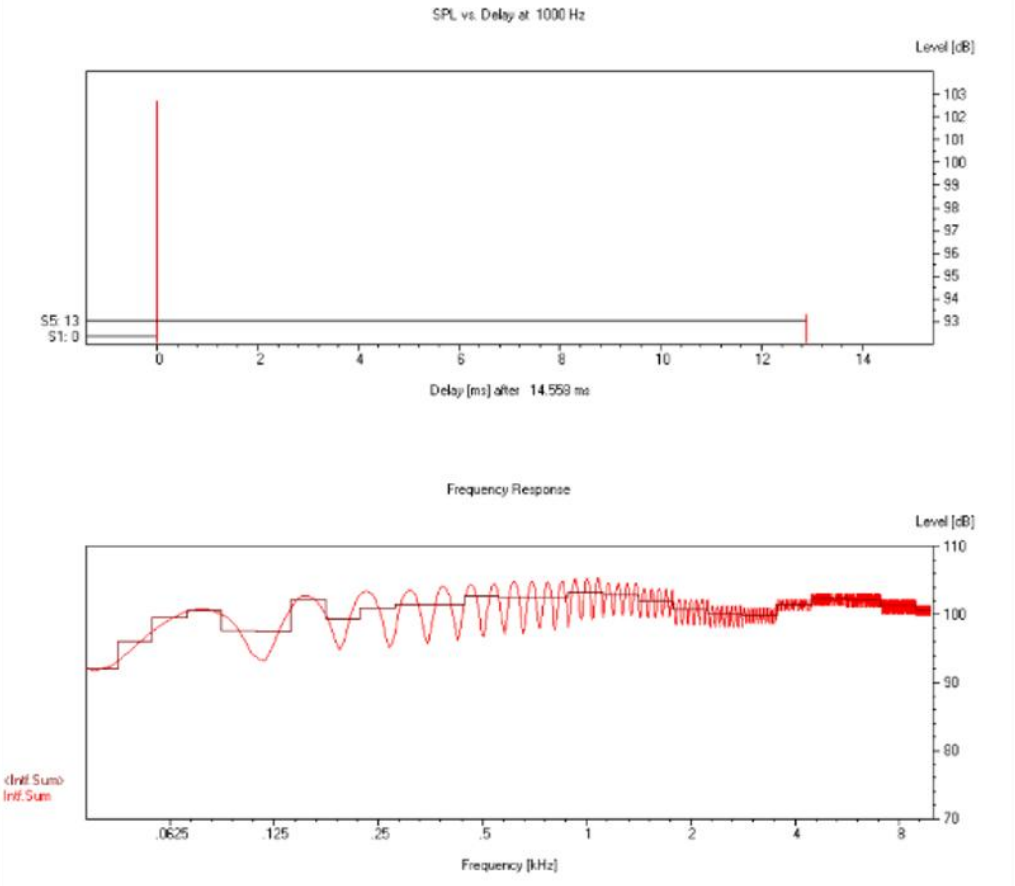


# Un problema, un’opportunità



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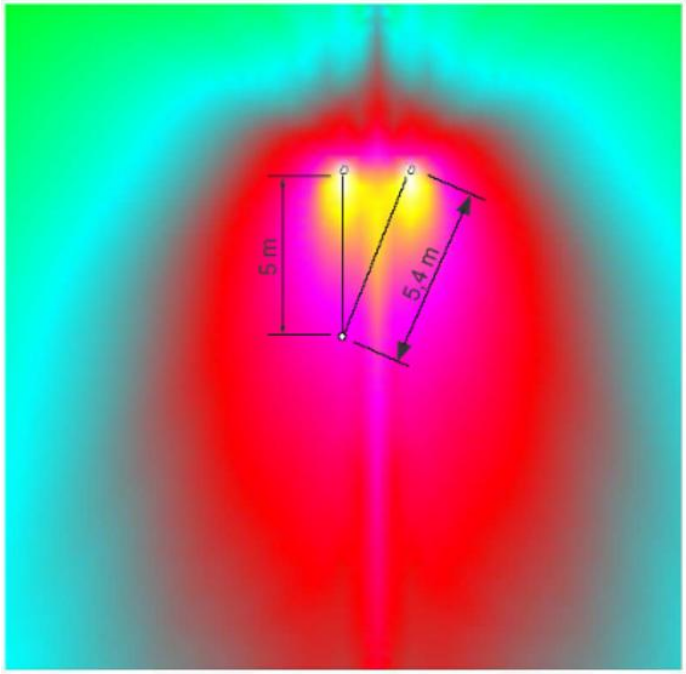
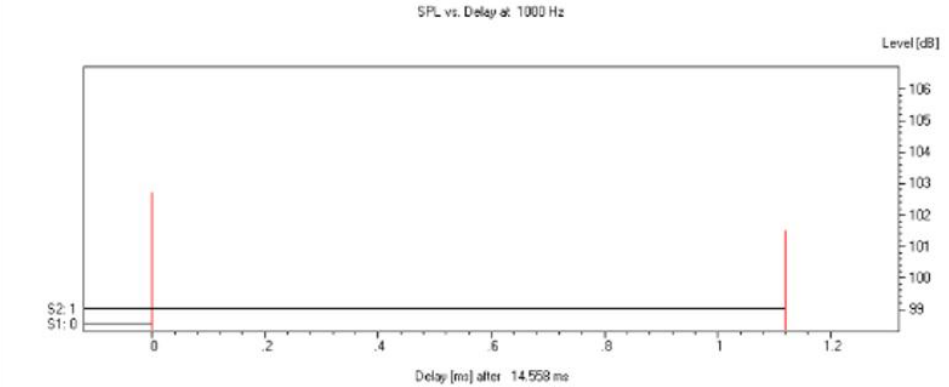
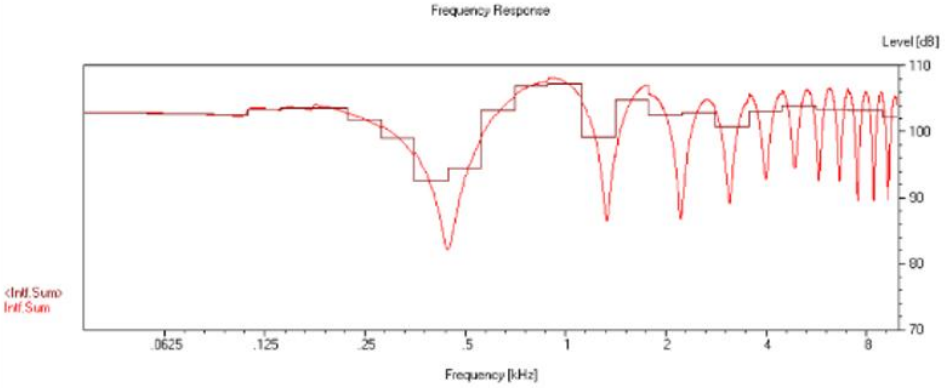


# Gli albori… anni 20

Fig. 1. First use of a distributed sound system, New York, Park Avenue (1919). Note trumpet horns in upper left hung above crowd aiming downward. (Photo from Lester Cowan *Recording Sound for Motion Pictures*, McGraw Hill, New York, 1931.)

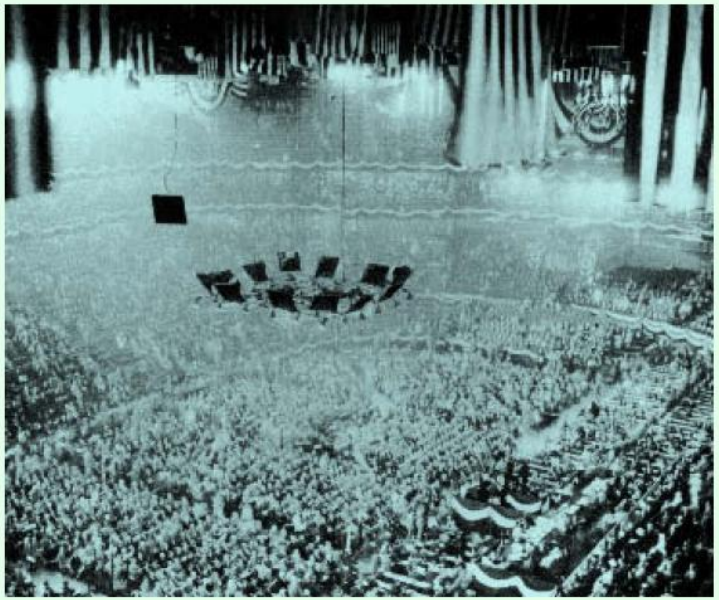
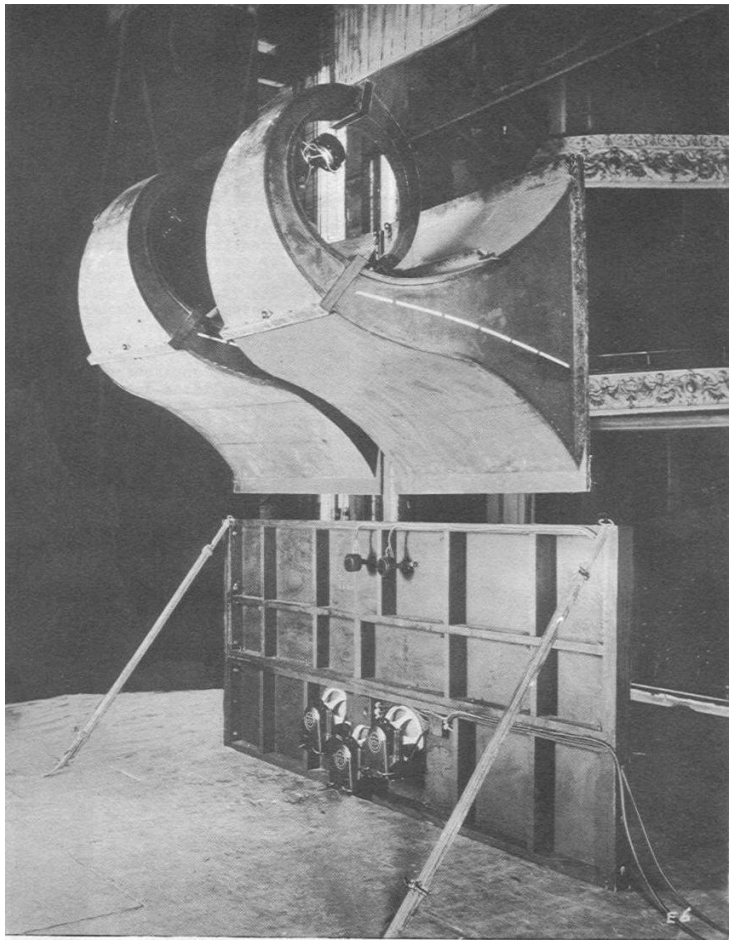
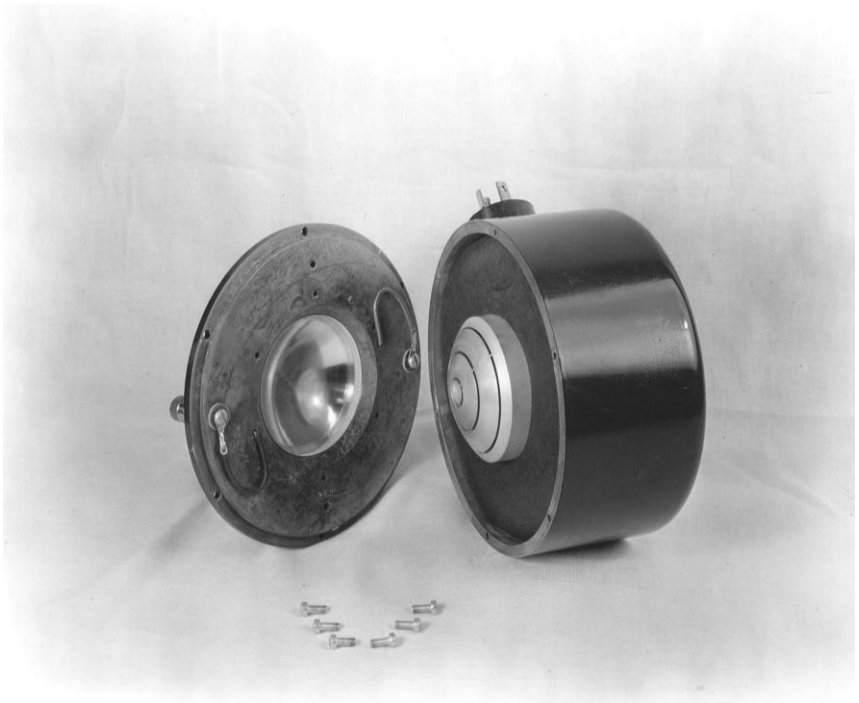


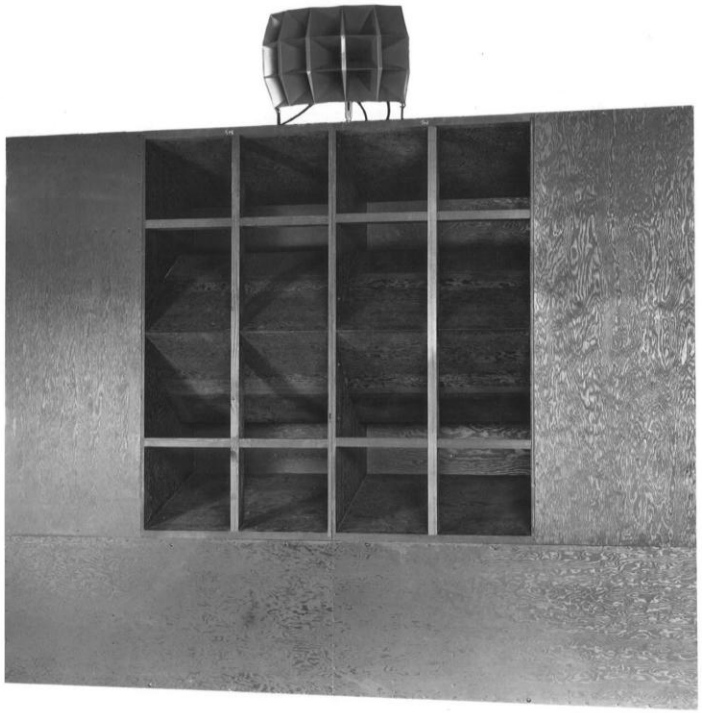
Fig. 2. First central array sound system, 1920 Chicago Republican Convention. (Photo from Frederick Thrasher, ed., *Okay for Sound … How the Screen Found its Voice*, Duell, Sloan, and Pearce, New York, 1946.)

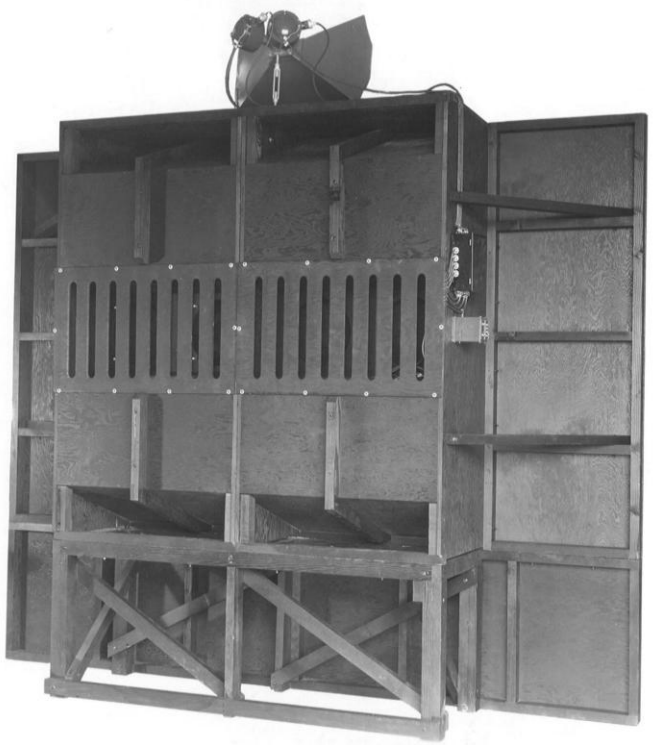
# Il cinema sonoro, anni 30





# Il cinema sonoro, anni 30



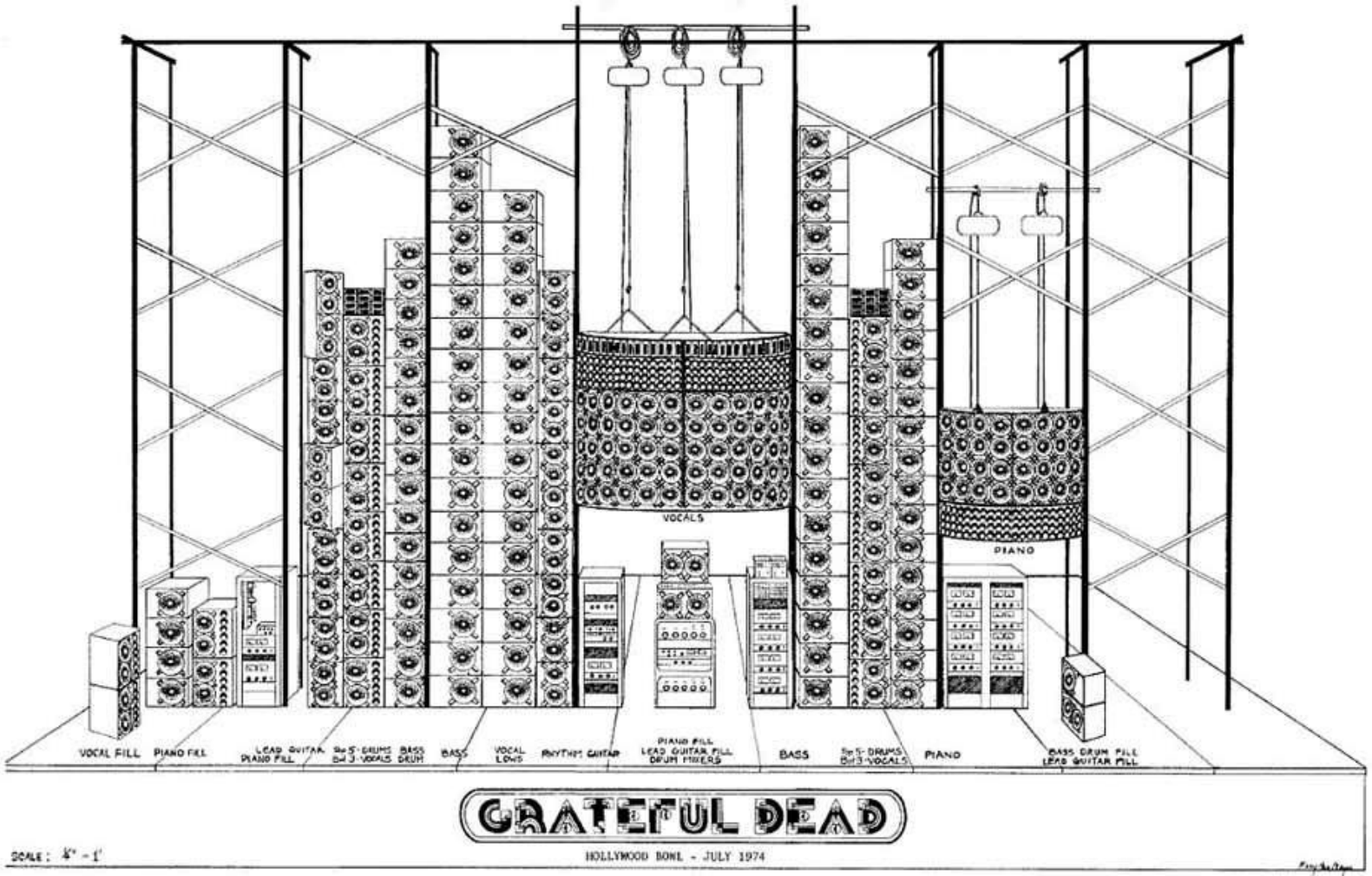


# Arriva la TV, audio “casalingo” dopoguerra -> primi 60

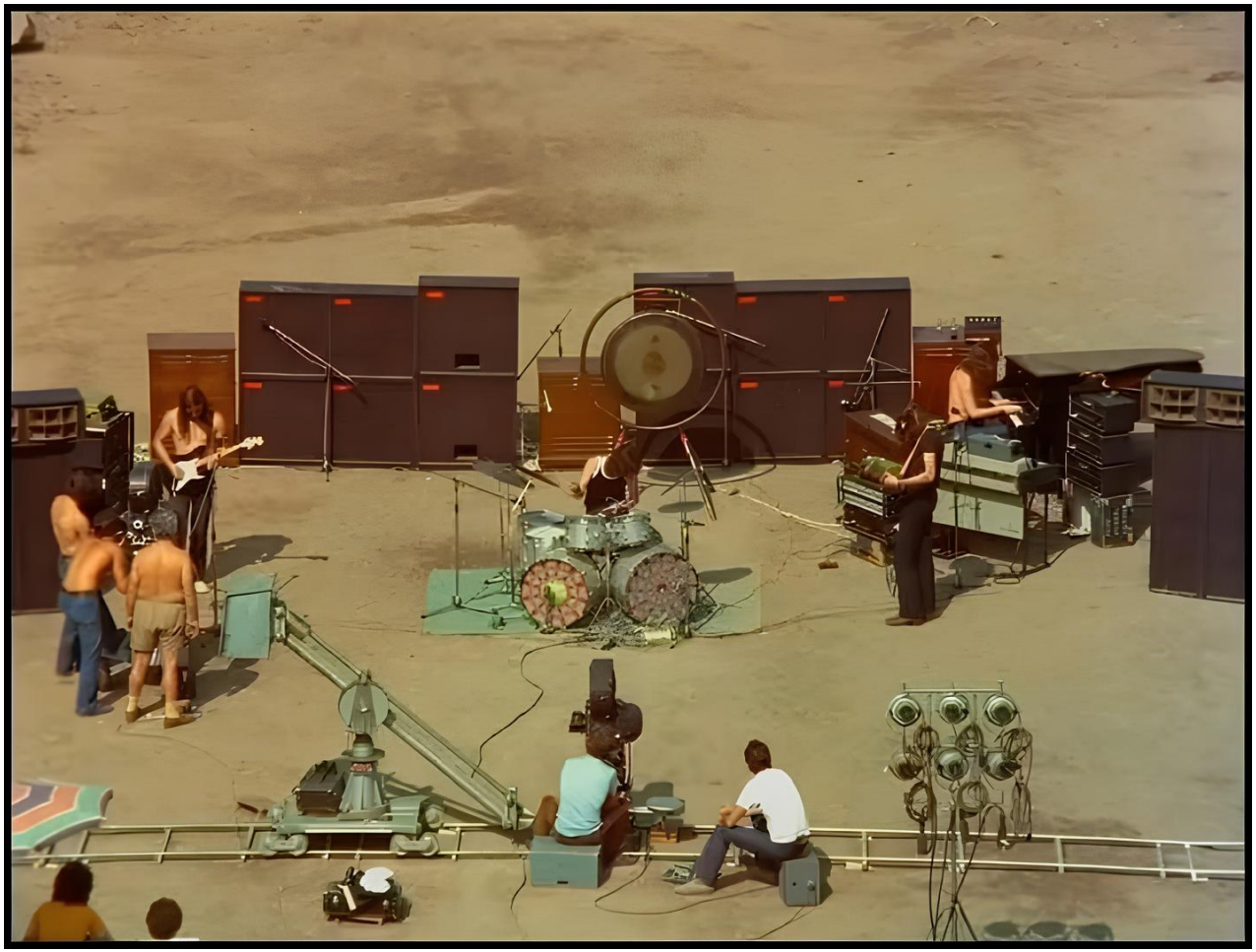
# Beatles Shea Stadium 1965

# Woodstock 1969

# Il “wall of sound” 1972



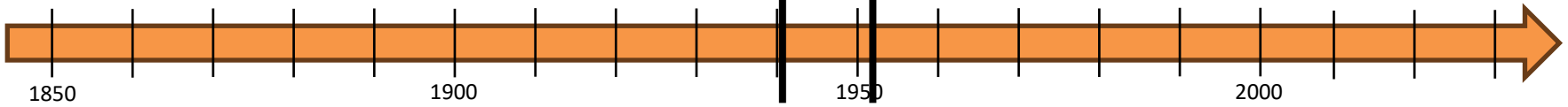
# Pink Floyd at Pompei 1972

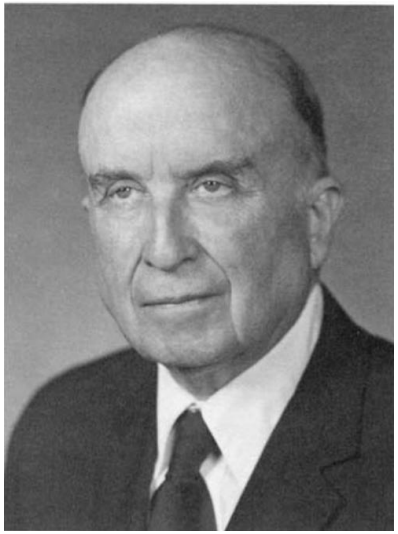


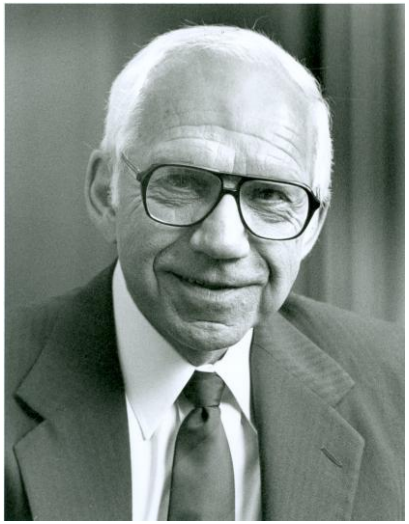
# Progettazione e modelli

*Olson 1940 – modelli a costanti concentrate*

*Beranek 1952 “Acoustics”*



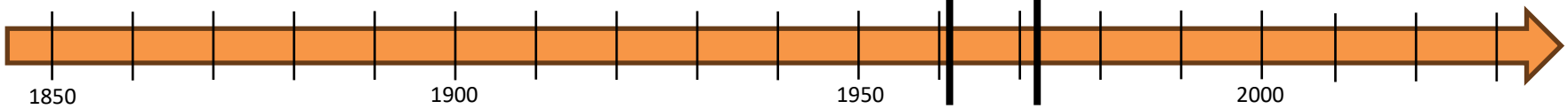



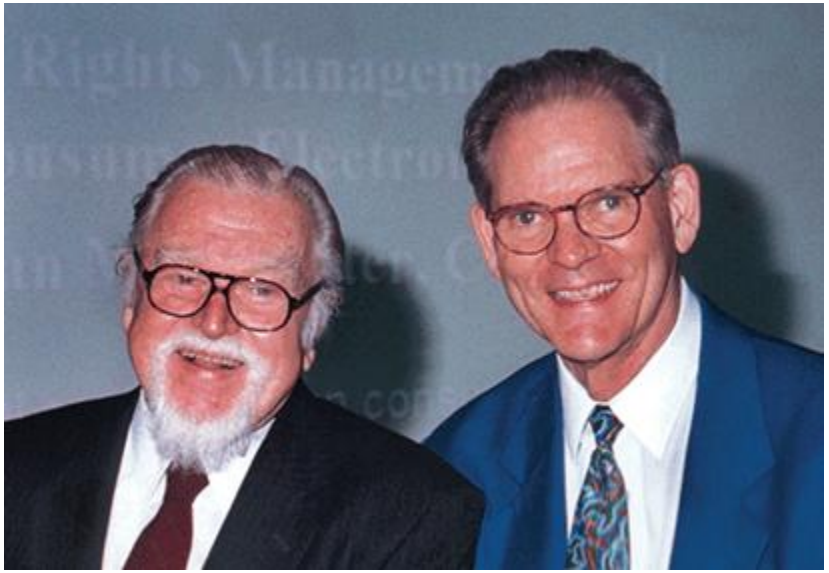


# Progettazione e modelli

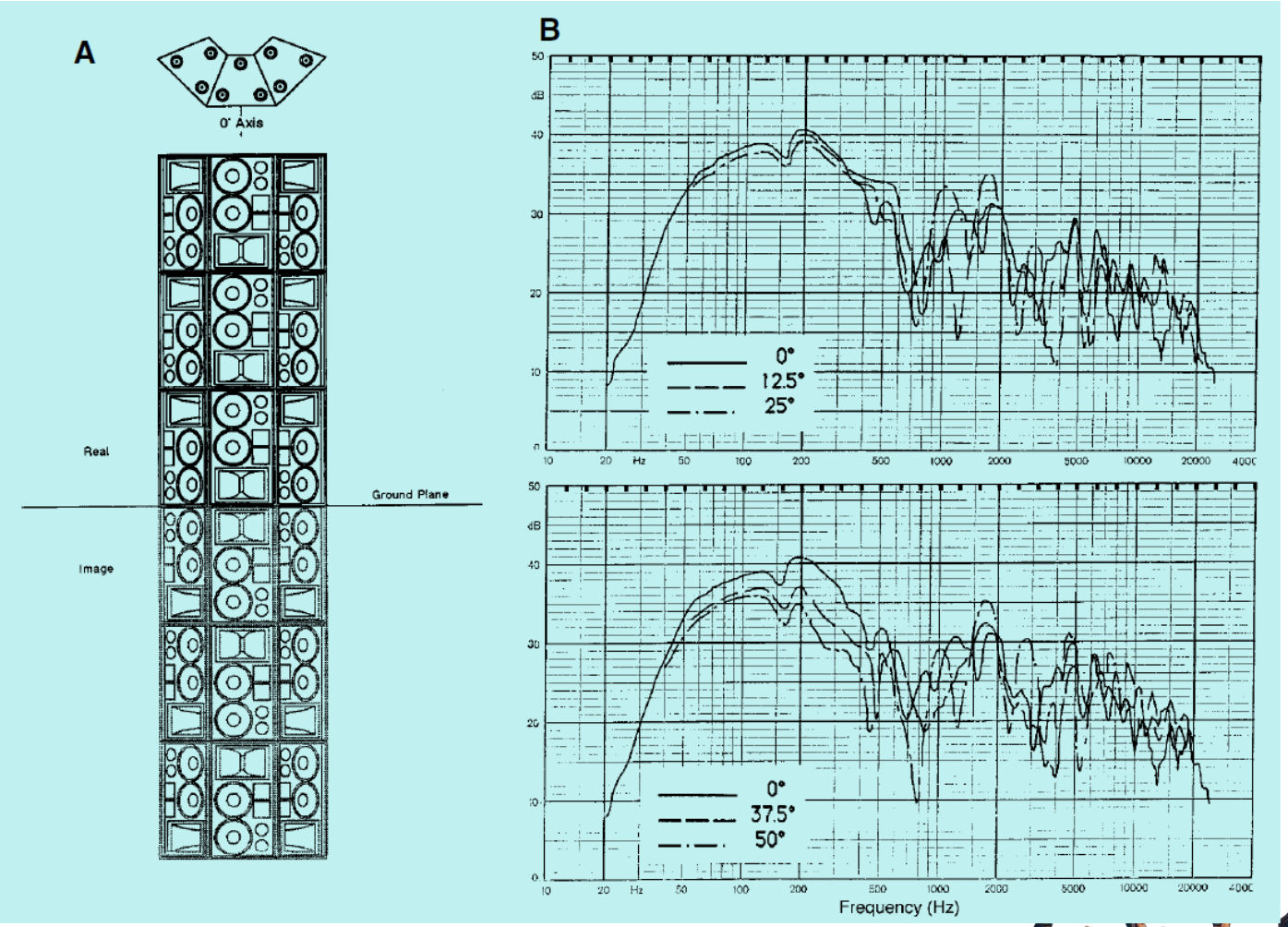
*Small 1972 JAES progettazione varie tipologie di caricamento*

*Thiele 1961 – modello di calcolo*



# I sistemi “compatti” - anni ‘80



# Sistemi compatti – anni 80

# Il line array – anni 90

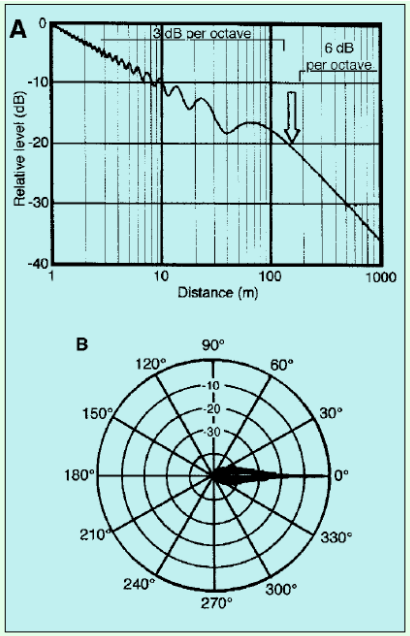



Fig. 33. Performance of a continuous array 3 meters in length. Attenuation with distance at 10 kHz (A); polar response at 10 kHz (B).

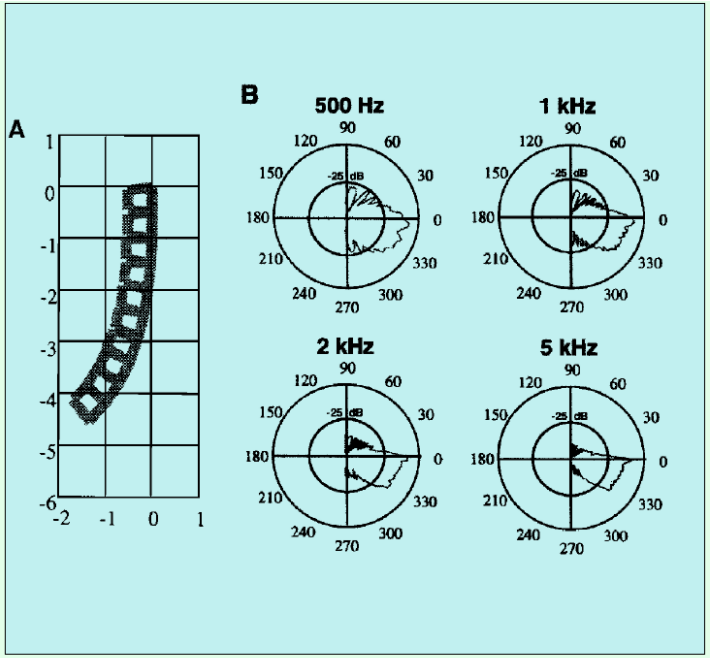
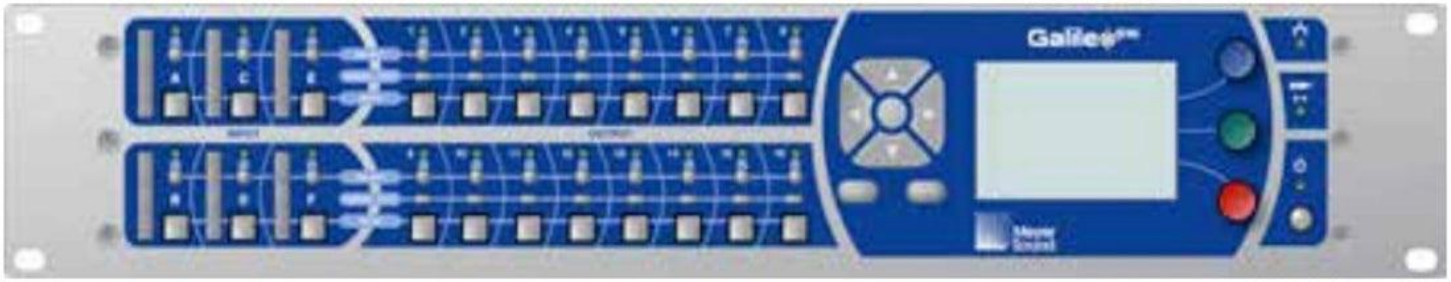
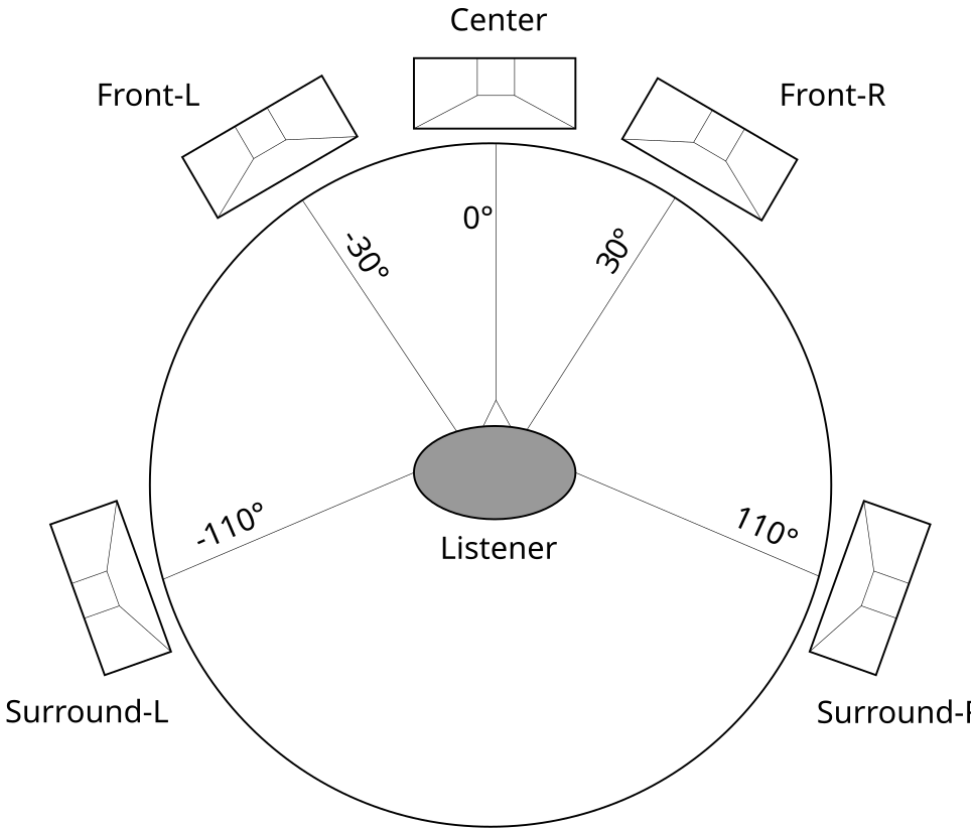



Fig. 34. Performance of a spiral array. Side view of array (A); polar response of array at 500 Hz, 1, 2, and 4 kHz (B). (Data courtesy M. Ureda.)

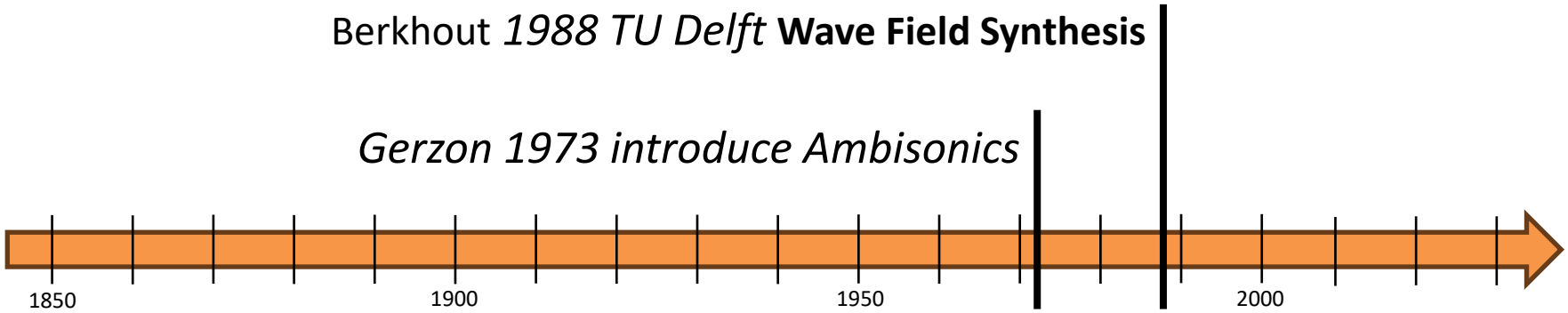
# La rivoluzione DSP

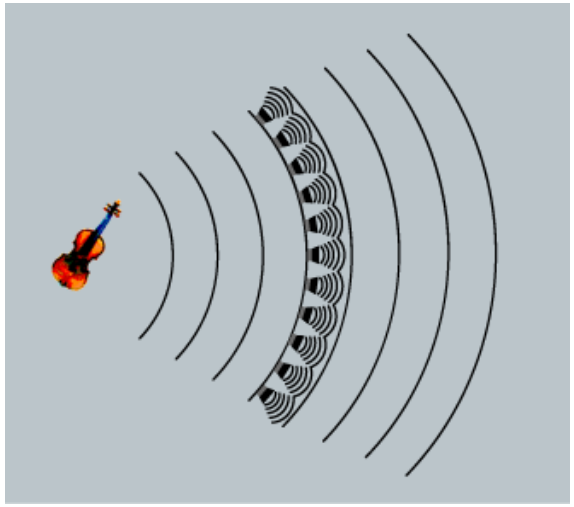


# Ancora il cinema!



# Audio 3D


Berkhout *1988 TU Delft* **Wave Field Synthesis**
*Gerzon 1973 introduce Ambisonics*
1850
1900
1950
2000



# “The sphere”

# Audio “Personale”

# GRAZIE PER L'ATTENZIONE

https://aeshc.aescommittees.com/aes-oral-history-project/