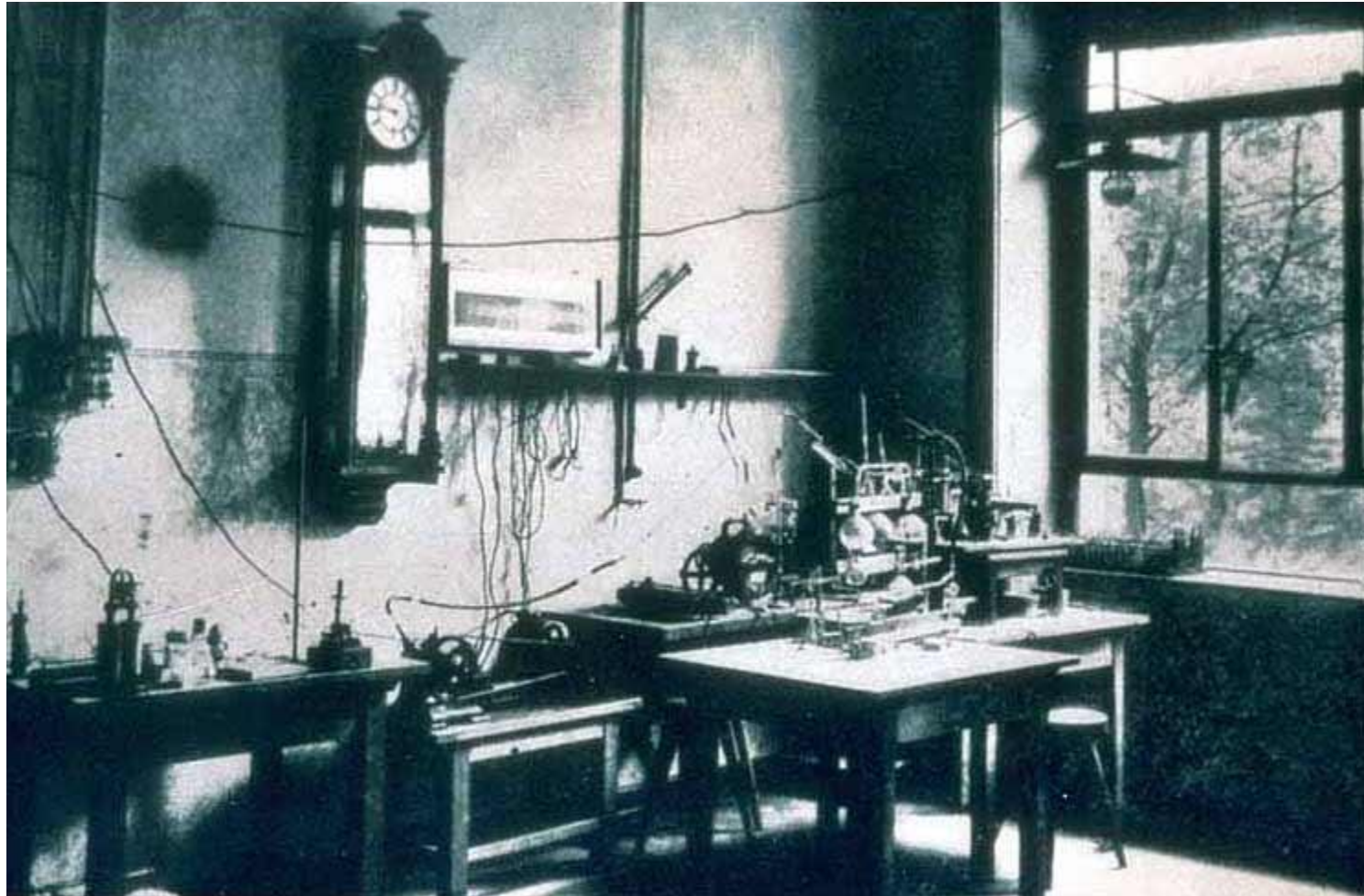


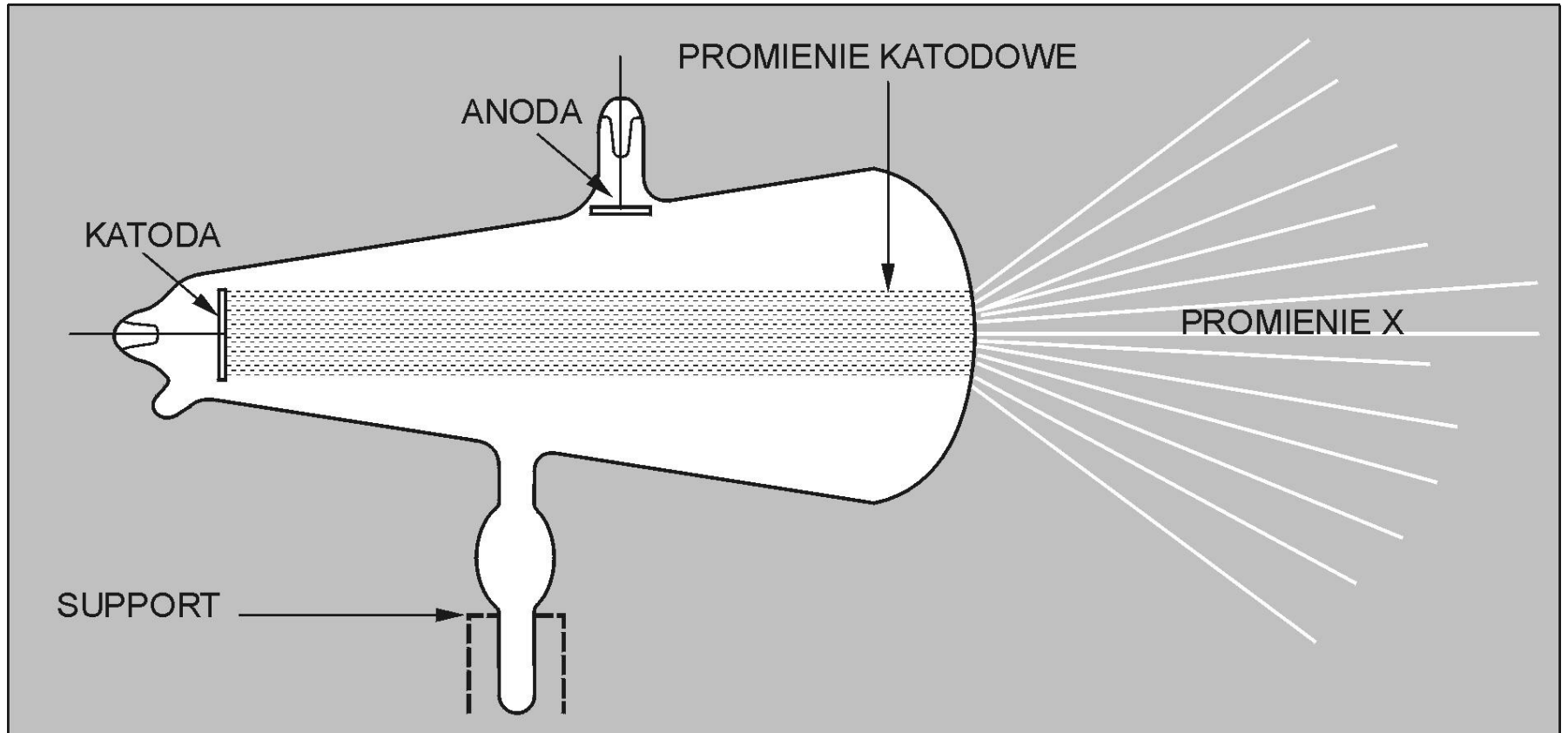
100-lecie
Lampy Rentgenowskiej
1913 - 2013

8 listopad 2013 r.

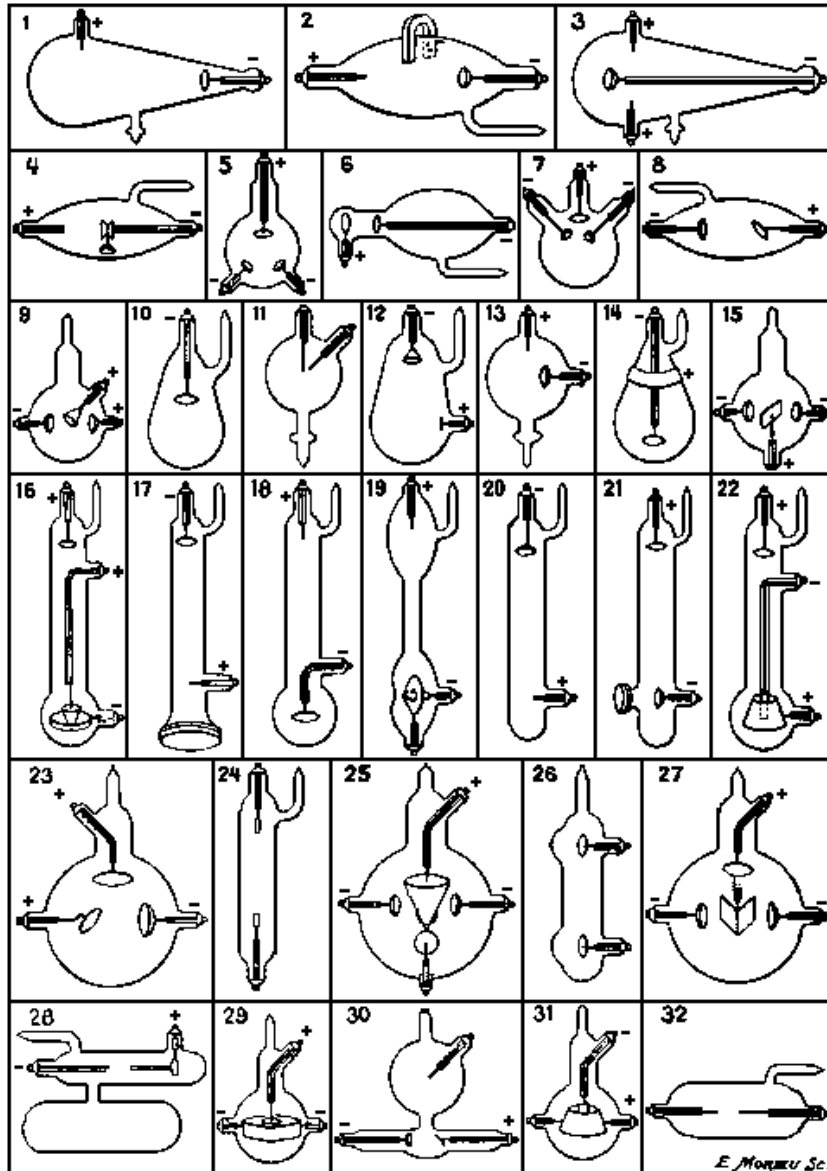
Grzegorz Jezierski



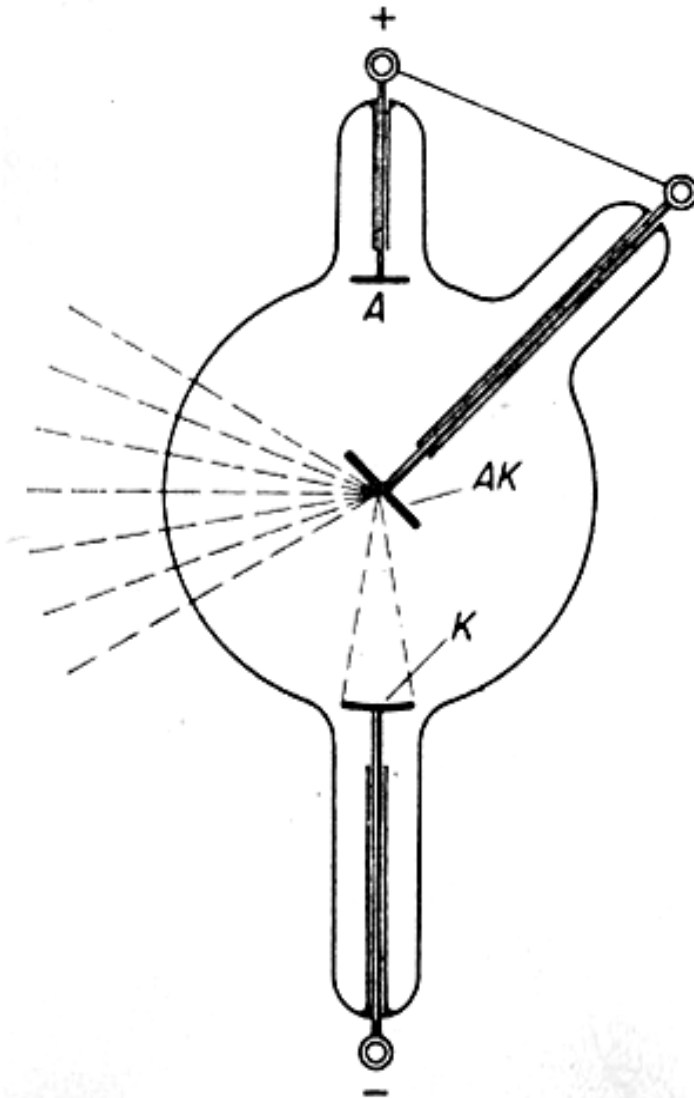
8 listopad 1895 r.



Rura Crookes'a

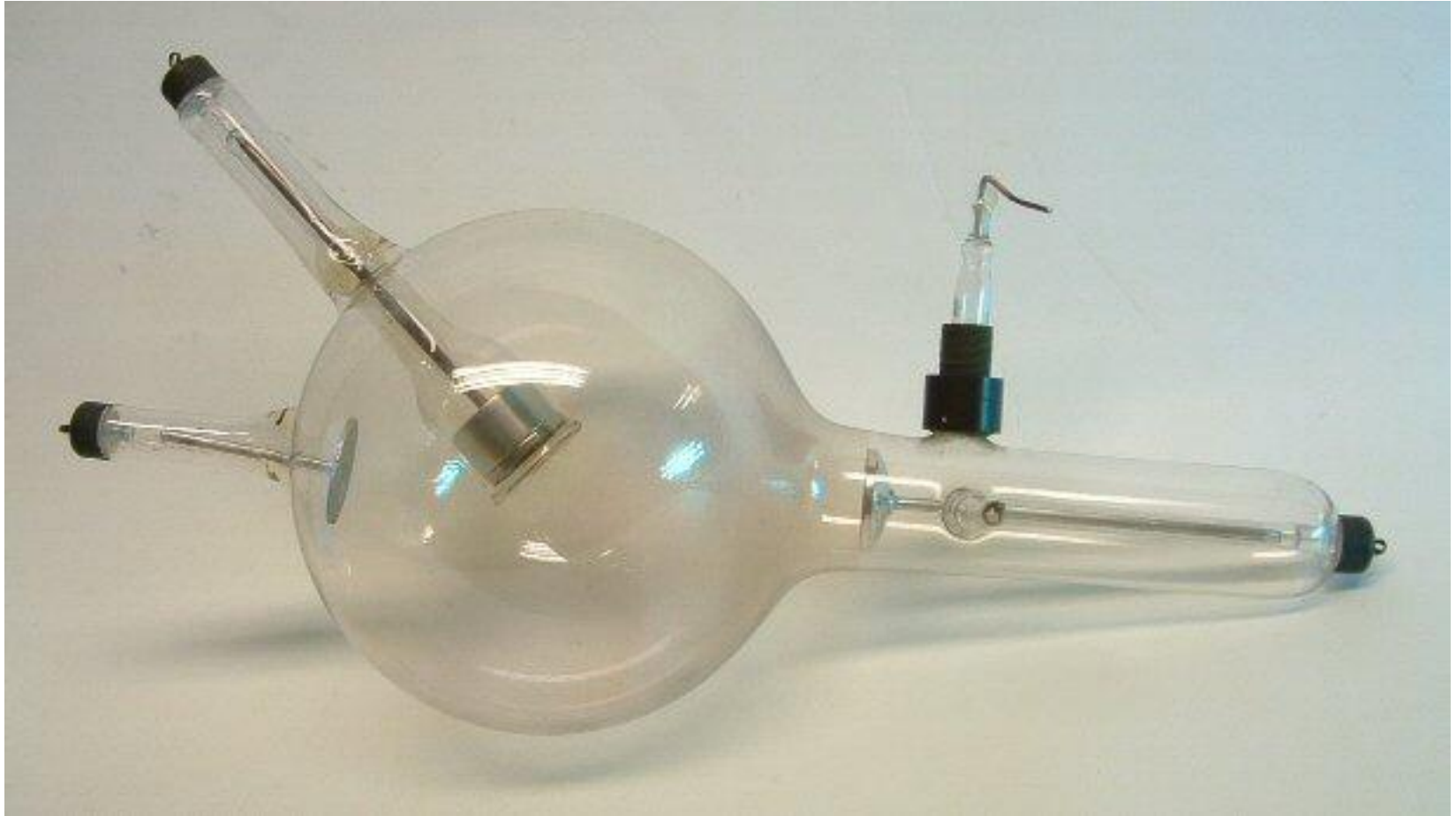


VARIOUS TYPES OF X-RAY TUBES.



**Lampa gazowana
(jonowa)
z zimną katodą**





Lampa Villarda



Lampa Bauera



Lampa Machlett



Lampy Edisona



ELECTRICAL APPARATUS.

OUR X RAY TUBES

ARE THE BEST THAT CAN BE MADE.

WE MAKE SPECIAL X RAY TUBES
FOR USE WITH COILS HAVING EXTRA HEAVY SPARK CAPACITY

Fluoroscopes

With Barium Platino-Cyanide Screens give finest results. We make all sizes, also unmounted screens.

CATALOGUE ON APPLICATION.

THOMSON DOUBLE-FOCUS TUBE, for high frequency coils.

FORM E5—Single-focus X Ray Tube, for induction coils of 4-inch to 12-inch sparks.

FORM G2—Single-focus X Ray Tube, for induction coils of 4-inch to 6-inch sparks.

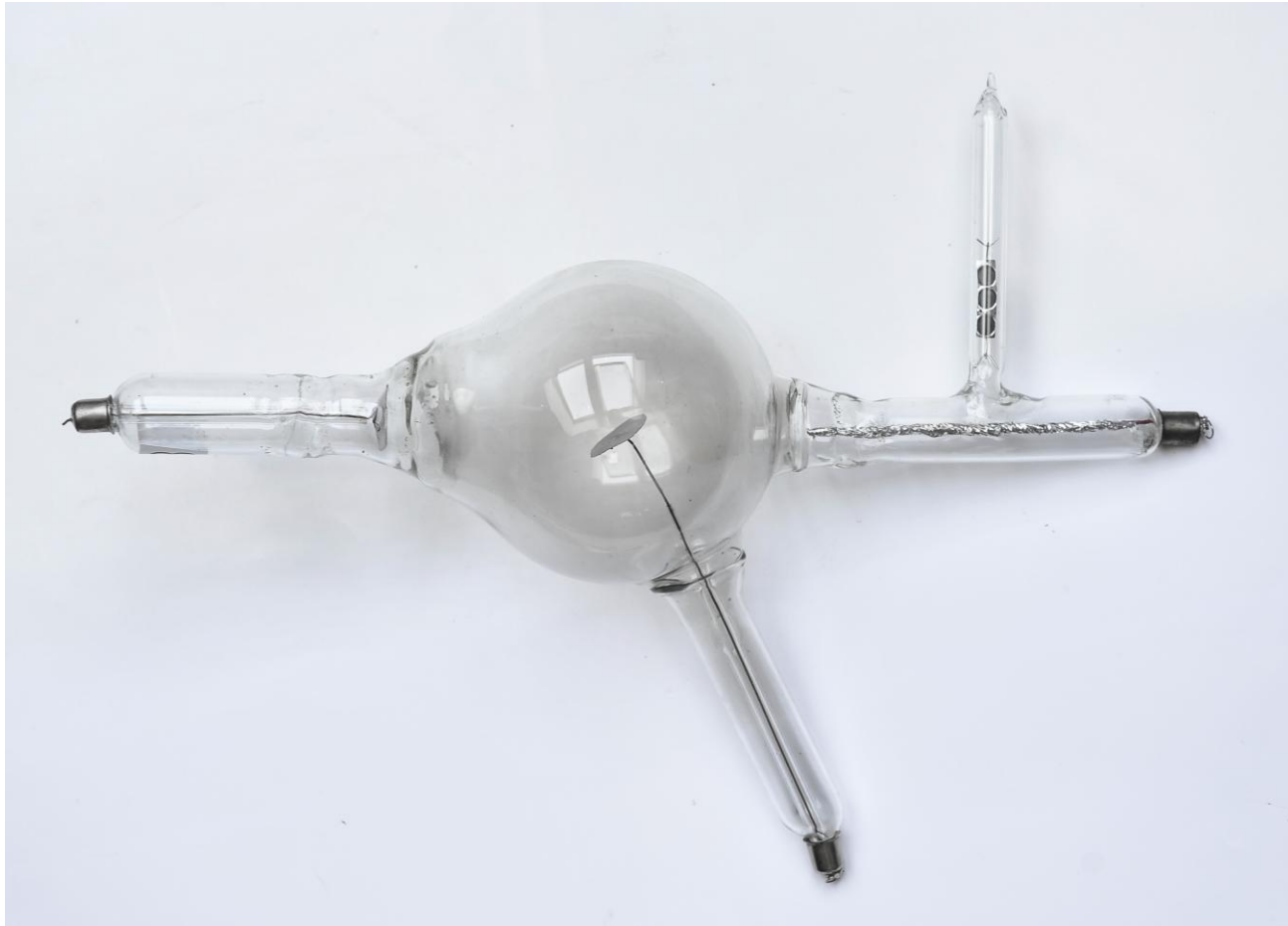
Miniature Lamps, Candelabra, Decorative, and Battery, for all Purposes.

Edison Decorative & Miniature Lamp Dept.
(General Electric Co.) HARRISON, N. J.

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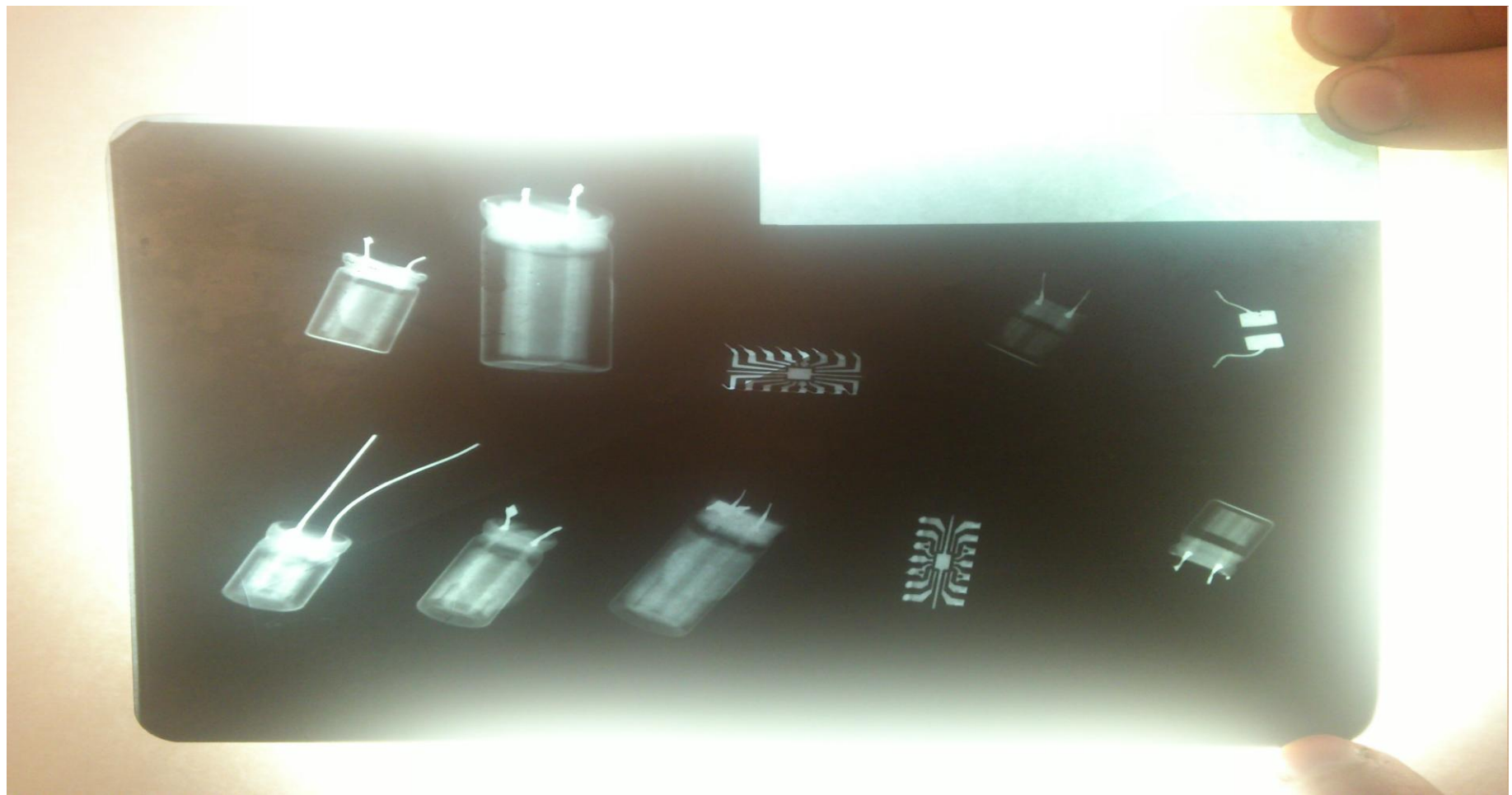


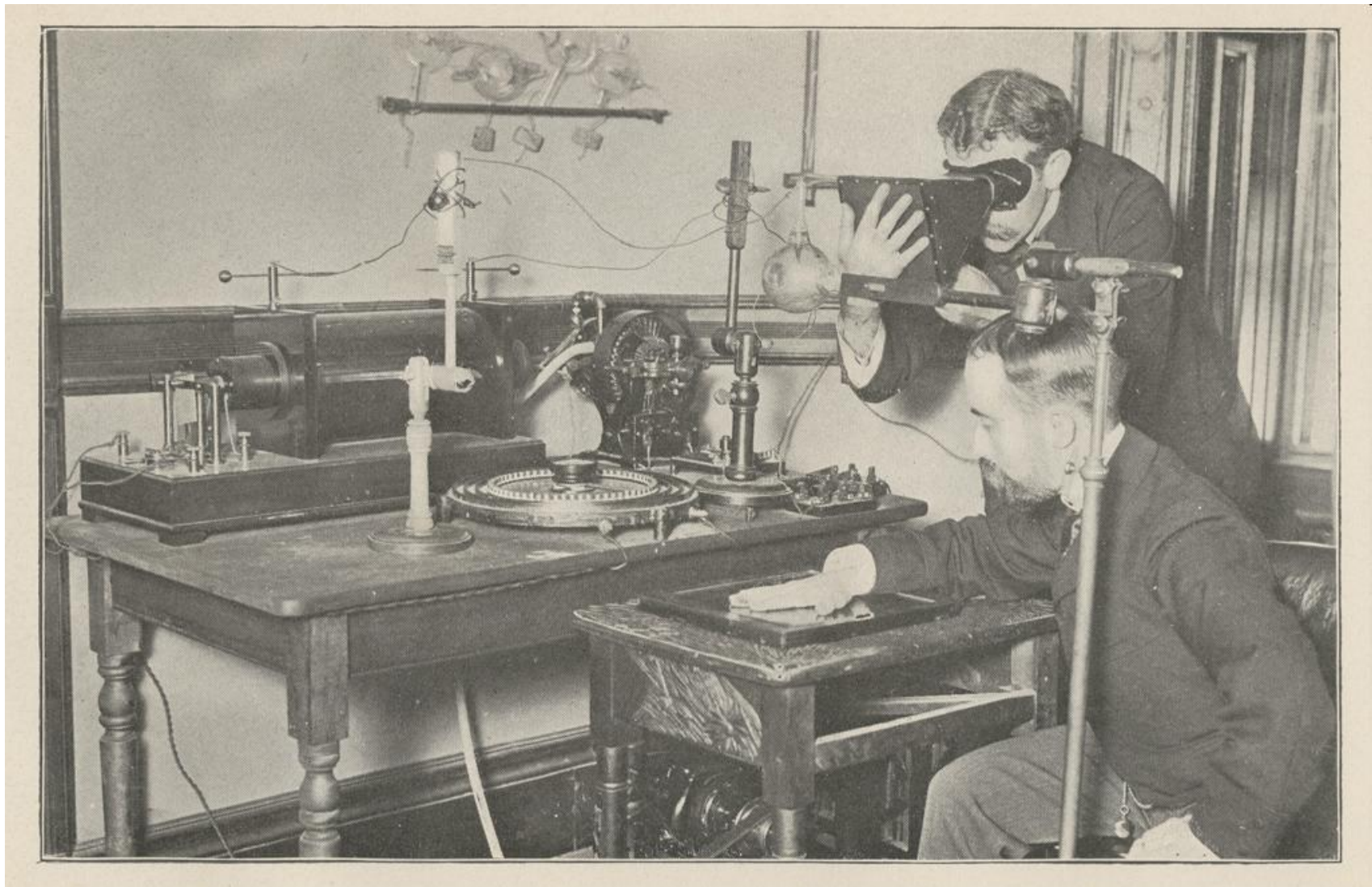
**Lampa jonowa
Uniwersytet Jagielloński**



**Replika lampy
gazowanej
wykonana przez
Aleksandra Zawadę
z Warszawy**

**ciśnienie: 0001 Tr
antykatoda: Mo
anoda, katoda : Al
napięcie: 40-50 kV
zasilana: induktorem
Ruhmkorffa**





**Zapytany o zachowanie lamp gazowanych,
Roentgen stwierdził w liście:**

***„Nie chcę się wypowiadać na temat czegokolwiek,
co związane jest z właściwościami tych lamp,
gdyż są one bardziej kapryśne
i nieprzewidywalne od kobiet.”***

90 rocznica śmierci (10.02.1923 r.)



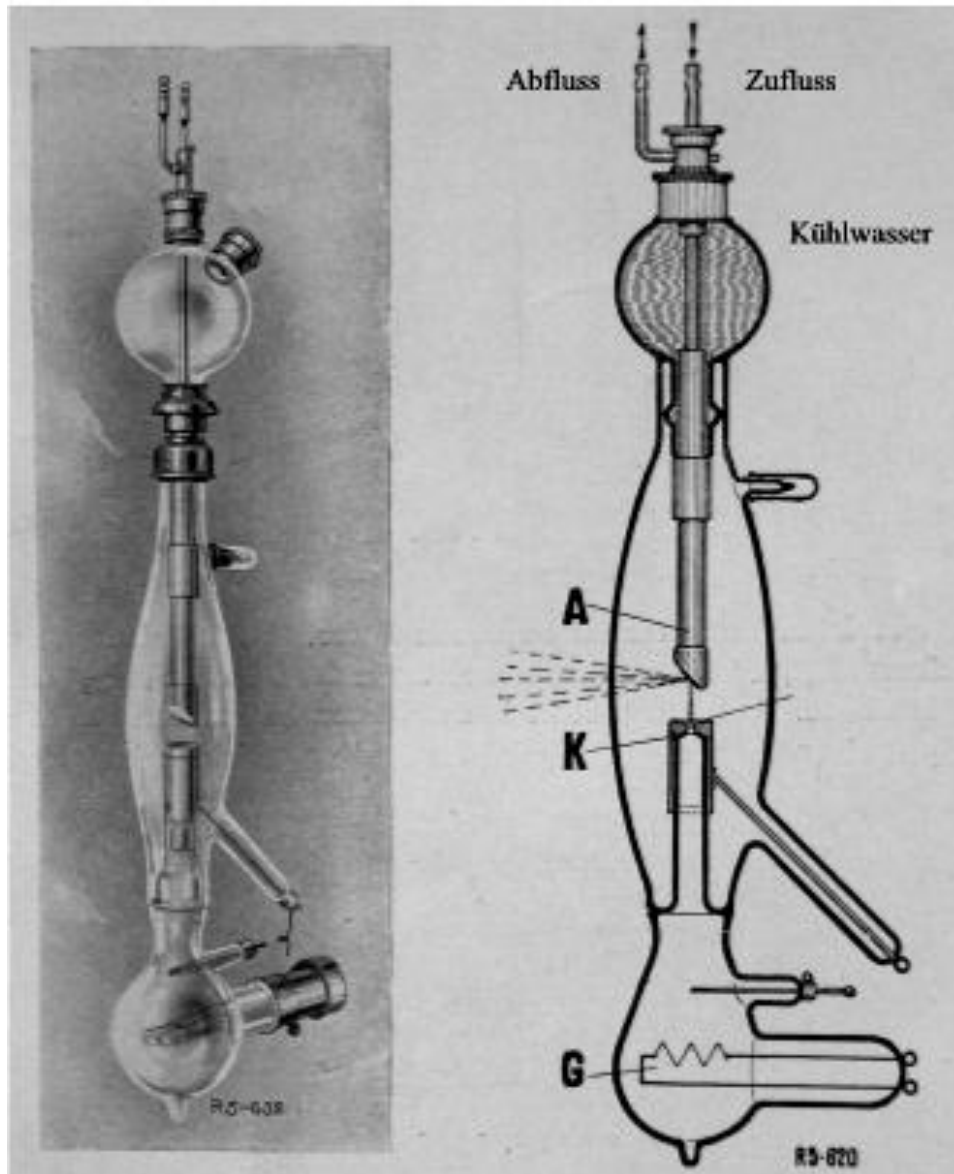
William D. Coolidge (1873-1975)

**W 1910 r.
wynalazł giętkie włókno
wolframowe**

**Patent 1,203,495
9.05.1913 r.**

**W lampie Coolidge'a:
Katoda: sama emitowała elektrony
Anoda: platynę zastąpił wolframem**





**Lampa
Lilienfelda
z zimną katodą
1912 r.**

Julius Edgar Lilienfeld

urodzony w 1882 r. we Lwowie,
austriacko-węgierski fizyk pochodzenia
żydowskiego.... (wikipedia)

Jako naukowiec jego biogram funkcjonuje w Jerozolimie, ale nie w Polsce. Jest to jeden z większych skandali na skalę międzynarodową, postać bezprawnie przywłaszczona przez Żydów, Niemców i Amerykanów.

Polak, o którym przede wszystkim zapomniała Polska, a który identyfikował się właśnie z naszym krajem.

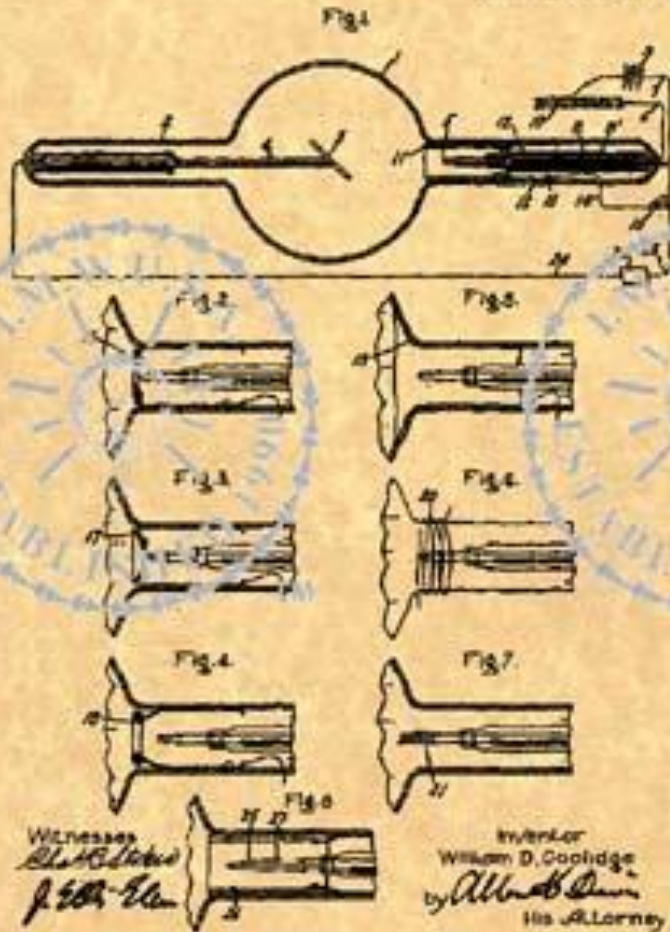
Patent z 1917 r. Be it known that I, Julius Edgar Lilienfeld, **subject of the Austro-Hungarian Emperor**, residing at Leipzig, Germany, have invented certain new and useful Improvements in Roentgen-Ray Tubes;

Patent z 1925 r. Be it known that I, Julius E. Lilienfeld, **a citizen of Poland**, residing at Kew Gardens, in the county of Queens and State of New York, have invented certain new and useful Improvements in High-Vacuum Tubes,

Profesor Lilienfeld kilkakrotnie odwiedzał Warszawę na zaproszenie Polskiego Lekarskiego Towarzystwa Radiologicznego. W czasie jednej ze swych wizyt wygłosił na posiedzeniu w Szpitalu Ujazdowskim odczyt w **języku polskim** o rozwoju lamp rentgenowskich.

W. D. COOLIDGE
 FUSION TUBE.
 APPLICATION MADE MAY 4, 1915.

Patented Oct. 21, 1916.



Witnesses
[Signatures]

Inventor
 William D. Coolidge
 by *[Signature]*
 His Attorney

UNITED STATES PATENT OFFICE.

WILLIAM D. COOLIDGE, OF BOSTON, MASS., ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

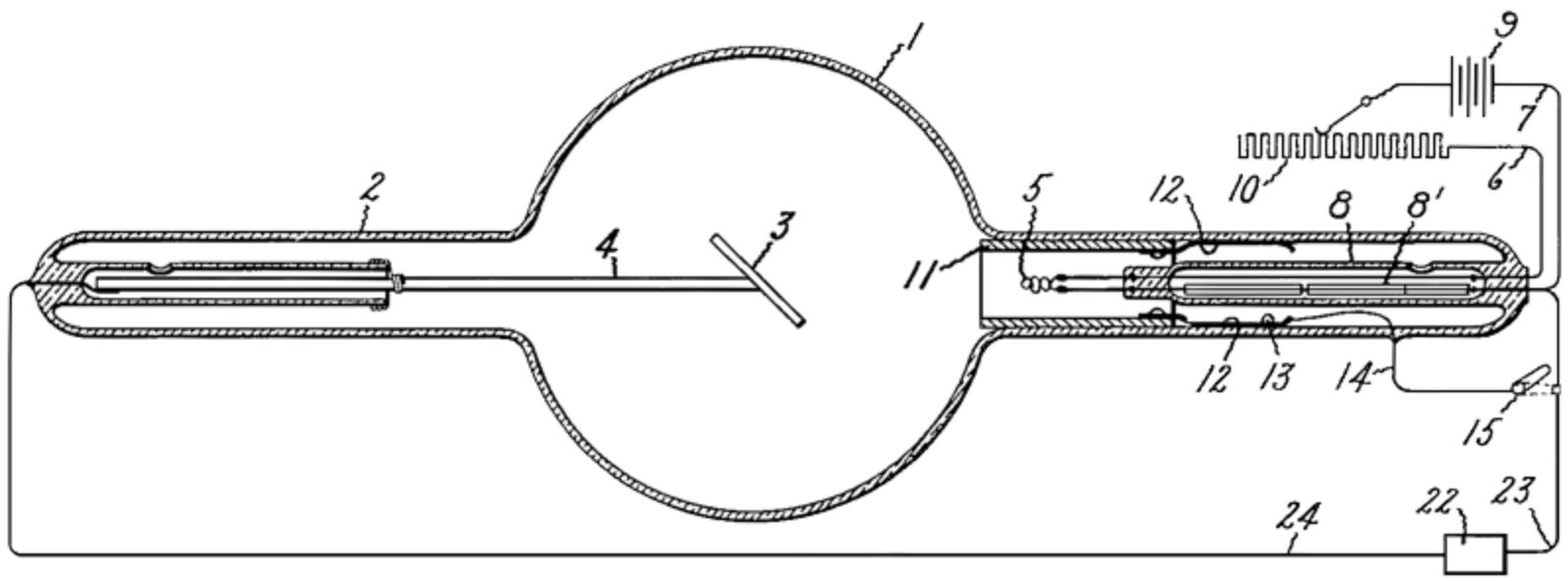
FUSION-TUBE.
 Application of Letters Patent, Filed May 4, 1915.
 Patented Oct. 21, 1916.

To all whom it may concern:
 Be it known that I, William D. Coolidge, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fusion Tubes, of which the following is a specification.

My invention relates to fusion tubes, and more especially to those operated by an incandescent filament, and is shown in the accompanying drawings, in which Fig. 1 is a side view of the tube, and Figs. 2 through 8 are various cross-sectional views of the tube at different points, illustrating internal features.

The object of my invention is to provide a fusion tube which is capable of operating at a high pressure, and which is capable of operating at a high temperature, and which is capable of operating at a high voltage, and which is capable of operating at a high current, and which is capable of operating at a high frequency, and which is capable of operating at a high power, and which is capable of operating at a high efficiency, and which is capable of operating at a high reliability, and which is capable of operating at a high safety, and which is capable of operating at a high economy, and which is capable of operating at a high simplicity, and which is capable of operating at a high durability, and which is capable of operating at a high flexibility, and which is capable of operating at a high adaptability, and which is capable of operating at a high versatility, and which is capable of operating at a high universality, and which is capable of operating at a high omniscience, and which is capable of operating at a high omnipotence, and which is capable of operating at a high omnibenevolence, and which is capable of operating at a high omniscience, and which is capable of operating at a high omnipotence, and which is capable of operating at a high omnibenevolence.

Fig. 1.





THE SPRINGFIELD SUNDAY UNION AND REPUBLICAN, SPRINGFIELD, MASS., NOVEMBER 25, 1926

Dr. William D. Coolidge and his NEW MAGIC RAY

*Producing
as Many
ELECTRONS
Every
SECOND
as a
TON of
RADIUM*

By Robert Merrill

SINCE mankind actually, created the world-war has accepted its various uses to produce these extraordinary phenomena which were once called magic and are now recognized as the fruits of science.

In the deep forest that sheltered primitive man the ancient waters lashed darkly with acids and herbs as wild they thought was necessary. In the thicket, ferns or thorned bushes of medieval Europe the alchemists sought to draw from invisible nature powers greater than the world held. In the well-lighted laboratories of the twentieth century scientists and physicists still seek, with new tools and clever, new machines



WHAT
will it do for
Humanity ?

Dr. Coolidge, assistant director of the Research Laboratory of the General Electric Company, Schenectady, recently started scientists by his cathode tube

ray there with other substances than for electrons, which may mark great changes in medicine and industry.

In all of which Dr. Coolidge and his associates truly simply say, the tube is still a laboratory development, and its commercial possibilities must remain to be determined.

NEVERTHELESS, experiments in X-ray work in the laboratory laboratory show that 500 substances have been subjected to its rays and all but five or six have been affected by them. Recently a collection of elements was kept that they might be changed from the solid to liquid state. In the picture to illustrate this article Dr. Coolidge, it is known, has been working in collaboration with a medical physicist of high standing to test on the subject the properties of his ray.

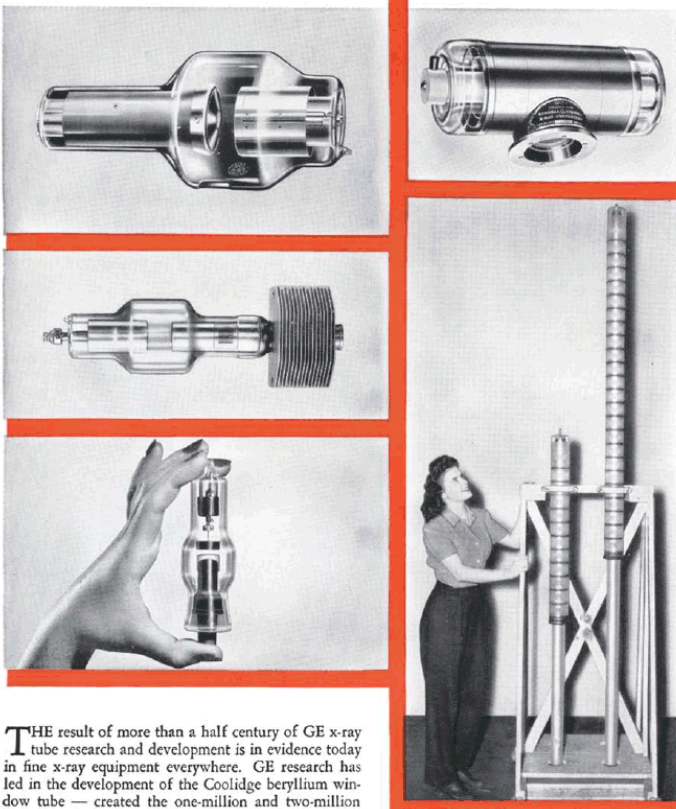
The use of the apparatus questions Dr. Coolidge has made many. The tube is smaller in size than the device to which it is attached and is a delicate machine for use in a laboratory. This he answers by saying that the ray outside the tube, more than the ray from the heated window at which the ray enters, is used to produce and few substances could be found to respond as readily to a beam of rays.

In the picture is shown the new type of vacuum tube, perfected by Dr. Coolidge, which projects the magic cathode ray, the modern equivalent that changes solids into liquids and liquids into solids. Its capabilities in the animal world have not been definitely determined, but it is known to produce marvelous changes in living tissues.

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RADIOLOGY

*In the **COOLIDGE LABORATORY**, research and vision combine to bring you the finest x-ray tubes in the world!*



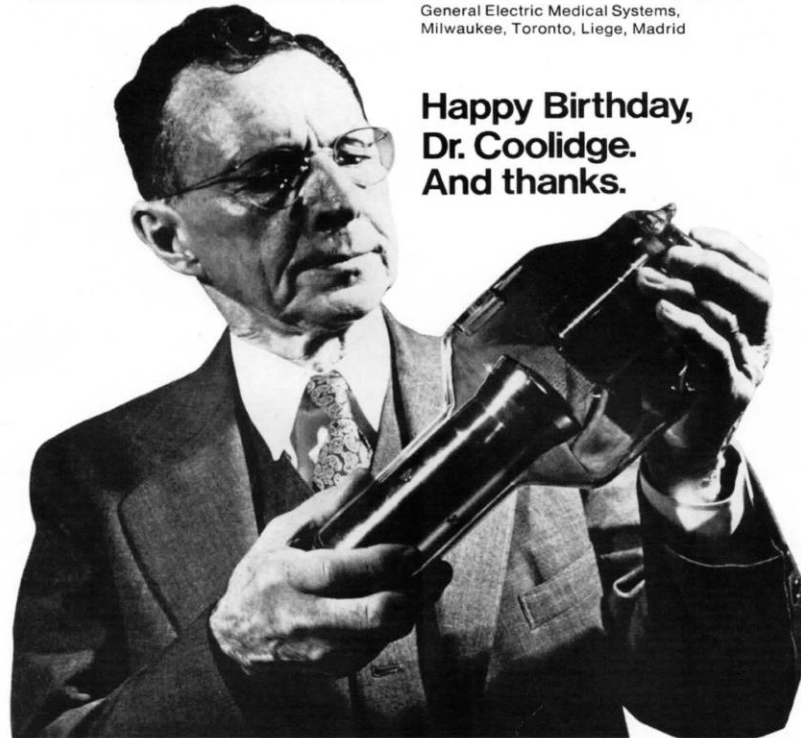
THE result of more than a half century of GE x-ray tube research and development is in evidence today in fine x-ray equipment everywhere. GE research has led in the development of the Coolidge beryllium window tube — created the one-million and two-million volt tube for roentgen therapy... a midget-size CDX tube for dental radiography, the versatile Rotating Anode tube and dozens of other tubes with performance ratings that have made them world famous. When you have an x-ray tube problem, see your local GE representative or write General Electric X-Ray Corporation, Dept. E-5 Milwaukee 14, Wisconsin.

**GENERAL  ELECTRIC
X-RAY CORPORATION**

What do you say to the man who perfected the x-ray tube, holds 83 patents, and is in his 101st year?

On October 23, Dr. William David Coolidge celebrated his 100th birthday. World scientists recognize his development of ductile tungsten which made possible the reliable economic incandescent lamp. The medical profession identifies him as the scientist who perfected the modern x-ray tube. Millions everywhere live more comfortable and healthier lives because

of his achievements, Dr. Coolidge holds 83 patents, received during 39 years with General Electric. Some 16 honorary degrees from governments and international societies, together with 8 honorary degrees from universities here and abroad attest to his scientific genius. We salute Dr. Coolidge as he enters his 101st year. A singular breed of men helping man. General Electric Medical Systems, Milwaukee, Toronto, Liege, Madrid

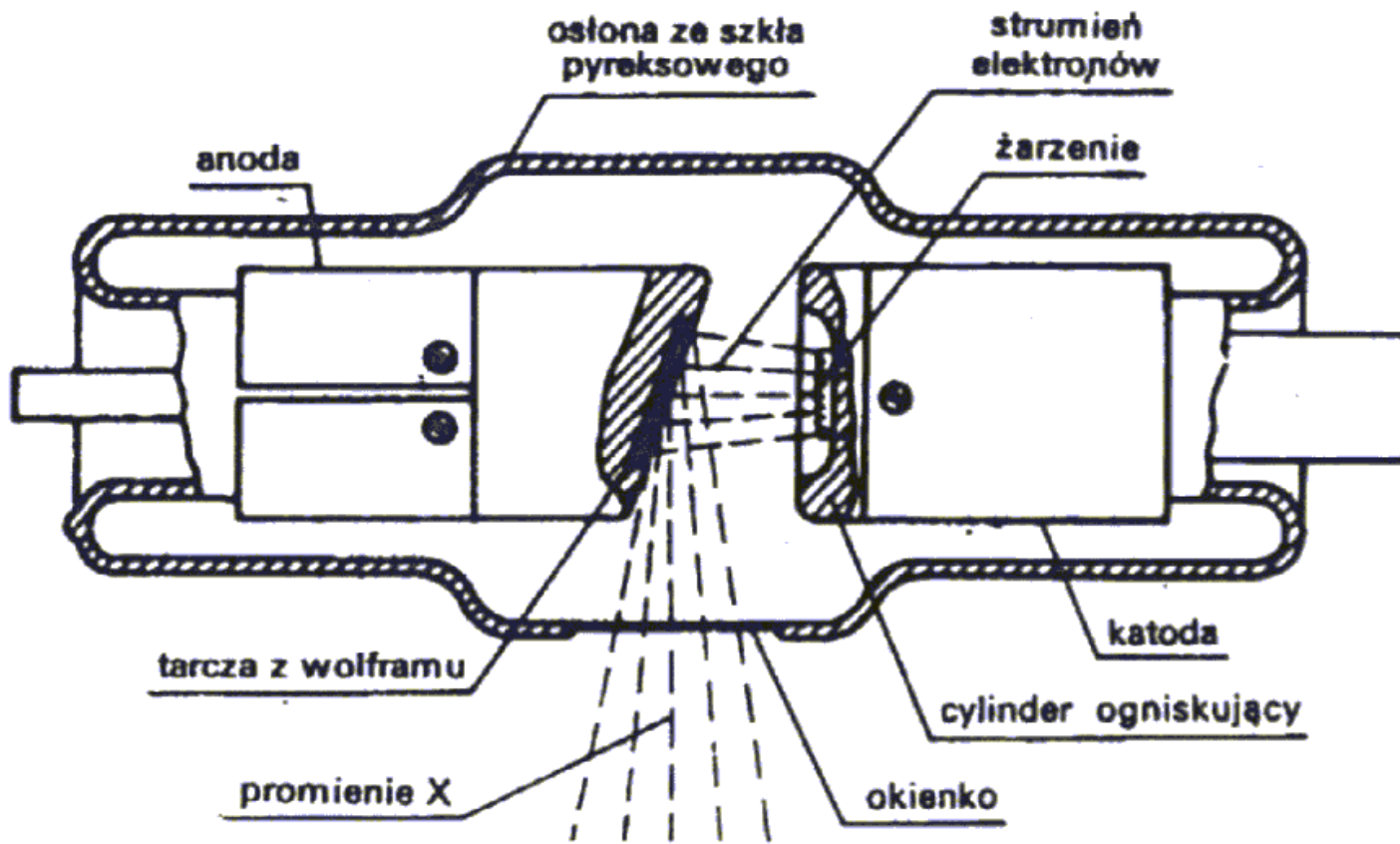


**Happy Birthday,
Dr. Coolidge.
And thanks.**

GENERAL  ELECTRIC

**Pojawienie się lampy z „gorącą katodą”
otworzyło nową erę w medycznej i przemysłowej
praktyce radiologicznej.**

**Lampa Coolidge’a stała się wielkim biznesem
dla firmy General Electric w Schenectady.**



Wczesne lampy	Współczesne lampy
wypełnione gazem	próżniowe
ciśnienie: 0,1 Pa – 005 Pa (10^{-3} – $5 \cdot 10^{-5}$ torr)	ciśnienie: $\sim 10^{-4}$ Pa ($\sim 10^{-6}$ torr)
niestabilne źródło elektronów	sterowalne źródło elektronów
jako tarczę wykorzystywano ściankę lampy	stosuje się małą metalową tarczę
brak układu do ogniskowania wiązki elektronów	układ ogniskujący wiązkę elektronów
kształt katody nie jest krytyczny	katoda w postaci żarnika
małe moce lamp – niewielka ilość wydzielanego ciepła	znaczne moce – duże ilości wydzielanego ciepła

Wykonana przez AEG dla Siemens-Reiniger-Veifa



80 cm długość, 15 cm średnica bańki, 185 kV, 4 mA

Westinghouse 2249 (lata 1930)



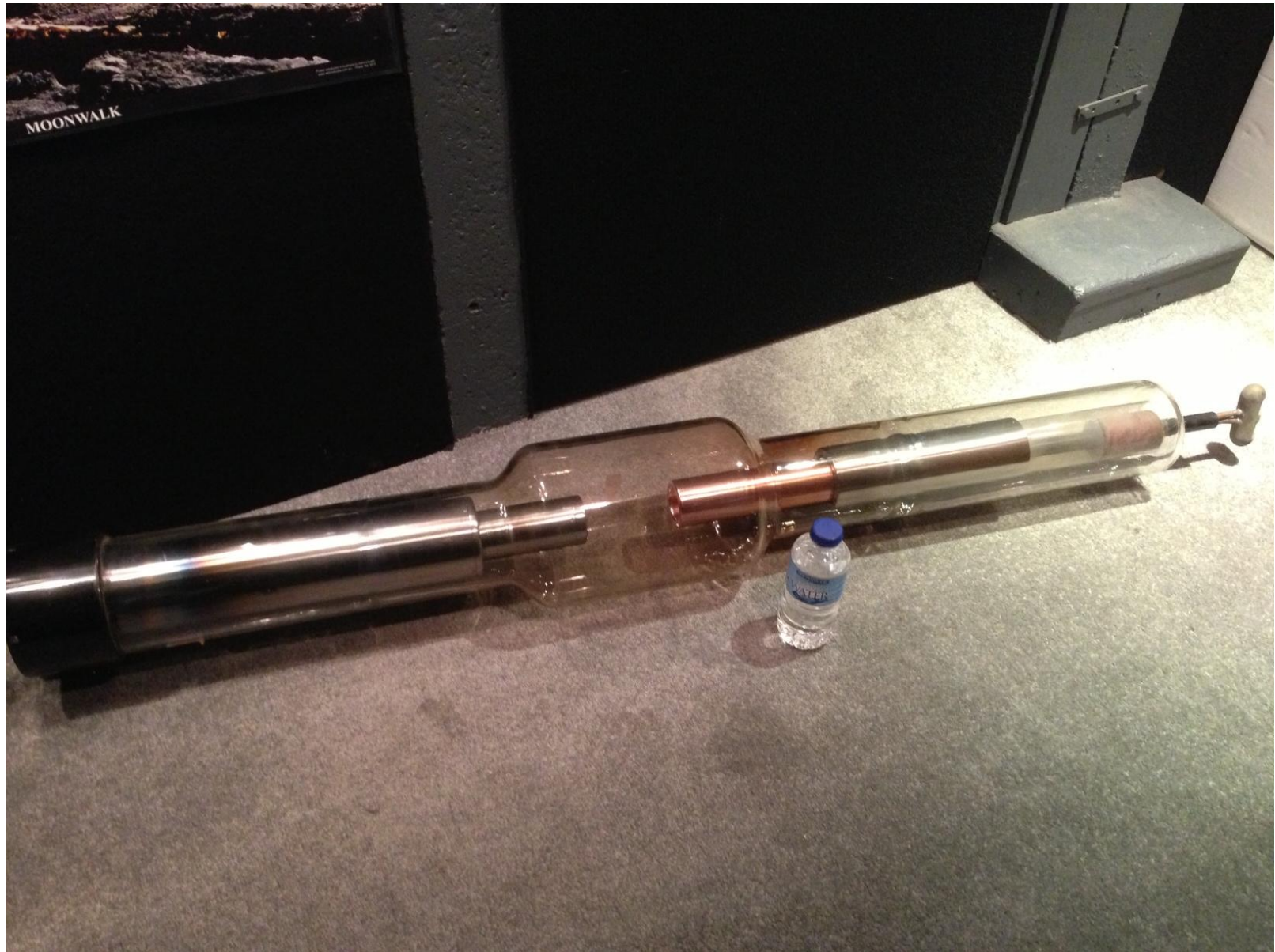
**Dr Wacław Szymański – pracownik Centrali Zaopatrzenia
Instytucji Ubezpieczeń Społecznych 1939 r.**

- *„Rentgenowska lampa rozbieralna do analizy spektralnej i strukturalnej”* - 38 098 z 1954 r., Zbigniew Bojarski (1921-2010) i Zbigniew Ziołkowski (Instytut Metalurgii Żelaza w Gliwicach),
- *„Miniaturowa lampa rentgenowska”* - 106 760 z 1980 r., Wiesław Zaraska, Antoni Starzec, Jacek Miłośz, (AGH w Krakowie),
- *„Lampa rentgenowska małej mocy”* - 118 293 z 1982 r. Jerzy Massalski, Wiesław Zaraska (AGH w Krakowie),
- *„Lampa rentgenowska małej mocy”* - 119 719 z 1983 r., Jerzy Massalski, Wiesław Zaraska (AGH w Krakowie),

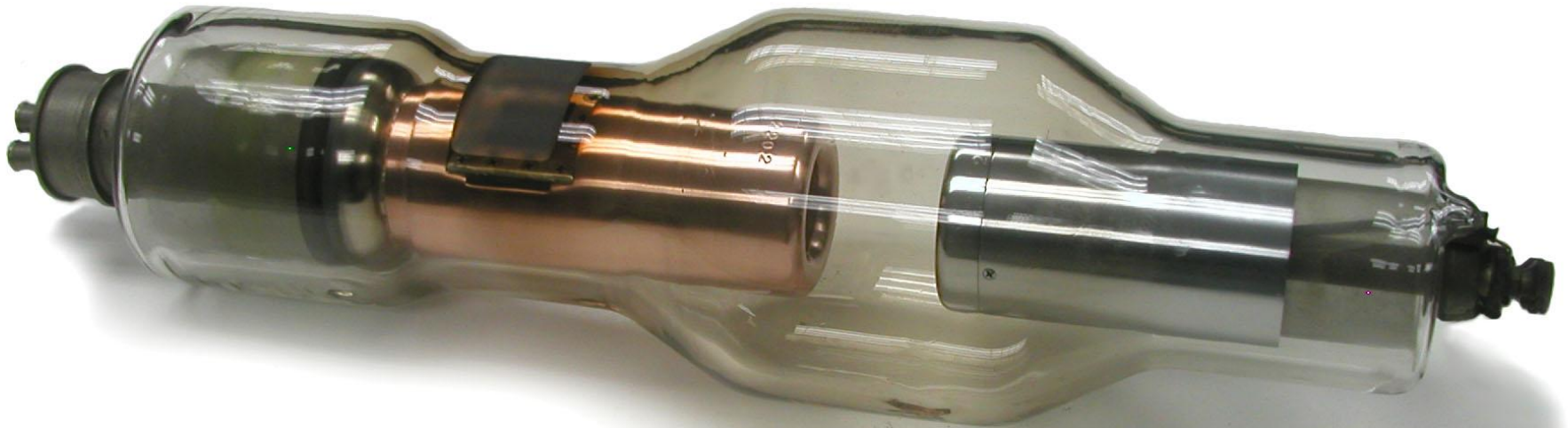


**Philips/Muller METALIX
z chłodzeniem wodnym (lata 1920, 1930)**



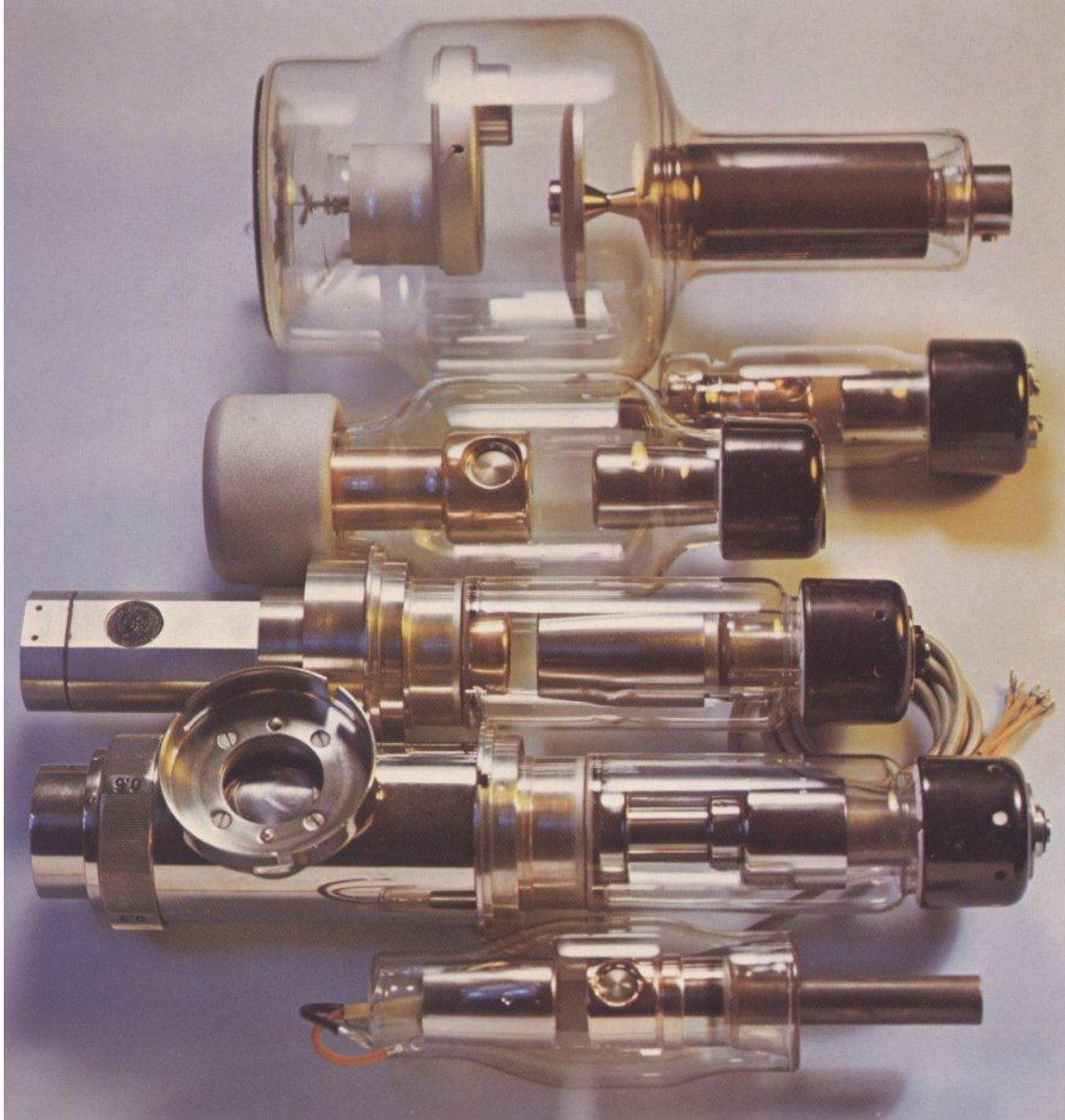


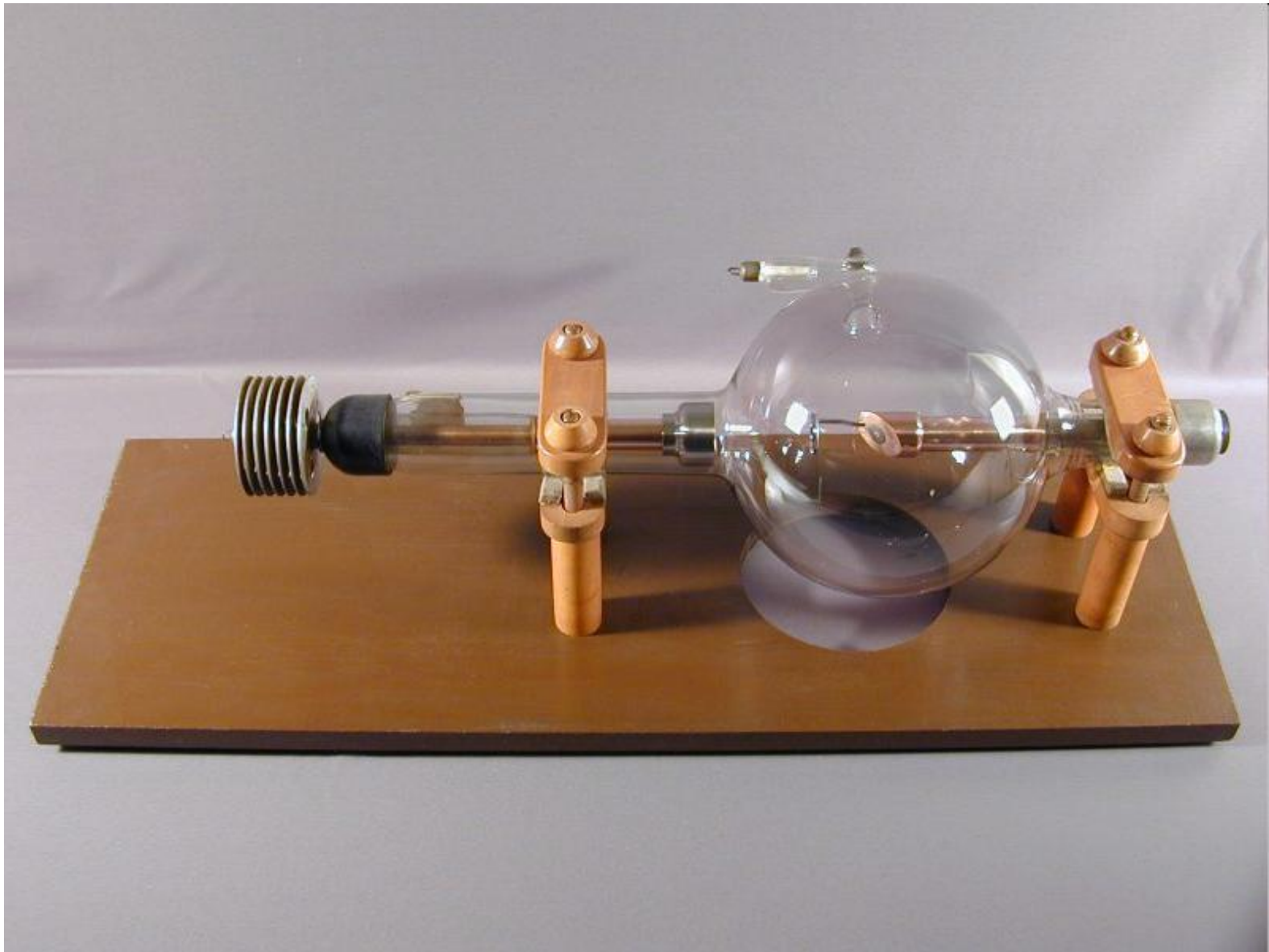
General Electric SRT-2 (lata 1950)



SR – self-rectifying, T – therapy, 250 kV, 15 mA









Patenty USA – 19 pełnych segregatorów

Dziękuję za uwagę

Zapraszam

**Muzeum Lamp Rentgenowskich
Politechnika Opolska
ul. Prószkowska 76, bud.5**

www.xraylamp.webd.pl