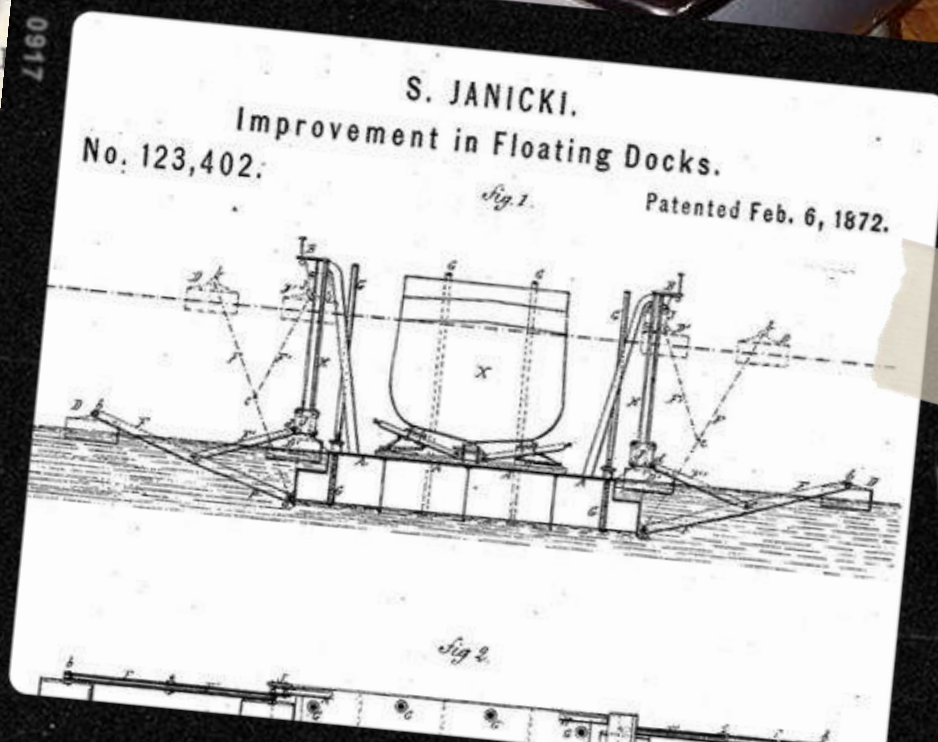
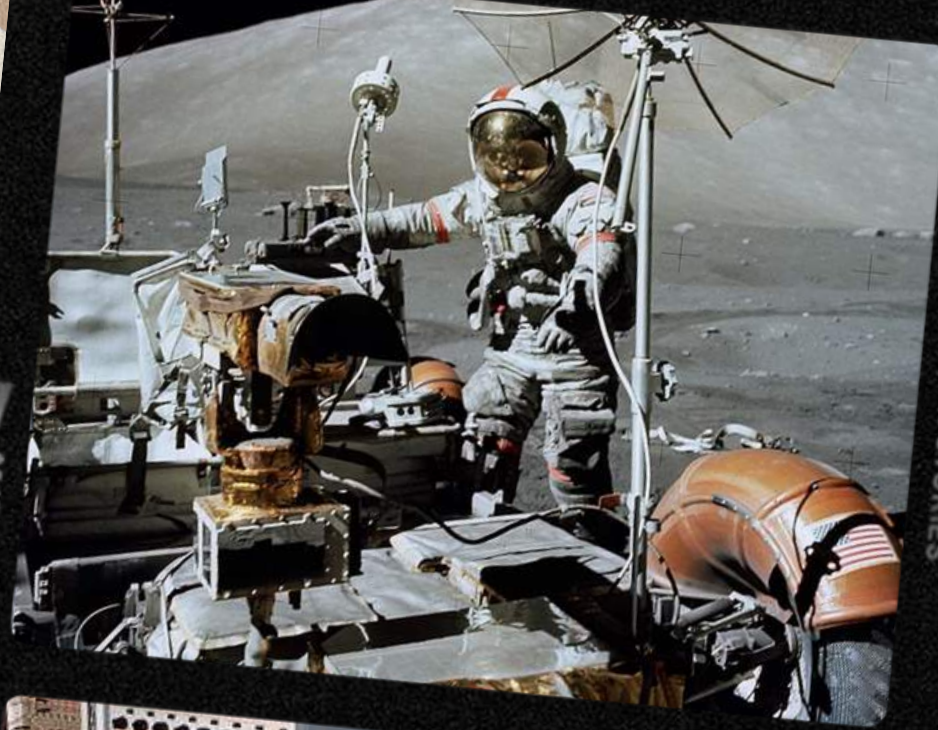


A CONCISE CHRONICLE OF POLISH INVENTIONS AND TECHNICAL IMPROVEMENTS

Inventors' Day is celebrated in numerous European countries on November 9. On this occasion, we would like to present the profiles of key Polish inventors, innovators and visionaries, and some of their inventions (selected from a large group) that conquered the world. Many of these outstanding designers unjustly sank into oblivion, lived in poverty, emigrated due to a lack of development potential (e.g. during the partitions, Stalinism), or were harassed in communist Poland.



THE RAILWAY INDUSTRY



**Jan Józef Baranowski
(1805-1888)**

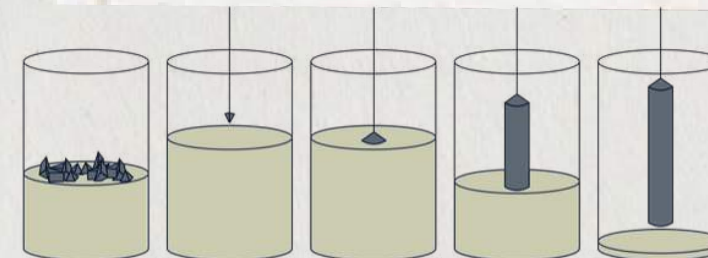
An economist, financier, polyglot, inventor, and participant of the November Uprising. In 1832, he emigrated from Poland to France and eventually Great Britain. He was the creator of various inventions such as a **gas meter**, a **manual validator for conductors** (awarded two medals at the National Exhibition in Paris in 1849), a **machine for printing and inspecting tickets** (awarded at the Universal Exhibition in London in 1851), a **semaphore**, i.e. an automatic railway signaling system, and the author of **the first English textbook for learning Polish** (The Student's Anglo-Polish Grammar, 1880).



**Jan Czochralski
(1885-1953)**

In addition to contributing to the development of processors, he patented a **tin-free bearing alloy** that was used in the production of bushings for railway bearings to increase the speed of trains. The alloy, called **metal B** in Poland, was produced by plants in Ursus and was used by railways in Germany, the USA, the USSR, Czechoslovakia, France, and England. Czochralski died forgotten in his homeland.

A chemist and metallurgist, philanthropist, inventor, and the most cited Polish scientist in the world. He developed the **Czochralski method**, i.e. a **method for measuring the rate of metal crystallization**, which is still used in the production of silicon semiconductors and single crystals, basic for the production of processors in the electronics industry. He studied and initially worked in Germany. He had German citizenship but returned to Poland in 1928 where he was harassed by the representatives of the Polish scientific community. He was also harassed by the Secret Political Police after World War II. He was stripped of his professor's title for allegedly acting to the detriment of Poland and his presumed cooperation with the Third Reich (rehabilitated in 2011).

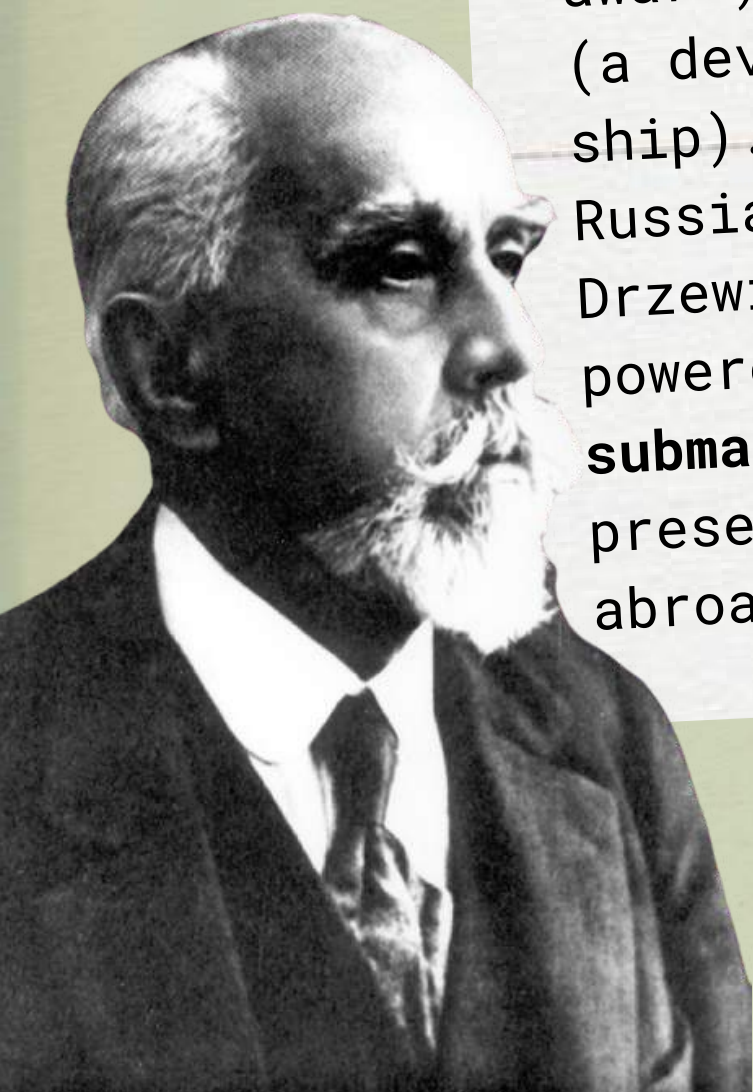


METAL SCIENCE

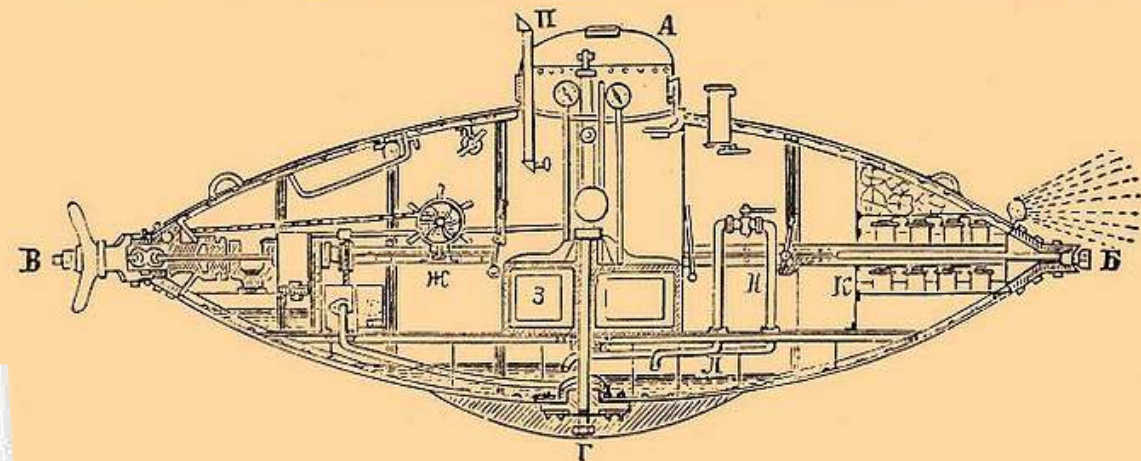
SUBMARINE NAVIGATION AND AERODYNAMICS

Stefan Drzewiecki (1844-1938)

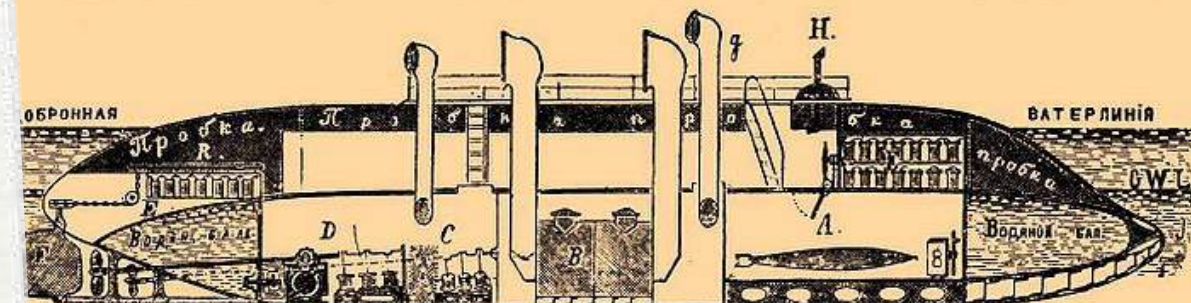
An engineer, inventor, and pioneer of submarine navigation and aviation. At the Vienna Exhibition in 1872, he presented a compass for conical sections and a regulator for steam and hydraulic engines (for which he received an award), as well as a train speed recorder and a dromograph (a device that automatically traced the course of a sailing ship). The latter invention attracted the interest of the Russian prince Konstantin and was used in the Russian Navy. Drzewiecki presented the world's first, one-man, muscle-powered submarine in 1887 and the first electricity-powered submarine in 1888. He was fascinated by aerodynamics and presented an airframe prototype model in 1909. He lived abroad and spent most of his life in France.



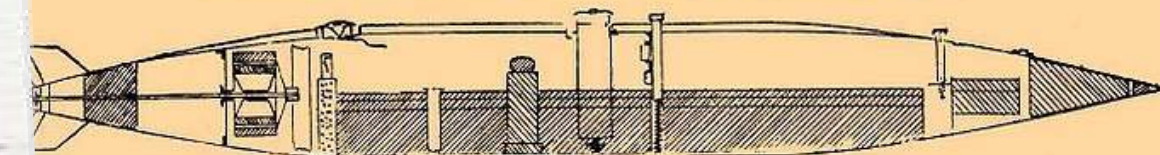
ПОДВОДНЫЕ ЛОДКИ.



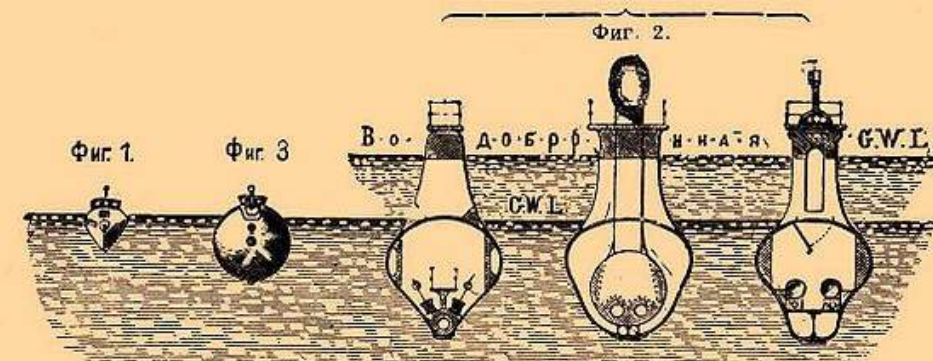
1. Подводный минный аппарат С. К. Девецкого и подводная лодка „Губа“ в Шербурге, 1887 г.



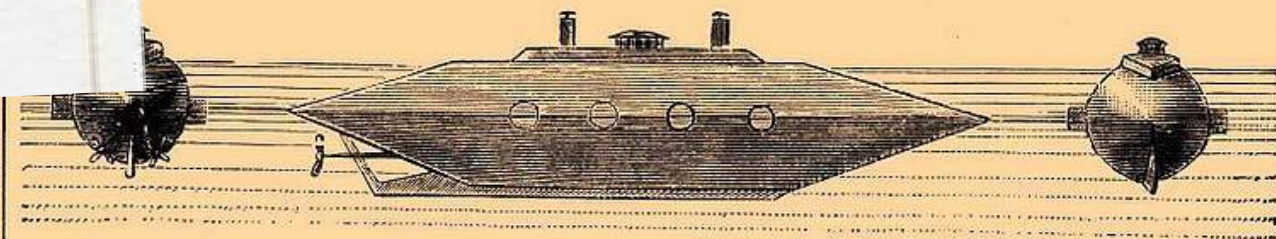
2. Подводный водобронный миноносец С. К. Девецкого, 1892 г.



3. „Жимног“ Зеде, 1889 г.

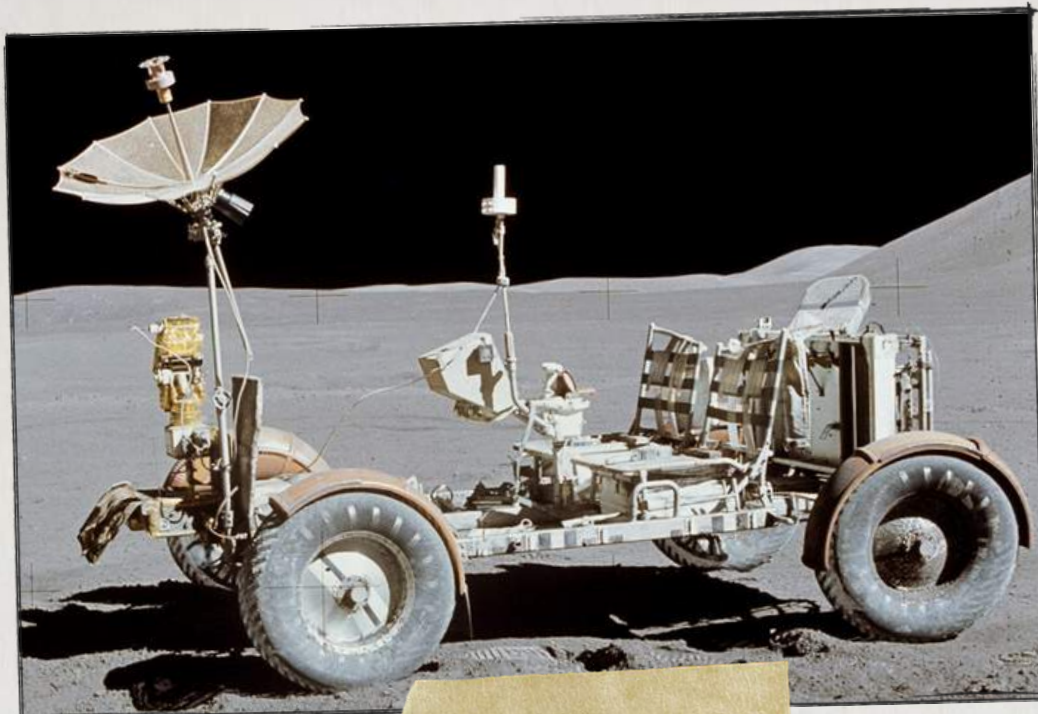


4. Сравнительная величина подводных лодок.



5. Подводная лодка Наутилус, строилась в 1887 в Вестиндских доках.

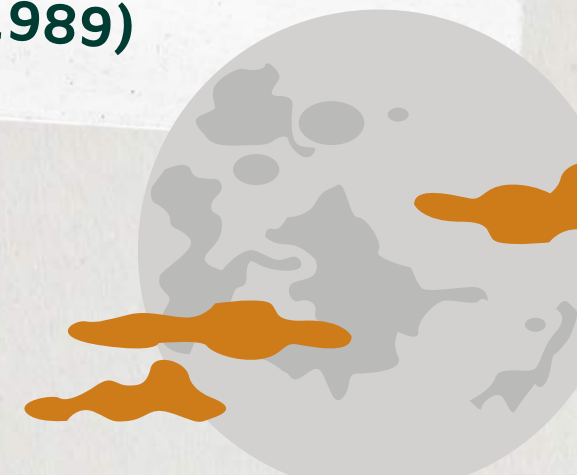
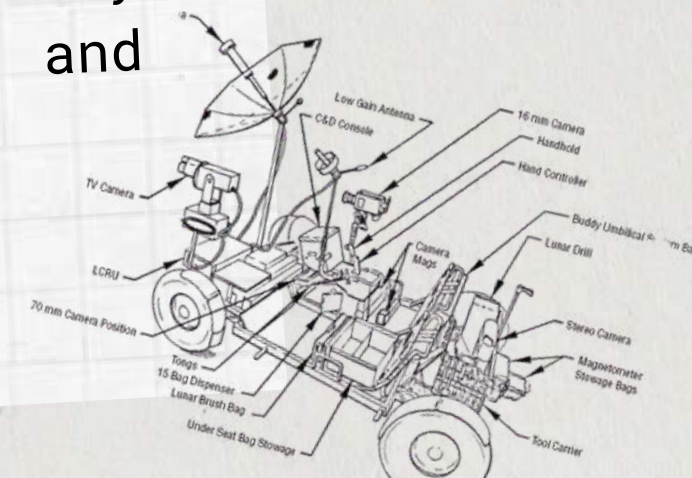
OFF-ROAD VEHICLES



An engineer specializing in off-road vehicles, known as the father of terramechanics. He served in the Polish and Canadian armies during World War II. Post-war, he lived in various European countries, and he eventually permanently immigrated to the USA in 1956. He participated in a competition organized by NASA as an employee of General Motors. He built the **Lunar Roving Vehicle** which was used in the manned missions of Apollo 15, 16, and 17. He received three honorary doctorates in Germany, Canada, and Italy.



**Mieczyslaw Bekker
(1905-1989)**

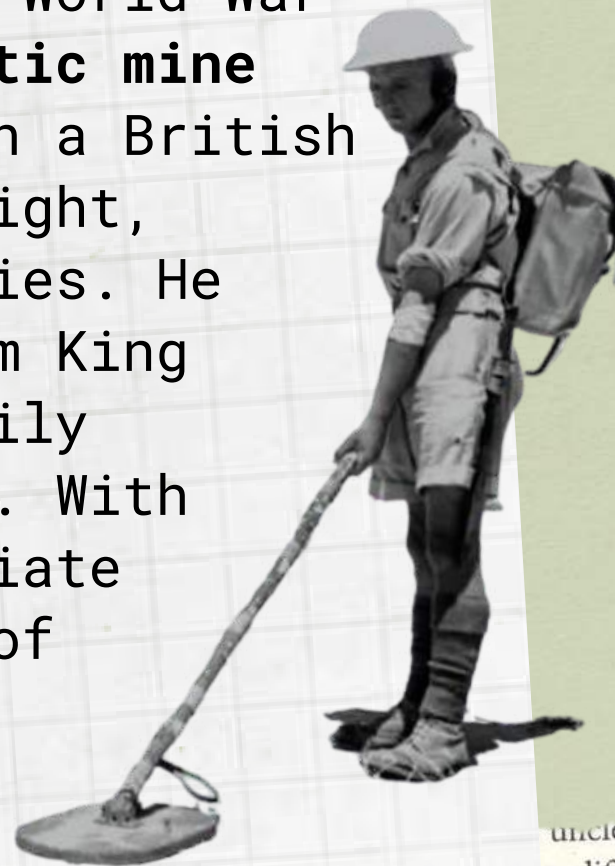


TELECOMMUNICATION



**Józef Kosacki
(1909-1990)**

An electrical engineer, the designer of advanced telecommunication systems, and a lieutenant of sappers in the Polish Armed Forces during World War II. He developed a **hand-held electromagnetic mine detector** in 1941, which won first prize in a British competition that aimed to build a lightweight, portable mine detector to support the allies. He also received a congratulatory letter from King George VI for that invention and voluntarily relinquished the patent for his invention. With time, the mine detector underwent appropriate modifications and was used by the armies of various countries until the 1990s.



Józef Hofmann (1876-1957)

A pianist with absolute ear, a composer with technical interests, a fan of the automotive industry. He lived permanently in the USA, and he patented dozens of inventions, including a **phonograph** (sound recording device), a **paper clip** (inspired by the shape of a treble clef), **car wipers** (inspired by the metronome), a **height-adjustable pianist stool**, a **spiral water heater**, a **spring bumper**, and a **pneumatic shock absorber**.

THE AUTOMOTIVE INDUSTRY AND MUSIC

ELECTRONICS AND ELECTRICAL ENGINEERING

An electrical engineer and inventor, the creator of a series of **professional Nagra tape recorders** used by radio and television reporters, as well as film studios around the world. He emigrated from Poland to Switzerland with his parents in 1939 where he studied, worked, and was buried. The winner of four awards from the American Film Academy: two scientific and technical awards of the 2nd category, which he received in 1965 and 1977, as well as two Oscars for his work in the film industry, which he received in 1978 and 1990. He was honored with an honorary doctorate by the Federal Polytechnic University of Lausanne.



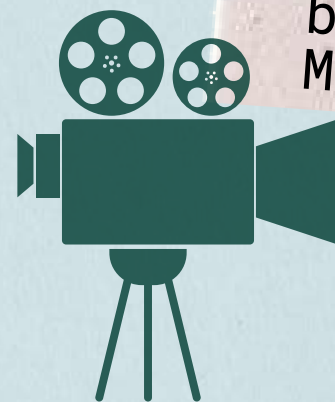
**Stefan Kudelski
(1929-2013)**



**Kazimierz Prószyński
(1875-1945)**

An entrepreneur, cinematographer, director, engineer, inventor, and pioneer of Polish cinematography.

He invented a **pleograph**, i.e. a camera for recording and playing back films (patented as early as 1884) – a more perfect version of a **biopleograph** (a film projector with good image synchronization). He also constructed a device called a **kinofon** (a system for simultaneous image and sound emission), an **obturator** (a projector shutter that removes flickering images from a screen during the broadcast of a film), an **aeroscope** (the world's first handheld automatic film camera), and a **universal expeditor** (a device for folding a series of newspapers and their addresses so that they could be delivered to subscribers). Prószyński started recording short films using the devices he constructed in 1895. The films included Ulica Franciszkańska, Ślizgawka w Łazienkach, Powrót birbanta, Przygoda dorożkarza. He died in the Mauthausen-Gusen concentration camp in 1945.



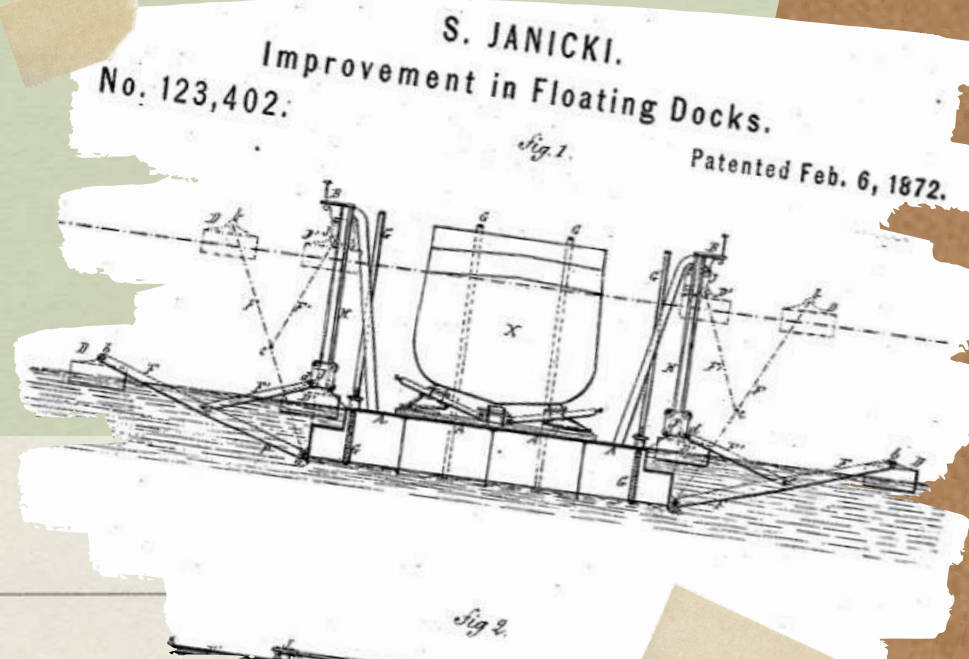
CINEMATOGRAPHY

INLAND NAVIGATION AND HYDRAULIC ENGINEERING



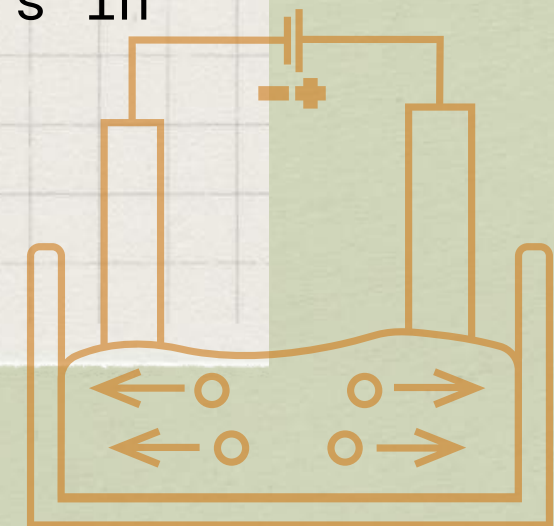
Stanisław Janicki
(1836-1888)

A civil engineer, hydrologist, designer, and inventor. He presented his concept for a **floating dock** for ship repair (patented in Great Britain and then in the USA) in 1871. The floating dock was later used in the production of ships. He designed **floodgates and river flows**. He also developed a **system for pulling barges upstream** with steel ropes placed at the bottom of a river and supervised construction work on the northern section of the Suez Canal. He was the creator of a modern **concept of river regulation** (1882), in which the degree of regulation depends on the type of soil. The usefulness of that concept was confirmed when it was put into practice.



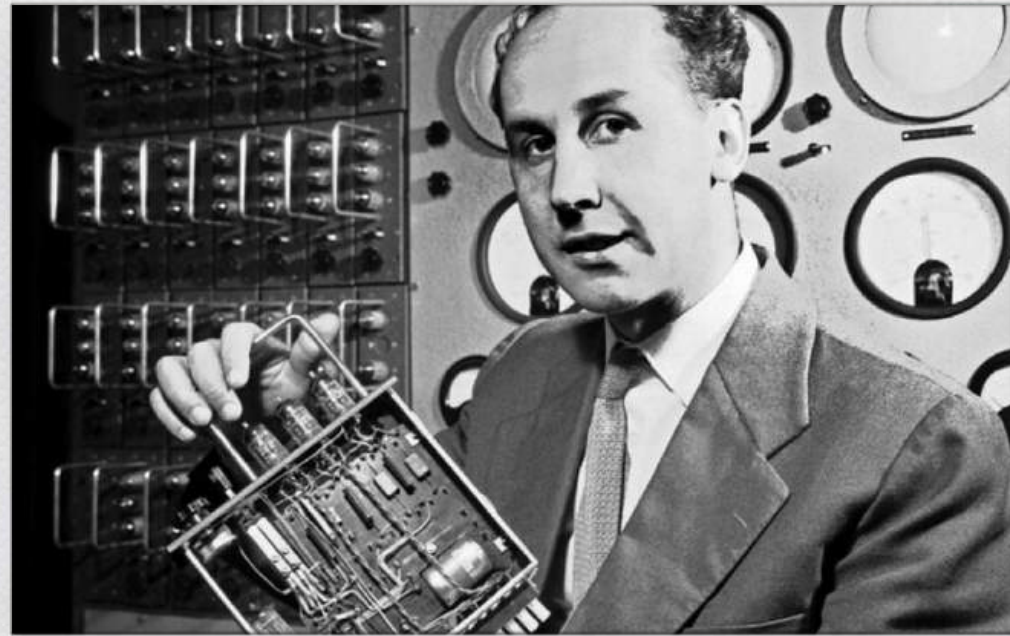
Stanisław Ignacy Łaszczyński
(1872-1939)

A chemical sciences Ph.D., industrialist, and inventor, the creator of a **method for obtaining copper and zinc using electrolysis**. The inventor of rock-breaking explosive material called **miedziankit**. He was shot in Kielce by German soldiers in 1939.



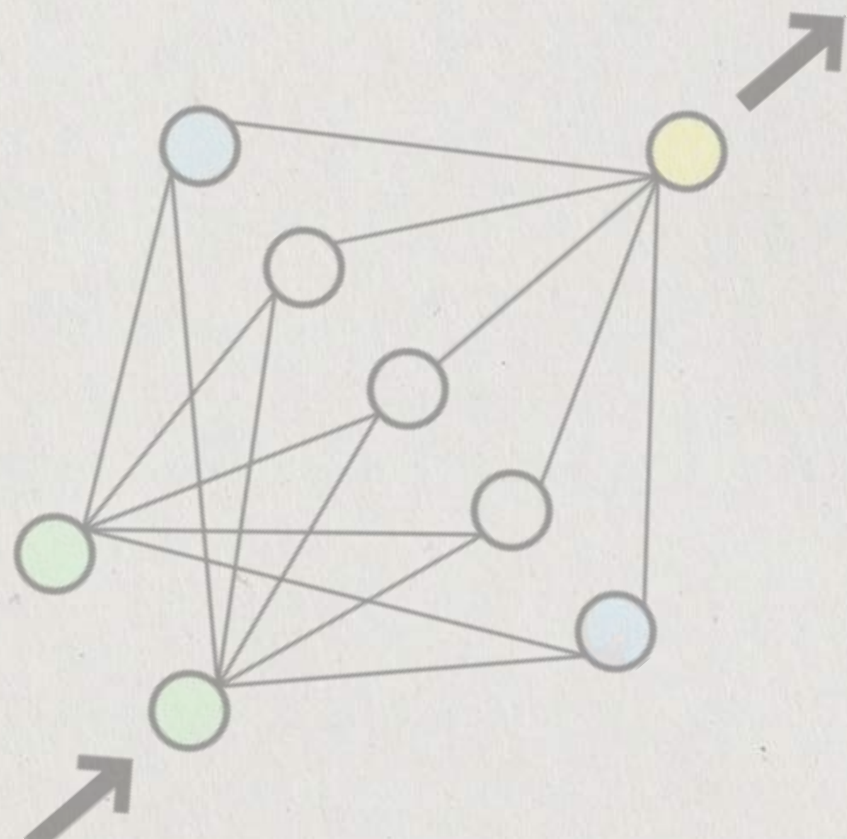
METALLURGY

ELECTRONICS AND IT



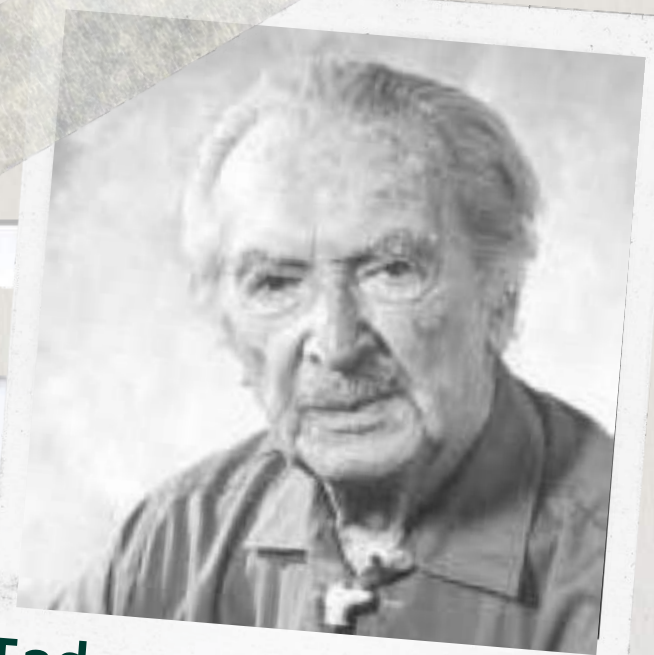
Jacek Karpiński (1927-2010)

An electronics engineer, IT scientist, and inventor. He was the constructor of the AAH machine for meteorological analyses, the world's first transistor-based differential equation analyzer AKAT-1, and the Perceptron - the first computer for analyzing external environments. The most interesting invention was the K-202 minicomputer, whose central unit, equipped with permanent and operational memory, had the size of a suitcase and could perform one million operations per second. Karpiński's computer was ahead of the American computer development by about a decade - the memory of the K-202 could theoretically be extended to 8 megabytes, while the memory of American personal computers was 64 kilobytes. Unfortunately, the development of the K-202 computer was limited by the prevailing socialist system in Poland, and the inventor himself was harassed by that system, mainly for belonging to the Home Army and participating in the Warsaw Uprising. Poland failed to make the most of this inventor's potential

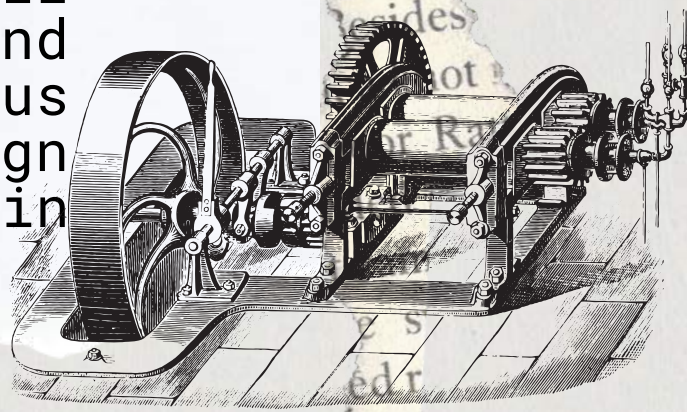


METALLURGY

A mechanical engineer, metallurgist, the creator of three technological processes: **continuous hot-dip galvanization**, **metal sheet cold-rolling**, and metal sheet hot-rolling. He was the inventor of a **planetary rolling mill** for producing thin and wide steel sheets. He built a galvanizing plant in Poland in 1933 that used the world's first technological line for the industrial-scale production of annealed and galvanized steel sheets. **The Sędzimir method protected steel against corrosion**, was relatively cheap, and not very toxic (it did not generate poisonous vapors or acid fumes). Galvanized sheets began to be used **in the production of car bodies, roofing, gutters, and window sills**. When Sędzimir was on his way to the USA, World War II broke out, so he remained in exile and died there. He was the holder of numerous medals and decorations from foreign countries for his achievements in metallurgy.



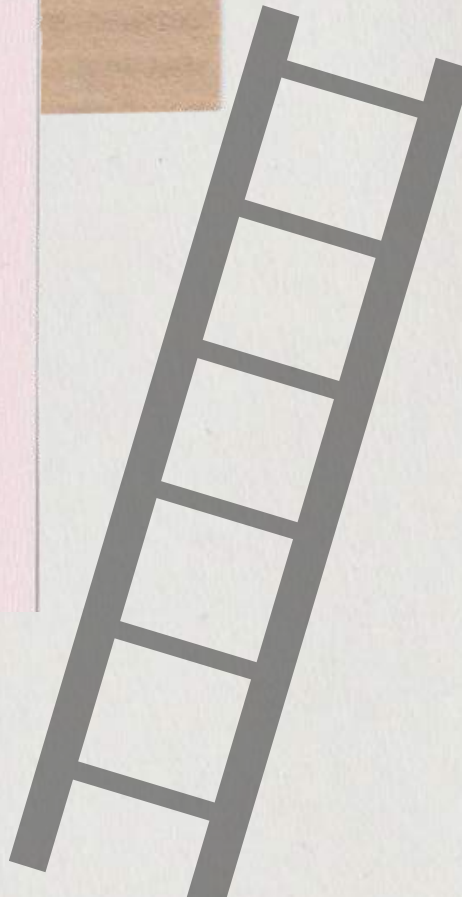
**Tadeusz Sędzimir
(1894-1989)**



Antoni Szczerbowski (1859-1912)

A teacher, editor, and a member of the Volunteer Fire Department. He constructed a **universal fire ladder** consisting of two separate, wooden spans that could be used as two shorter ladders or joined together using the steel ends at a right angle to form a long roof ladder or a pyramid with different opening angles. The invention is still used today, although it is now made of aluminum.

FIREFIGHTING

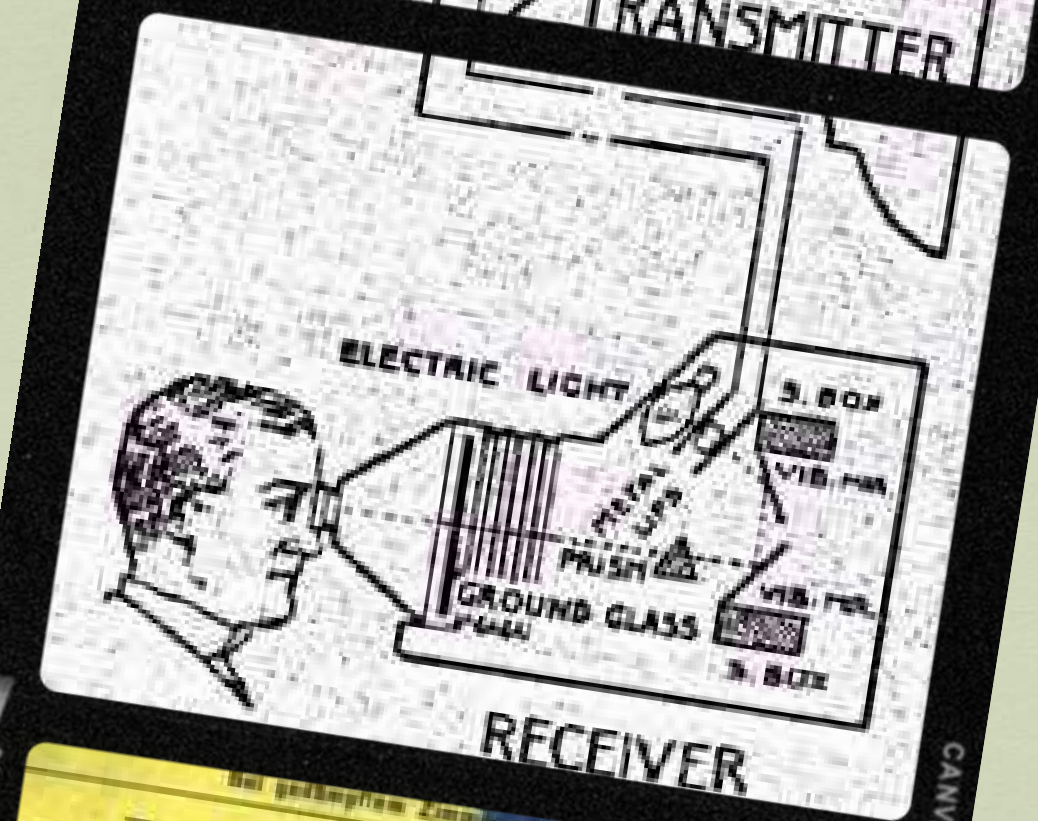
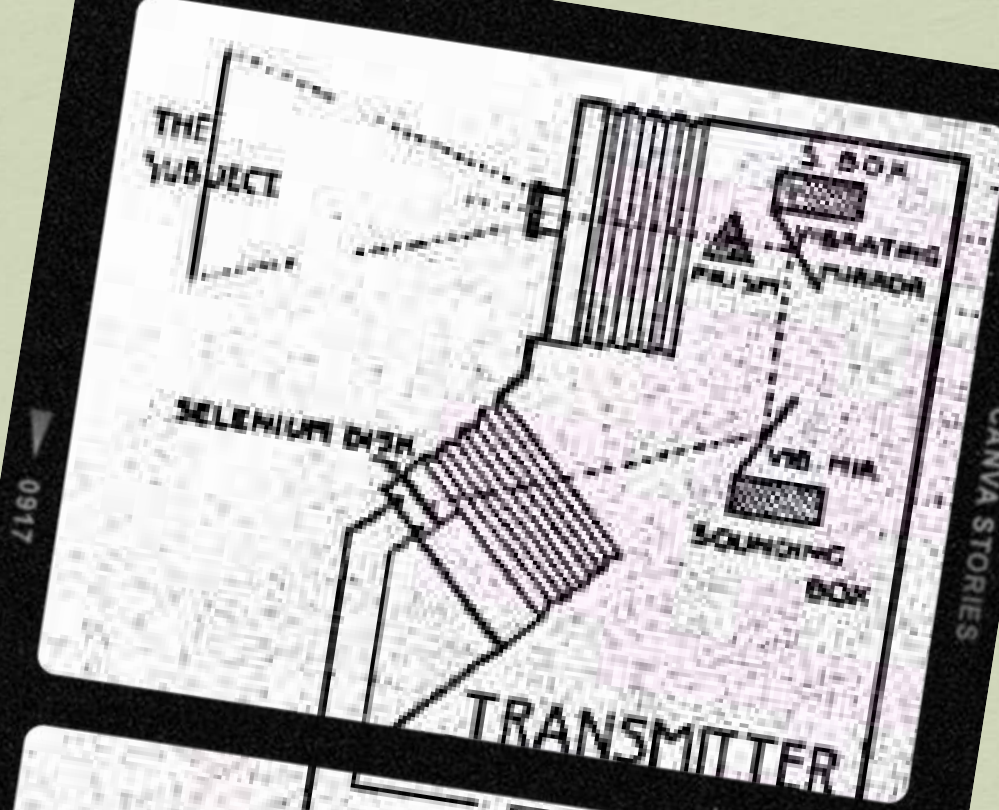
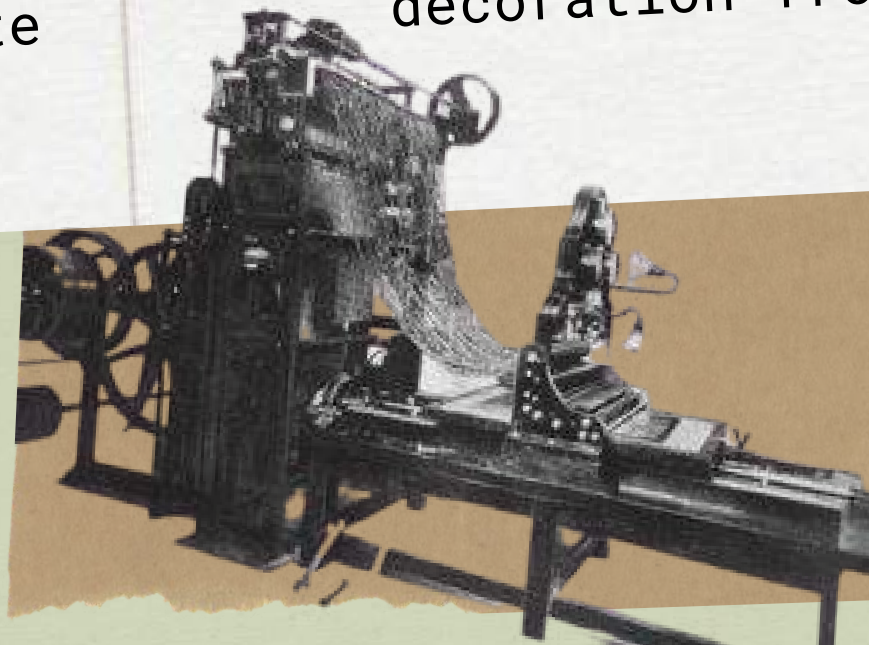
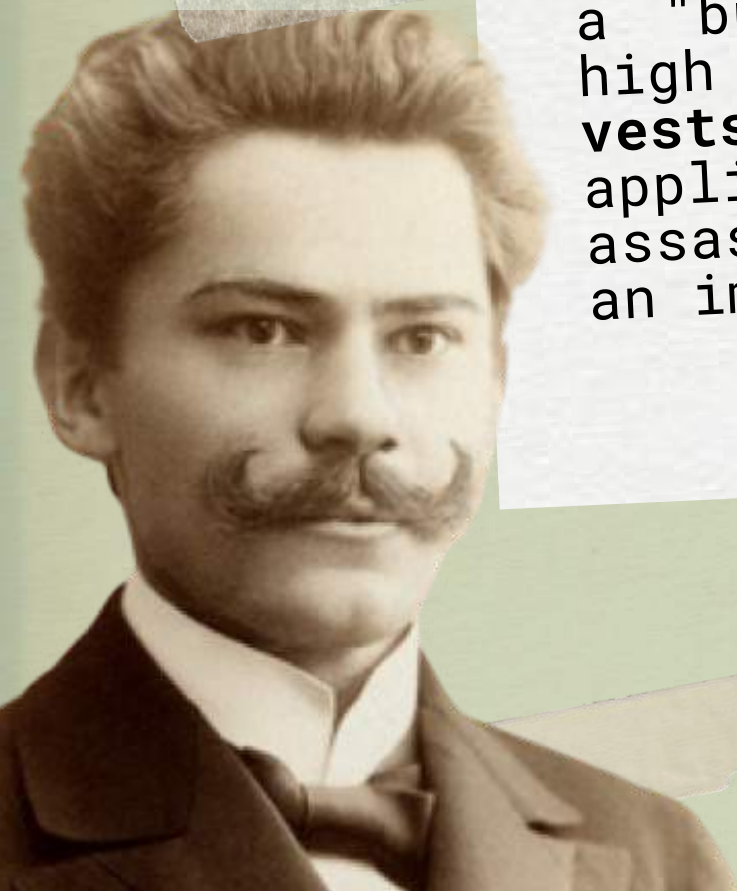


WEAVING, PHOTOGRAPHY, AND TELEVISION



Jan Szczepanik (1872-1926)

A teacher by education, and a versatile self-taught inventor that focused mainly on transferring and preserving color images. In 1897, he presented a **telectroscope** - a device for reproducing sound images at a distance via electricity (a prototype of the TV set). He was the creator of **color-sensitive photographic paper** which was improved upon by Kodak and mass-produced by the company in the 1920s. He was also the creator of the **electric method for photographic pattern copying during fabric production**. He developed a "bulletproof fabric" (silk with a dense weave and high strength) that was used to create **bulletproof vests** and coverings for carriage interiors (the latter application saved the Spanish King Alfonso XIII from an assassination attempt, for which the inventor received an important state decoration from the king).



© Jan Szczepanik
In natürlichen
Farben
kopierendes
Papier
Nach dem Ausbleichverfahren
(System...)

source of photos, page 1:

Apollo 17- Lunar Roving Vehicle and Eugene Cernan.jpg: NASA, Public domain, via Wikimedia Commons

AKAT-1.JPG: Topory, CC BY-SA 3.0 <<http://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

Janicki floating dock.jpg: Stanisław Janicki (1836-1888), Public domain, via Wikimedia Commons

source of photos, page 2:

Jan Józef Baranowski.JPG: Unknown author, Public domain, via Wikimedia Commons

Jan Józef Baranowski Automatic Railway Signals.JPG: Jan Józef Baranowski (1805-1880), Public domain, via Wikimedia Commons

Jan Czochralski.jpg: unknown-anonymous, Public domain, via Wikimedia Commons

source of photos, page 3:

Stefan Drzewiecki.jpg: Public domain, via Wikimedia Commons, <http://en.wikipedia.org>

Brockhaus and Efron Encyclopedic Dictionary b47 060-2.jpg: painter from Brockhaus and Efron Encyclopedic Dictionary, Public domain, via Wikimedia Commons

source of photos, page 4:

Apollo 15 Lunar Rover final resting place.jpg: NASA/Dave Scott, Public domain, via Wikimedia Commons

Mieczysław Bekker: <https://autokult.pl/10443,prof-mieczyslaw-bekker-polak-ktory-wyslal-samochod-na-ksiezyc>

LRV main components.jpg: Public domain

Mieczysław Bekker na poligonie General Motors, Santa Barbara, USA, 1970 r., Żr. Muzeum Politechniki Warszawskiej, <https://www.pw.edu.pl/>

Świadectwo: <http://www.muzeumpw.com.pl/gallery/normal/23a1b8769917fb8109fc2ee6b6f45ba5.jpg>

source of photos, page 5:

Józef Kosacki.jpg: unknown-anonymous, Public domain, via Wikimedia Commons

MINE DETECTOR IN NORTH AFRICA 1942.jpg: James (Sgt) No 1 Army Film & Photographic Unit, WAR OFFICE SECOND WORLD WAR OFFICIAL COLLECTION., Public domain, via Wikimedia Commons

Josef Hofman 03.jpg: Unknown (Bain News Service, publisher), Public domain, via Wikimedia Commons

source of photos, page 6:

Stefan Kudelski: <https://film.interia.pl/>

Aeroskop Prószyński dawniej i dziś.jpg: Unknown author, Public domain, via Wikimedia Commons

Kazimierz Prószyński: warszawa.naszemiasto.pl

source of photos, page 7:

Stanisław Janicki Stanisław Witkiewicz.jpg: Józef Łoskoczyński, Public domain, via Wikimedia Commons

Janicki floating dock.jpg: Stanisław Janicki (1836-1888), Public domain, via Wikimedia Commons

Stanisław Ignacy Łaszczczyński: <https://laszczynski.pl/zdjecia/laszczzynscy-linia-jozefa/#gallery-17>

source of photos, page 8:

AKAT-1.JPG: Topory, CC BY-SA 3.0 <<http://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

Jacek Karpiński: Fot. East News, wyborcza.pl

Komputer K-202 ze zbiorów Muzeum Techniki w Warszawie.jpg: Pulawysmok, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

Neuralnetwork.png: under the Creative Commons Attribution 1.0 Generic license

source of photos, page 9:

Ignacy Łukasiewicz: fot. NAC(2), archiwum(2), plus.dziennikpolski24.pl

Ignacy Łukasiewicz (coin).jpg: Creative Commons Attribution-Share Alike 4.0 International, 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic license

Antoni Patek.jpg: Public domain

source of photos, page 10:

Tadeusz Sędzimir: https://www.sendzimir.com/pdf/ts_bio.pdf

Antoni Szczerbowski: <https://www.ospkety.pl/antoni-szczerbowski-1859-1912-czyli-ratwonicstwo-pasja/>

source of photos, page 11:

Jan Szczepanik - autograph 2.jpg: Public domain

Jan Szczepanik - photographic paper.jpg: Public domain

Automatic loom with patents of Jan Szczepanik.jpg: Public domain

TTelektroskop: <https://wynalazki.andrej.edu.pl/wynalazki/36-t/1199-telektroskop>



CENTRUM
TRANSFERU TECHNOLOGII MORSKICH

Copyright@ Centre for Maritime Technology Transfer, Maritime University of Szczecin

graphic design: Dorota Ziólkiewicz
text: Dorota Chybowska
translation: MD Online