

ONCE REVOLUTIONARY, NOW TAKEN FOR GRANTED

# GREAT INVENTIONS

35 x 50'



# GREAT INVENTIONS

BRAND NEW LONG-RUNNING ENGINEERING AND  
HISTORY SERIES



Pull on your jeans, grab a take-away coffee and travel to work on the underground...  
Jeans, coffee and the underground are things we use every day without a second thought.  
Although we take them for granted, they are still amazing inventions.

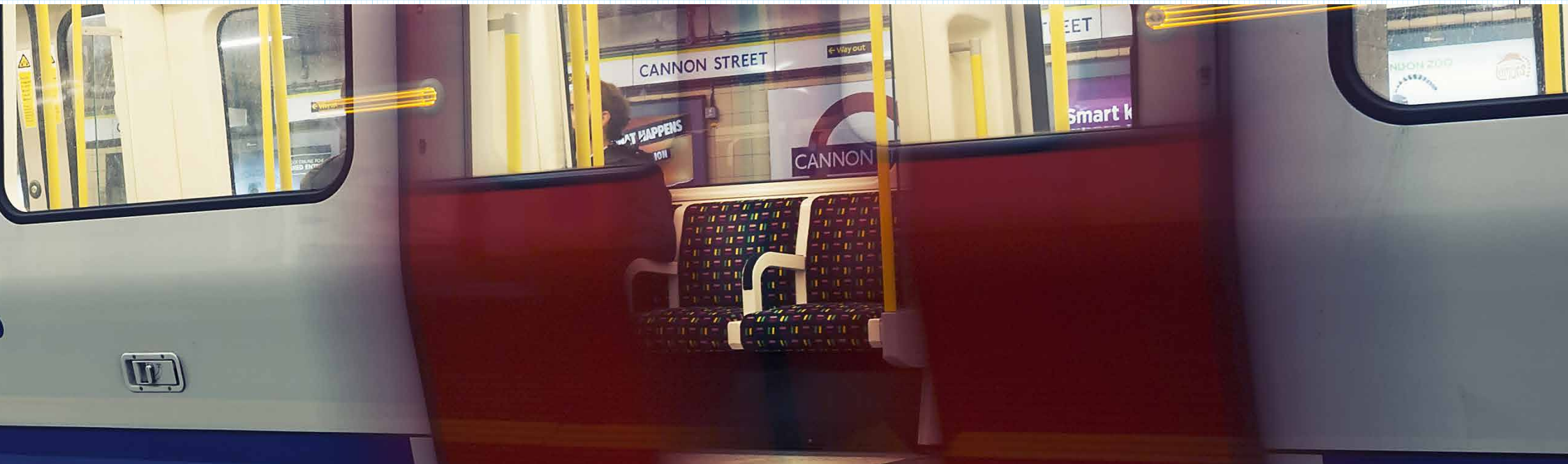
**Great Inventions**, the new long-running engineering and history series from ZDF Studios, celebrates and looks behind the scenes at everyday objects to discover their sometimes bizarre, sometimes mysterious, or even accidental, origins. Fascinating images and thrilling storytelling are combined with light-hearted touches.

The range of topics is huge – and so is the scale of the **Great Inventions** project. 35 films are being produced initially, depicting not only the technical revolution itself, but also its social significance, in a relevant and entertaining way. We start the day with amazing inventions and end it with them too: video games, a cold beer and condoms are also featured because they too are **Great Inventions**.



## HISTORY AND KNOWLEDGE IN CAPTIVATING IMAGES – WILL SLOT PERFECTLY INTO THE SCHEDULE

3



## FORMAT

**Great Inventions** – the range of topics is virtually infinite, but every episode has a consistent look with a clear structure.

Each programme celebrates the eureka moment of the invention, shows the world before and after, and offers a glimpse into the future. Graphics are used to explain the technology, while international experts unravel the social significance and look at the inventions from the perspective of their own specialist fields – such as physics, medicine, psychology or history. Unique archive footage and exciting shots provide a wealth of fascinating images and a fresh look at the science.

The programme is woven together by storytelling that follows the rules of drama and entertainment. Stories are not told in a purely chronological way. Every scene leads into the next one and draws our attention to something new (introduces a new range of topics). Thus, the familiar fatigue effect of documentaries is avoided, enabling a wider audience to be addressed and keeping them “engaged” until the end.

# TOPICS

## EPISODES 1 - 6



Name:

### SUBWAY SYSTEMS

No. **01**

Produced by World Media Rights

Initially ridiculed, underground railways are now a success around the world. The era of underground passenger transport began more than 150 years ago in London with steam locomotives. The smoke was even “sold” as a cure by the operators. The tunnel network was gradually expanded using the shield tunnelling method and electric trains replaced the steam locomotives. **Great Inventions** ventures underground around the world, watches giant drills cut their way through the earth and takes a look into the future of the subway.



Name:

### SUSPENSION BRIDGES

No. **02**

Produced by World Media Rights

Bridges are symbolic of all sorts of interpersonal and other connections. But they are also the physical connection between land masses, connecting different parts of a city, people and continents. Sometimes delicate in appearance, sometimes mighty, they are structures that have to meet the most stringent requirements. **Great Inventions** takes a journey through their history, from the simple plank over a stream to the suspension bridge that is over a kilometre long, and explains what aircraft have to do with bridges and how the tensile forces are kept under control.



Name:

### SUPERMARKETS

No. **03**

Produced by World Media Rights

Meat from the butcher, bread from the bakery, vegetables from the greengrocer - fresh food, personal service, but very time-consuming. This is what shopping looked like until the birth of the supermarket. After some initial difficulties, the new shopping experience got an unexpected boost due to the Great Depression of the 1930s. Today, supermarkets are an indispensable part of our daily lives. **Great Inventions** explores the link between the history of the supermarket and that of the car and highlights other inventions that have made large shops big business.



Name:

## FLUSHING TOILETS AND SEWERS

No. **04**

Produced by World Media Rights

We can now enjoy music, a heated seat and even a perfectly targeted spray jet while spending a penny. The history of the toilet goes back a long way and even the ancient Romans built latrines. But a special place to answer the call of nature is not enough. The result also has to be transported away. **Great Inventions** follows the path of this bodily waste through the sewage system to the treatment plant and beyond - and explains why the concentration of drugs in our rivers is increasing.



Name:

## CARS

No. **05**

Produced by World Media Rights

No roof, only three wheels and rather uncomfortable - that's how you could describe the first petrol-driven car. Developed in 1885-86 by the German Karl Benz, it was far too expensive for most people. The American Henry Ford changed all that a few decades later. He revolutionised the production process and made cars affordable for almost anyone, with his Model T. Few inventions have had such a profound effect on the world as the car. **Great Inventions** celebrates this unique invention and looks into the future of mobility.



Name:

## TELEVISION

No. **06**

Produced by World Media Rights

TV is a medium that stimulates the imagination, arouses curiosity, promotes education and allows millions of people to participate in major events. Three men were involved in the invention, a farm boy who produced an electronic image, Charles Jenkins from San Francisco who used moving silhouette images and the Scottish inventor John Logie Baird, known by historians as the father of modern television. **Great Inventions** brings the story of television to life with spectacular images such as the moon landing in people's living rooms.



# TOPICS

## EPISODES 7 - 12



Name:

### THE X-RAY

No. **07**

Produced by World Media Rights

"I have seen my death." These were the words of a woman when she saw an image of her hand. The woman was Anna Röntgen and the image was the first X-ray of a part of the human body. It was made by her husband, the German physics professor Wilhelm Röntgen. He had previously invented the X-ray while experimenting with so-called Crookes tubes. **Great Inventions** charts this revolutionary technology, including bizarre images of X-ray equipment in shoe shops, the importance of electron beams in medicine and their connection with space.



Name:

### SATELLITES

No. **08**

Produced by World Media Rights

Sputnik, the first artificial satellite, was launched into space on a rocket by the Soviet Union in 1957. A year later, the USA followed suit with Explorer. Today there are more than 2,000 satellites in orbit around the Earth, used mainly for telephony, television, radio and digital data transmission. A large number are also used for geoscientific research and meteorology. **Great Inventions** explains the technology without which modern communication and many of the amenities we now take for granted would not be possible.



Name:

### THE JET ENGINE

No. **09**

Produced by World Media Rights

How do you manage to generate the thrust necessary to keep a plane in the air without one of the engines exploding due to the amount of heat generated? The solution was to use ten combustion chambers instead of just one big one. This was the idea of Sir Frank Whittle, inventor of the jet engine. Initially used by the military in jet fighters, after World War II jet aircraft enabled millions of people to travel the world. **Great Inventions** takes a very special flight through the history of aviation.



Name:

## COMPUTER GAMES

No. 10

Produced by World Media Rights

They stare at the screen spellbound, move their fingers around the keyboard at lightning speed, communicate worldwide via a headset, and move around and fire with unerring accuracy using a joystick. They are gamers. It is a world where teenage programmers are as rich as rock stars, professional gamers become icons and fill huge stadiums around the world, and people play for nights on end to advance to the next level. **Great Inventions** takes viewers into the world of Marios and monitors, conventions and consoles.



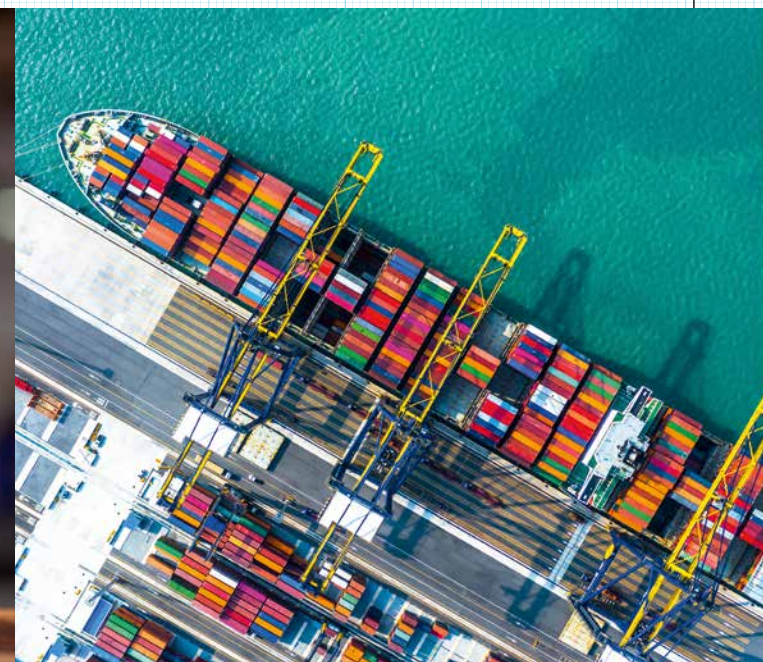
Name:

## WINE

No. 11

Produced by doc.station

It is one of humanity's oldest cultural assets. With the help of special wine-growing methods, a series of biochemical maturation processes occur during storage. Sometimes it takes decades before it is really good. We are talking about wine. Viticulture was practised in the Near East as early as 6000 years BC. Viticulture is thought to have originated in Georgia and what is now Armenia. **Great Inventions** examines the art of wine-making, the culture of wine appreciation and the importance of the drink in medicine.



Name:

## HARBOURS

No. 12

Produced by doc.station

Larger, deeper, automated and green. To compete in the world of global trade, it is necessary to constantly adapt. Every year, container ships are getting bigger, requiring ports with greater channel depths. When completely new ports are built, as for example in Shanghai, they are located far from the coast. At the largest ports around the world, loading and transport processes are almost fully automated. **Great Inventions** looks at the history of ports and examines the latest developments, such as so-called green ports.



# TOPICS

EPISODES 13 - 18



Name:

## CONDOMS

No. **13**

Produced by doc.station

The first condoms were made from the air bladders of fish by Greeks on the island of Crete some 2000 years BC. Later, during the Middle Ages, for a long time the ends of sheep's appendices were used for protection. Casanova is the most famous person to have used small linen bags. But it was only when Charles Goodyear invented vulcanisation that condoms really caught on. **Great Inventions** looks at an innovation with far-reaching implications for society, provoking scandal on the one hand and offering freedom and protection from diseases on the other.



Name:

## BREAD

No. **14**

Produced by doc.station

Two inventions have changed bread-making significantly: ovens and the action of yeasts. If you leave unbaked bread dough to stand, yeasts in the air cause fermentation: from thin doughs comes a kind of fermented drink, while thicker ones form a yeast dough that can be baked into light, tasty bread. **Great Inventions** goes on the trail of a staple food that is indispensable in Europe and North America, is around forty thousand years old and originates from northern Iraq, southern Italy and Israel.



Name:

## AGRICULTURE

No. **15**

Produced by doc.station

In the grain field, the vineyard, in salad cultivation and in animal stalls, agriculture is increasingly making use of robots, drones and other automated processes. The digitisation of agriculture is seen by many as the solution to all its problems. The intention is not only to make it more productive and cheaper, but also more sustainable. Smart farming will generate large amounts of data. But who does it belong to and who is allowed to use it? **Great Inventions** provides the answers to these and other questions.





Name:

## CRIMINALISTICS

No. **16**

Produced by doc.station

How did the crime happen? Who was the perpetrator? Who is the victim? Investigators collect evidence at the scene. Every little detail can be important. Modern investigation techniques such as DNA analysis and laser and computer tomography are now used to convict perpetrators. And with increasingly sophisticated methods, the police have now taken the hunt for criminals to the next level. New technologies even allow cold cases to be solved. But it has been a long road to get to this point. **Great Inventions** explores the hunt for criminals yesterday and today.



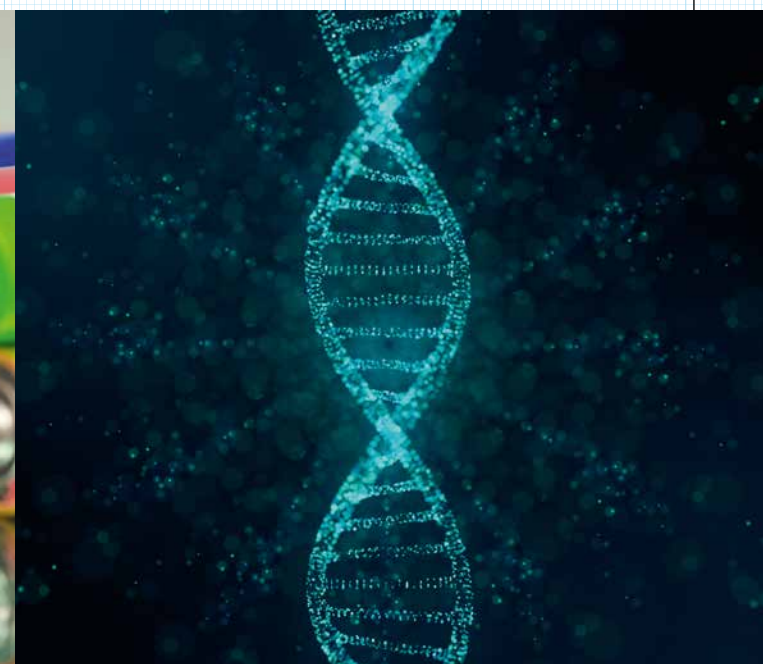
Name:

## BATTERIES

No. **17**

Produced by doc.station

The first battery was the “voltaic pile”, invented by Alessandro Volta in 1800. In subsequent years, the technology was constantly developed and improved. Since then, chemists have tested every imaginable material in the search for a new type of battery. Lithium-ion, sulphur, sodium-ion and lithium-air batteries, the research keeps moving forward. The search for alternative power is breathing new life into batteries. **Great Inventions** navigates the energy storage jungle.



Name:

## GENETIC ENGINEERING

No. **18**

Produced by doc.station

During a period of about 150 years, the discoveries of pea experimenter Mendel led to a completely deciphered genetic code, gene shears made it possible to rewrite our genome and the first designer babies were born in China. Since then, the science has passed some unbelievable milestones and now has a new tool: CRISPR – scissors combined with a navigation device that make it possible to modify the genome of plants, animals and humans. **Great inventions** looks through the microscope.

# TOPICS

EPISODES 19 - 24



Name:

**TINS**

No. **19**

Produced by doc.station



Name:

**BEER**

No. **20**

Produced by doc.station



Name:

**BICYCLES**

No. **21**

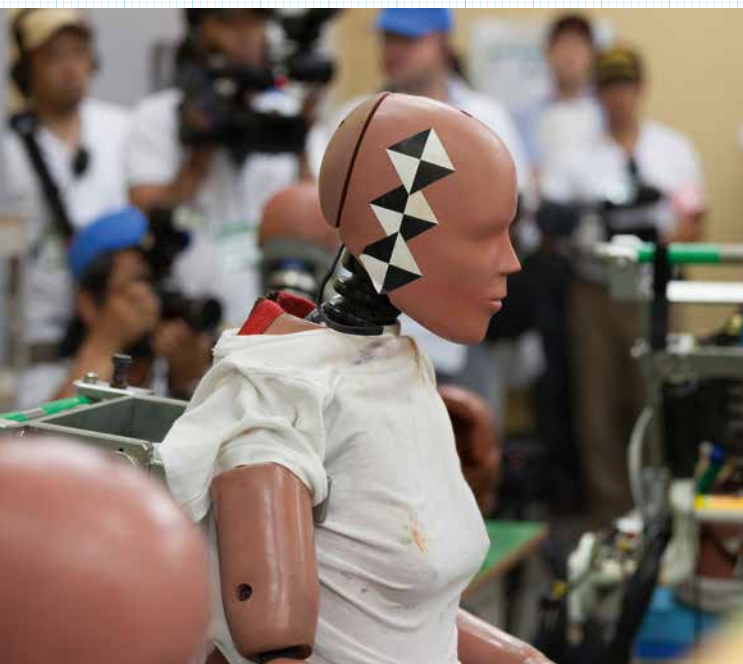
Produced by Off the Fence

Non-perishable foods have significantly changed the way we eat. The canning processes means that we now have access to almost every type of food at all times. The development of the food industry and the production of processed foods on a large scale were only possible thanks to modern preservation methods. But now, with modern cold chains, special storage rooms, shock freezing, freeze drying and vacuum packaging, **Great Inventions** asks the question - has the classic tin can become obsolete?

The first beer was brewed around 13,000 years ago - in Israel, not in England. Or maybe by German monks? What makes a good beer? What role does the choice of hop variety and yeast play? How do modern craft beers differ from mass-produced beers? And does the German purity law actually result in "pure beers" - or how many chemicals do they contain? Why are gas chromatography and modern sequencing methods used? There are lots of questions about hops, malt and water. **Great Inventions** provides the answers.

The first moments of success in early childhood, the first feeling of independence, the first rush of speed - what gives us these things? The bicycle. We have been propelling ourselves on two wheels for about 200 years. Initially invented as a wooden running machine by Karl von Drais, it later gained pedals and, thanks to Dunlop, became much more comfortable with the addition of pneumatic tyres. But for **Great Inventions**, the bicycle is more than a means of transportation. It is also associated with emancipation, environmental awareness and lifestyle.





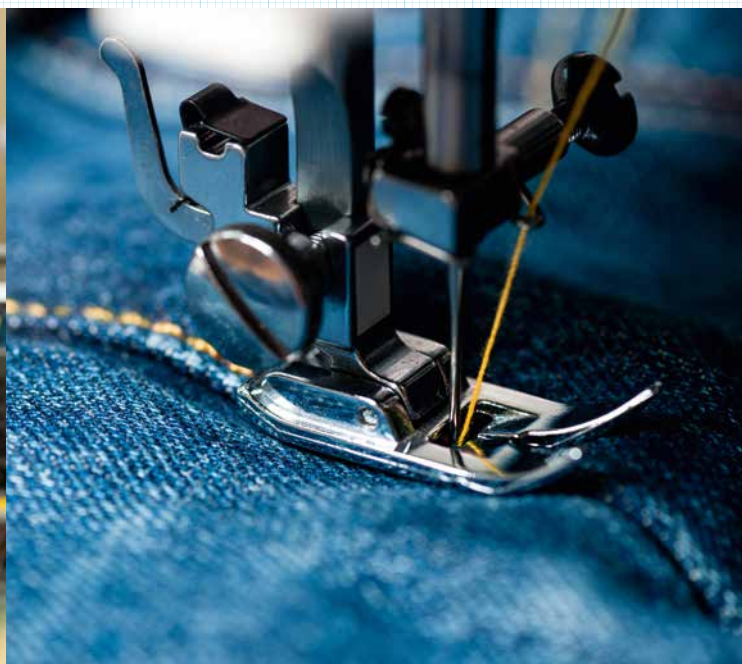
Name:

## CRASH TEST DUMMIES

No. **22**

Produced by Off the Fence

Crash test dummies have just one purpose - to save countless lives every year. Thanks to them, we have safety belts, air bags and crumple zones. Crash tests were initially carried out on real people, animals or animal carcasses. Nowadays, the dummies are packed with technology and cost up to one million US dollars. **Great Inventions** looks back at the early testing using humans and pigs and shows how much high-tech equipment is needed to make our lives safer.



Name:

## JEANS

No. **23**

Produced by Off the Fence

What does the legendary gold rush in California have to do with studs on denim trousers? The first target market for jeans manufacturers were the gold prospectors. As they always put their finds directly into the pockets of their work clothes, these soon tore and needed strengthening. There are many stories like this in the history of jeans. But where does the name jeans come from, and the word denim - and what role does a German chemical company play in jeans fashion? **Great Inventions** provides the answers.



Name:

## COFFEE

No. **24**

Produced by Off the Fence

Coffee was born in Ethiopia when a shepherd noticed his goats jumping around wildly after eating coffee berries. Or so the story goes. What is certain is that the word coffee comes from Kaffa, a region in Ethiopia. The leaves and dried berries were initially infused in hot water in a similar way to tea. It was only later, when coffee reached the Ottoman Empire, that it was prepared in a way we would recognise today. **Great Inventions** explores all aspects of coffee growing and appreciation.



# TOPICS

EPISODES 25 - 30



Name:

## ROLLERCOASTERS

No. **25**

Produced by Off the Fence

Rapid descents and spectacular loops are what make rollercoaster rides so thrilling and give you that queasy feeling in your stomach. Their origins can be traced back to 16th century Russia. Today, they are bigger, more daring, and faster than ever - the Formula Rossa rollercoaster in Abu Dhabi holds the world record of 240 km/h, reaching this speed in just 4 seconds. **Great Inventions** treats viewers to an on-screen test drive with spectacular images.



Name:

## INDUSTRIAL ROBOTS

No. **26**

Produced by Off the Fence

Universally applicable, with several axes and equipped with grippers or tools - automated machines that can be programmed to move according to any sequence, path or angle. These are excerpts from the definition of an industrial robot. The first industrial robot was called Unimate and was used in the automotive industry from 1961. Today, it is hard to imagine factories without robots. Around 4 million will be in use worldwide by 2022. They include delta, dual-arm and hexapod robots. **Great Inventions** covers them all.



Name:

## CRUISE SHIPS

No. **27**

Produced by Off the Fence

A man gets into the bathtub, the water overflows and he shouts "Eureka". The man's name was Archimedes and he had discovered that he could measure the density of a body indirectly based on the amount of water displaced. His discovery, that buoyancy is equal to the weight of the water displaced, is still valid today. It even applies to cruise ships with more than 5000 passengers. **Great Inventions** examines the history of these giant ocean liners, what it takes to build a floating hotel complex and how the journey is continuing.





Name:

## CONCRETE

No. **28**

Produced by Off the Fence



Name:

## ELEVATORS

No. **29**

Produced by Off the Fence



Name:

## THE FRIDGE

No. **30**

Produced by Off the Fence

Tunnels, breakwaters, house building - we come across concrete almost everywhere. The basic concept is simple - cement made from limestone and clay and sand, gravel and finally water. But how these are mixed is important. How heavy or light, pressure-resistant or heat-insulating should the concrete be? Is the emphasis on load bearing capacity or safety, thermal insulation, moisture protection, fire prevention or sound insulation? **Great Inventions** explores this fascinating building material, said to have been used by the Egyptians more than 5000 years ago in the construction of their pyramids.

In 1743, the French King Louis XV had a manually operated "flying chair" installed on the outside of his palace. This allowed him discreet access to the chambers of his mistresses. A moving chair of this type had been invented by a mathematics professor some 70 years earlier. However, transport systems for loads and people already existed during Egyptian and Roman times. **Great Inventions** goes up the Shanghai Tower - at 1230 meters per minute - in the fastest elevator in the world.

An estimated 60 million are produced annually and about 500 million are in use worldwide. Fridges. Even in ancient times, ice was taken from the mountains and used in cellars to store food. The first artificial cooling system was presented at the University of Glasgow in 1784, and around 50 years later, fridges began to be sold commercially. In this episode, **Great Inventions** tells it like it is, explaining the advantages of modern refrigerators but also the problems caused by CFCs.

# TOPICS

## EPISODES 31 - 35



Name:

### RETAINING DAMS

No. **31**

Produced by k22 film

The blueprint is provided by nature or, to be more precise, beavers with their stream fortresses. Dams. They allow the controlled irrigation of agricultural land and produce drinking water – but, above all, they prevent flooding. They are the reason for some of the biggest relocation exercises in history. In today's energy-hungry times, dams with their turbines are becoming increasingly important for generating electricity. **Great Inventions** looks at controlled irrigation, sunken cities and hydropower.



Name:

### PROSTHETICS

No. **32**

Produced by k22 film

A new era of prosthesis development has begun. In bionics, man merges with machine. For patients who have lost limbs due to accidents, wars or illness, a prosthesis is a tool that helps them return to normal life. **Great Inventions** not only looks at the medical aspect of bionics, but also deals with ethical principles, as healthy people could also use the technology to pimp their bodies.



Name:

### HOOK AND LOOP FASTENER

No. **33**

Produced by k22 film

Whether on shoes, caps, jackets or cable ties, in industry, medicine, or in cars, hook and loop Fastener is used everywhere and it is now difficult to imagine our lives without it. A Swiss engineer had the idea one day in about 1941, after taking his dog for a walk. He removed the burrs clinging to his dog's fur and placed them under a microscope, where he discovered that there were little hooks on the burrs. **Great Inventions** tells the story of how this versatile "sticky" material was invented and tests the strongest hook and loop fasteners in the world.





Name:

## HARVESTERS

No. 34

Produced by k22 film

Combine harvesters are often described as the smallest factories in the world. Invented in the USA in the 1920s, these work horses are real all-rounders that can cut, separate, chop and thresh - all at the same time. They can harvest up to 70 tons of grain in one hour. **Great Inventions** shows charming archive footage of the first machines chugging across a field behind a tractor and provides spectacular images of the smart combine harvesters of tomorrow - even gamers have discovered a penchant for these high-tech behemoths.



Name:

## GLASS

No. 35

Produced by k22 film

Glass is probably as old as the earth. It is found in nature, where it is created by volcanoes and lightning strikes. Today, glass is an extremely versatile high-tech material. Gorilla Glass is unbreakable, fibre-optic cables are flexible, solar cells are becoming transparent, and glass can now be used to store energy. And glass is becoming smart. **Great Inventions** asks whether the first plaster made of glass, with built-in personal bio-information for faster healing, will be produced soon.



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