

# Inventions

ORIGINAL IDEA BY **Joan Munt**

ADAPTED BY **Olga Alas**

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The guiding thread of this survey is that of inventions, in the sense of machines or mechanical devices to be seen in the selected paintings. They are frequently not the principal subject of the painting: on the contrary, they are secondary objects that illustrate the numerous inventions that have made our lives easier and more comfortable.

In the ancient world art, science and technology were not separated as they are today. In their original sense the words art (*ars* in Latin) and technology (from the Greek *tecné*) meant the same, i.e. man's capacity to create. Leonardo da Vinci represents the remarkable culmination of the synthesis of the two concepts. From Newton onwards and subsequently with Romanticism, art and science became separated into two different and contrasting disciplines: objectivity, reality and logic as opposed to subjectivity, imagination and emotion. In the 20<sup>th</sup> century and even more so in the 21<sup>st</sup> century, these boundaries have once again become less precise with art being enriched by science and vice versa.



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ROOM 2

GABRIEL MÄLESSKIRCHER

(?), ca. 1430–Munich, 1495

*Saint John the Evangelist*, 1478

Oil on panel. 77.2 x 32.2 cm

INV. 235 (1928.17)

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GABRIEL MÄLESSKIRCHER WAS A 15<sup>TH</sup>-century German painter. His style reveals the influence of the Munich school although he imbued his works with a greater sense of narrative and realism. This small painting is one of eight panels in the Museum by the artist on the Four Evangelists accompanied by episodes from their lives and martyrdoms painted for an altarpiece of the Evangelists in the Benedictine monastery of Saint Quirinus in Tegernesee, for which Mälesskircher also painted a number of other altarpieces dedicated to the Virgin and other saints and martyrs.

Although depicted on a small scale, this panel would seem to include an hour-glass. However, it is most likely that Saint John would have used a water clock or a

clock in the form of a candle marked with the hours. If the painting had depicted an exterior, we might have seen a sundial. However, Mälesskircher chose to depict an everyday object in keeping with the rest of the furniture and objects in this scene.

An hour-glass is a simple device that functions to measure out a specific period of time from the moment when the sand begins to fall from the upper bulb until it runs out. It thus only requires gravity to work. Grain by grain it reflects the discon-

tinuous nature of time as proposed by various modern-day theories of the universe. Symbolically, the hour-glass represents the passing of time and death. In many works of art a skeleton wearing a black tunic holds an hour-glass in its hand, while in others it has a sickle or scythe. Although today hour-glasses are only decorative items, we often see them represented, for example on computer screens where they are used to indicate that a particular operation or command is being carried out.

ROOM 7

VITTORE CARPACCIO  
 Venice (?), 1460/66–1525/26

*Young Knight in a Landscape*, 1510

Oil on canvas. 218,5 x 151,5 cm  
 INV. 82 (1935.3)



*YOUNG KNIGHT IN A LANDSCAPE* IS ONE of the first examples of the full-length portrait in European painting. Carpaccio's painting is signed and dated on the cartellino on the right. There are numerous theories as to the sitter's identity. *The motto malo mori quam foedari* ("Better to die than be dishonoured") visible next to the stoat may indicate that he is a knight of the Order of the Ermine. However, the most widely accepted suggestion is that the sitter is Francesco Maria della Rovere, 3<sup>rd</sup> Duke of Urbino. The landscape in which the young knight is located, wearing armour and unsheathing his sword, is as curious as the figure itself, including as it does minutely detailed depictions of flora and fauna alluding to good and evil.

Characterised by an anthropocentric vision of the world, the Italian Renaissance was the period that saw the birth of the portrait while depictions of God and Christ became increasingly humanised. This new Renaissance man, the centre of the universe, had the potential to become an invincible hero or super-man through his weapons, which evolved as a result of new technologies for casting metals.

The sword appeared at an early date in civilisation, in the 4<sup>th</sup> millennium before

the Christian era. Swords have one or two sharp edges depending on whether they are for slicing or stabbing. The earliest swords were made of copper, which is a very soft material. Subsequently bronze was used, then iron and finally tempered steel. Suits of armour, which were complete suits made of metal or other resistant materials such as leather, functioned to protect the combatant's body. Exclusively worn by nobles and monarchs, they were extremely expensive, were made to measure and were often given as highly prized diplomatic gifts, implying a value beyond the merely functional (many were displayed but not used). Armourers were nothing less than engineer-artists who focused on the functional aspect of the armour, as these suits had to allow for movement, protect the wearer and of course weigh as little as possible, while also taking pains with the aesthetic aspect. Among the most celebrated armourers was Helmschmid, a member of a famous family of this craft who worked for the Emperor Maximilian, for Charles V and for the Duke of Mantua. Helmschmid made the famous Mühlberg suit of armour now on display in the Royal Palace in Madrid.

ROOM 8

**ALBRECHT DÜRER**  
 Nuremberg, 1471–1528

***Christ among the Doctors*, 1506**

Oil on panel. 64.3 x 80.3 cm  
 INV. 134 (1934.38)



THIS PAINTING DOES NOT OFFER A DIRECT depiction of the invention that concerns us here, namely printing, but rather shows the result, in other words the printed book. Gutenberg, a fellow German, invented the movable type printing press around 1450, fifty years before Dürer painted this work. As an intellectual and humanist the artist must have been fascinated by this new means of producing books. However, as an artist what would have interested him most was the concept of printing images using the technique of engraving and woodcutting since Dürer was in fact as great a printmaker as he was painter.

Dürer's interest in the new printing techniques is reflected in a letter that he wrote to his friend Pirckheimer from Venice,

where he painted this panel. Dürer comments on the laborious nature of executing panel paintings in comparison to making prints, in which less effort produces multiple images, thus facilitating their dissemination across Europe. *Christ among the Doctors* makes use of the contrast between the spoken word, referring to the word of Christ and the New Testament, and the written word, referring to the doctors or learned men and the Old Testament. We know that Dürer's religious ideas tended towards a moderate Catholicism although here he places considerable emphasis on the Christ Child, indicating his superiority to the old dispensation. Furthermore, Dürer was a friend of the reformers Luther and Calvin at a time when Germany was riven by theological dissent.

ROOM 10

**MAERTEN VAN HEEMSKERCK**  
 Heemskerck, 1498–Haarlem, 1574

***Portrait of a Woman spinning*, ca. 1531**

Oil on panel. 105 x 86 cm  
 INV. 183 (1969.14)



MAERTEN VAN HEEMSKERCK WAS A painter, printmaker and draughtsman active in the 16<sup>th</sup> century. He went to Italy where he studied Raphael and Michelangelo's frescoes, the influence of which is evident in his subsequent output. He also produced drawings of sculptures, classical ruins and views of cities and his work became widely known through prints. This portrait of a young woman spinning is one of Heemskerck's finest paintings from his early period although it is not the only work he painted on this subject.

The sitter is depicted in the foreground, filling the entire pictorial space. A striking element is the elaborate distaff that she

is using, as is her plain clothing, depicted in a limited range of colours. The distaff is an ancient object that was used for spinning. While this can simply be done with the fingers, faster and more accurate results are achieved with a spindle. The thread is tied to the spindle and twists as the spindle moves round. Weavers made thread in this manner until the mechanical spinner was invented, which saved an enormous amount of time and allowed a single worker to operate eight or more bobbins at once. This was the first important technical breakthrough in the textile industry and paved the way for the Industrial Revolution.

ROOM 12

CARAVAGGIO

Milan or Caravaggio, 1571–Porto Ercole, 1610

*Saint Catherine of Alexandria,*  
ca. 1598

Oil on canvas. 173 x 133 cm

INV. 81 (1934.37)



CARAVAGGIO'S PAINTING WAS COMMISSIONED by his first patron, Cardinal Francesco Maria del Monte. The figure of Saint Catherine is striking for the realism with which it is painted, while the model has been identified as Fillide Melandroni, a famous courtesan of the period. Richly dressed in the manner appropriate for Saint Catherine, who was a princess, and kneeling on a cushion, she looks at the viewer. The saint is surrounded by objects that refer to her martyrdom: the wheel with projecting knives, the sword with which she was beheaded and the martyr's palm. The light dramatically illuminates the scene, creating the chiaroscuro for which Caravaggio was

so celebrated and which would be enormously influential in both Italy and the rest of Europe.

Here the wheel is a religious symbol but one that allows us to focus on one of man's great inventions. It was invented in Mesopotamia in the 5<sup>th</sup> millennium before Christ. Wheels were probably first used for making pottery while they were also fundamental for the construction of transportation vehicles and as elements in a wide variety of machines. The earliest wheels were simple wooden disks with a central hole through which the axle was inserted. The subsequent invention of spokes allowed for the construction of lighter, faster vehicles.

ROOM 17

CANALETTO

Venice, 1697–1768

*The Grand Canal from San Vio,*  
*Venice,* ca. 1723-24

Oil on canvas. 141.5 x 204.5 cm

INV. 76 (1958.8)



CANALETTO IS ONE OF THE MOST important representatives of the genre of urban views in 18<sup>th</sup> century Venice. These views or vedute depict sweeping panoramas of the city, depicted with a topographical accuracy. They were highly prized by *Grand Tour* travellers and art lovers. The lengthy Grand Tour, which encompassed France as well as Italy, was an obligatory phase in the education of 18<sup>th</sup> century English aristocrats, who considered these vedute ideal souvenirs of their youthful adventures.

Canals existed in the ancient world and were constructed in both Mesopotamia and Egypt. They were used (and continue to be used) both for navigation and for

agricultural irrigation. For centuries river transport was an important alternative to roads. Venice is the quintessential example of a city of canals, although Birmingham has more in terms of kilometres. The inexpensive transport of primary materials by canal was one of the factors that contributed to the Industrial Revolution in England. In Spain the Castile canal was a highly ambitious project that was undertaken too late as railway transport had already assumed the lead. Another famous canal and one of the most important engineering projects in 19<sup>th</sup> century Madrid is the Isabel II Canal, which has a length of 70 kilometres and was used to bring water from Lozoya to the capital.

ROOM B CTB

**SALOMON JACOBSZ. VAN RUYSDAEL**

Naarden, ca. 1600–Haarlem, 1670

***Winter Scene with Skaters and Sledges before a City*, ca. 1660–70**

Oil on panel. 41.5 x 64.9 cm

INV. CTB.1997.15



THE 17<sup>TH</sup> CENTURY DUTCH PAINTERS were highly adept at describing their surroundings. Thanks to this interest in meticulous and accurate representation, paintings of this period include depictions of various inventions, machines and other objects that provided the only record of old technology until the invention of photography. This river landscape by Ruysdael includes a swing bridge, which is a type of bridge that can be raised with the help of a mechanism: the part that is raised turns around a horizontal axis like a hinge. The

technology is similar to that of draw-bridges of castles and fortresses although this version has the added technical complication of not having a supporting wall. In the foreground is a red sledge pulled by a horse and several skaters. Sledges seem to have been used in Ancient Egypt (19<sup>th</sup> century BC) for transporting sand, while over the centuries they have also allowed for transport on snowy or frozen surfaces through the skis or blades underneath them. Along with skates, they were also used for leisure activities.

ROOM B CTB

**JACOB GRIMMER**

Antwerp, ca. 1525–1590

***Winter Landscape with a Village, Skaters on a frozen River and Hunters in the Foreground*, undated**

Oil on panel. 25.5 x 35 cm

INV. CTB. 1999.23



JACOB GRIMMER WAS ONE OF THE leading landscape painters of the second half of the 16<sup>th</sup> century. Particularly notable are his series on the Four Seasons and he was largely responsible for the rise of naturalist landscape due to his mastery of spatial perspective and atmospheric effects. Grimmer can be considered the heir to Patinir in his use of a relatively high horizon line and a compositional structure of superimposed planes. His vision of the world focuses on everyday life and is a direct, uncomplicated one with little interest in the philosophical or

moral issues implied in the works of contemporaries such as Bruegel.

This winter landscape includes a water mill on the river bank. Such mills could not be used in winter when the water was frozen over. This defect, and the fact that they had to be located beside a river, meant that their use increasingly declined.

The large number of figures in the scene is characteristic of this sub-genre of landscape painting. Some are skating, others are hunting with dogs and there is even a humorous detail of a woman who has slipped over and whose skirt has ridden up.

ROOM C CTB

**VINCENT VAN GOGH**

Zundert, 1853–Auvers-sur-Oise, 1890

***Watermill at Gennepe*, 1884**

Oil on canvas. 85 x 151 cm

INV. CTB.1996.32



WATERMILLS AND WINDMILLS ARE mechanisms that convert hydraulic power and wind power into circular movements. They still exist today, for example, the modern turbines used in huge hydroelectric plants are in fact a type of watermill that transforms hydraulic power into electricity. Although obviously far more technically sophisticated and better designed, they are based on the same principles. Another contemporary example is the wind turbine that transforms wind power into electricity. This painting is by

far the largest within a series on the subject of watermills that Van Gogh executed in 1884. All the mills were located close to his parents' house in Nuenen near Eindhoven. The mill seen in this canvas, with its two vertical wheels, is the one in Gennepe, which worked directly over the river Dommel. At that period it was normal to have two wheels, each corresponding to a mill, in order to take maximum advantage of the season when the force of the river was at its height.

ROOM D CTB

PIERRE-ANTOINE QUILLARD

Paris (?), ca. 1704–Lisbon, 1773

*The Four Seasons: Winter,*  
ca. 1725–29

Oil on canvas. 42.5 x 33.5 cm

INV. CTB.1930.91



ALTHOUGH ESTEEMED BY HIS CONTEMPORARIES, Pierre-Antoine Quillard was among the French Rococo painters who have subsequently fallen into oblivion. Only a small number of works can be securely attributed to him and little is known of his life, although we do know that he was a pupil of Watteau. Like *The Four Times of the Day* and *The Four Ages of Man*, the theme of the Seasons was extremely popular in literature and painting in the first half of the 18<sup>th</sup> century. Quillard gives the group unity through the oval format and chromatic range of warm, golden-brown tones but particularly through the use of a repeated compositional format.

The fourth work in the series includes a mechanical clock on the wall. Measuring time was one of the earliest signs of human evolution: by measuring it, man gained the sense of being able to control it and in fact many inventions aimed to traverse distance in time and space. Arguing that the clock can be considered the archetypal model of the industrial era, some historians consider that the Industrial Revolution had its origins in the Middle Ages. All medieval cities had a church and bell tower that chimed at regular intervals, allowing for the synchronisation required between man and machine. It is thought that mechanical clocks were systematically introduced into Europe in the early 14<sup>th</sup> century. Many of them were complex objects that included astronomical data. One of the pioneers of the mechanical

clock was Giovanni Dondi, who built one in Padua around 1340. He also wrote a manual so that it could be repaired and rebuilt although this text is difficult to understand. There are modern replicas of his clock in several museums. Clocks have two basic elements that make them work: an element that provides the force to make the mechanism move and a second element known as the escapement that makes these elements move at a specific rhythm. Until the invention of electricity the elements of the first type were weights and springs. The most widely used early escapement was the verge and foliot type, which was extremely basic and imprecise. The invention of the pendulum was crucial for improving precision. Galileo formulated the pendulum theory around 1580 but it was the Dutchman Christian Huygens who constructed the first pendulum clock in 1656. Combined with the escapement (which was invented at around the same time), they facilitated the evolution of clocks. The subsequent invention of spiral springs to make the mechanism move resulted in the appearance of reliable pocket watches and the rise of famous clockmakers who worked with artists specialising in wood and porcelain to construct wall clocks, table clocks and vertical pendulum clocks. Successive modifications and inventions perfected this technology, making it more precise and reliable, with the result that inaccuracy was reduced from almost an hour a day to 15 seconds.

ROOM G CTB

**JOHAN BARTHOLD JONGKIND**

Lattrop, 1819–La Côte-Saint-André, 1891

***Windmill near Delft*, 1857**

Oil on canvas. 55.9 x 41.9 cm

INV. CTB.1996.15



BETWEEN 1855 AND 1860 JONGKIND returned to his native Holland, disappointed with the scant recognition that he had received in the Paris *Salon* and pursued by his creditors. In the years following his return, however, he maintained close links with Paris and with his painter and art dealer friends. Having settled in Rotterdam he devoted himself almost entirely to painting views of Holland, with a preference for subjects such as skaters in the winter, windmills on the banks of rivers and views of the port of Rotterdam. Jongkind's landscapes with windmills, a subject derived from earlier Dutch painting, are a recurring theme in his work. An earlier painting of 1840 depicts a mill near Overschie using a vertical composition similar to this one, although the vertical format was less com-

mon and the artist generally favoured a horizontal composition.

It is not known where the first windmills appeared or who invented them. Some scholars believe that they originated with the famous Greek inventor Heron of Alexandria around the first century BC. Others suggest that they originated in Persia in the 7<sup>th</sup> century AD. The Arabs later began to use them and they were introduced into Europe with the Crusades, as a result of which they became widespread in the medieval period. In addition to their application in irrigation and grinding corn, windmills can be used to pump water in areas located below sea level. They were also used in sawmills, paper manufactories, for pressing seeds to produce oil and for crushing a wide range of materials.

ROOM G CTB

**STANISLAS LÉPINE**

Caen, 1835–Paris, 1892

***The Seine at the Pont de Sèvres*, ca. 1876-80**

Oil on canvas attached to panel. 50.8 x 91.4 cm

INV. CTB.1996.14



LÉPINE DEPICTS A STEAM BOAT MAKING its way along the Seine. Up to now we have seen how hydraulic and wind power were transformed into rotational movement using a relatively basic type of technology. In the 18<sup>th</sup> and 19<sup>th</sup> centuries the invention of the steam engine and the discovery of electricity resulted in a complete change in our way of life. With a steam engine the pressure of the steam produced in a boiler (just like the pressure cookers we have at home) is transformed into a backwards and forwards, horizontal movement of a piston. Through an element known as a connecting rod, the

horizontal movement is transformed into a circular one and once this has taken place it can be applied to machines. The steam engine was invented by the Scot James Watt, who patented it around 1769. The first engines were made in 1776, resulting in a fierce battle for patents and Watt died a rich man. The horizontal steam engine was patented around 1825. This invention and subsequent improvements to it over the years paved the way for the appearance of the three great inventions that have been fundamental to modern culture: steam ships, the railways and electricity/electric light generators.

ROOM M CTB

**MAXIMILIEN LUCE**

Paris, 1858–1941

***Factory by Moonlight*, 1898**

Oil on canvas. 55.9 x 46 cm

INV. CTB.1996.9



LUCE WAS BORN IN PARIS ON 13 MARCH 1858. He studied printmaking and started to work for Eugène Froment making plates for publications. In 1887 Pissarro introduced him to the Neo-impressionists Seurat, Signac and Cross and Luce soon became a champion of their “new” style, which applied scientific theories of colour and light to painting. All the group’s members had profound political convictions and Luce was both a radical anarchist and a committed Pointillist.

Here Luce depicts a factory in the densely industrialised area of Charleroi. From the time of the Industrial Revolution in the 18<sup>th</sup> century the principal European

cities had large numbers of factories that started to make use of the new technology of steam engines. Suitably adapted, these engines could be used in the manufacture and production of certain objects and products or for the industrial transformation of energy sources. It is interesting to note how the Impressionist and Post-impressionist painters were fascinated by motifs such as factories, railways, stations and bridges, which for them represented modern life, production and communication. Luce also depicted foundries, steelworks, blast furnaces and chimneys but ceased to focus on these themes after 1900.

ROOM O CTB

**HENRI MATISSE**

Le Cateau-Cambrésis, 1869–Nice, 1954

***Canal du Midi*, 1898**

Oil on card attached to plywood. 24 x 36 cm

INV. CTB.1997.13



THIS PAINTING IS ONE OF A GROUP BY Matisse executed near Toulouse in the winter of 1898-99. It was the artist’s first visit to the south and he remembered it as his first encounter with light and colour. Many of the landscapes that he painted during this period, including the present one, seem to have been executed outdoors and in front of the subject. The colour, however, is not naturalistic and Matisse’s works of this period are generally described as “proto-Fauve” as they seem to look forward to the intense and subjective chromatism that would become the principal feature of that movement, which appeared five or six years later.

The Midi canal was a major engineering project that made it possible to cross France from the Mediterranean to the Atlantic. It was built between 1666 and 1681 under the supervision of the engineer Pierre-Paul Riquet and earned him the title of Baron de Bonrepos. It was previously known as the Royal Languedoc

Canal but was renamed in 1789 during the French Revolution.

After two hundred years of use for the transportation of merchandise the canal began to be the victim of train transport and later of the roads. In the late 19<sup>th</sup> century the French State took over its management and unsuccessfully invested in it in order to try and revive it as a means of transport for goods. This policy came to an end in the 1970s and since then it has only been used for tourism.

The canal has a large number of locks, which are old mechanisms still in use today. Locks are designed to raise and lower vessels in a safe way where there are different water levels. They work on the principal of creating a type of artificial tank on which the boat can rest. For the boat to be lowered this tank is filled up, the boat enters and the water is emptied out. To raise the boat the tank is emptied, the boat enters and it is filled again.

ROOM 43

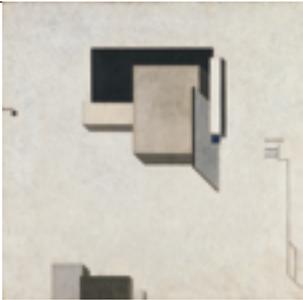
ELIEZER LISSITZKY

Pochinok, 1890–Moscow, 1941

***Proun 1 C***, 1919

Oil on panel. 68 x 68 cm

INV. 652 (1988.20)



LISSITZKY DEFINED HIS “PROUNS” AS an intermediary state between painting and architecture. He trained in the latter discipline in Germany, was a member of the Bauhaus and developed a style close to Russian post-revolutionary Constructivism. In line with Bolshevik ideology, this approach was oriented more towards production than the creation of works of art. Lissitzky’s works give the impression of instability and of unrealisable or utopian forms. He made simultaneous use of various vanishing points, creating the sensation that we are seeing various structures from different positions in space: from the air, as if flying over them,

or from the ground, as if they were above our heads. Compositions of this type are related to a series of reversible axonometric drawings that can be seen in both directions at once, thus emphasising their geometrical nature. The world of inventions is not just limited to objects but also encompasses concepts and theories. The French mathematician Gaspar Monge, Count of Péluse (1746-1818), invented descriptive geometry, which could be defined as the geometrical procedures that allow for a representation of three-dimensional space on a flat surface. This branch of mathematics is crucial for engineering and architecture.

ROOM 44

LÁSZLÓ MOHOLY-NAGY

Bacsorsod, 1895–Chicago, 1946

***Large Railway Painting***, 1920

Oil on canvas. 100 x 77 cm

INV. 675 (1974.41)



MOHOLY-NAGY WAS A PAINTER AND photographer, albeit specialising in the latter field. He was also an industrial designer. Here we see a virtually abstract composition in which the forms, intended to imitate *collage*, suggest the electric pylons, signals, letters and signs characteristic of railways. Moholy-Nagy’s work is a paean of praise to the machine world, expressed through an investigation into abstraction. At an early date he began to focus on art, experimenting

with photograms and collage of a type influenced by Dadaism and Constructivism. On the invitation of Gropius he started to teach at the Bauhaus, working primarily in the metalworking studio and experimenting with new materials and forms. Moholy-Nagy moved to Berlin in 1920 where he worked as a typographic designer and photographer and was also involved in filmmaking and photography. This painting could equally well be a piece of avant-garde graphic design.

ROOM 48

RICHARD ESTES

Kewanee, 1932

***Telephone Booths, 1967***

Acrylic paint on masonite. 122 x 175.3 cm

INV. 539 (1977-93)



THIS DEPICTION OF THE CITY FOCUSES on four telephone booths with the users inside seen from behind. The city makes its presence felt through the reflections of shop windows and signs on the aluminium of the booths while human presence seems to be cancelled out by this static, cold, distant and de-humanised view of the urban environment. So pronounced is the degree of realism that the work appears to be a photograph. Richard Estes was one of the founders of Hyperrealism or Photorealism, a pictorial trend that emerged in the USA in the late 1960s. This approach aimed at absolute precision at a greater level than that possible with the human eye. While in the present day these telephone booths now seem positively prehistoric, they intro-

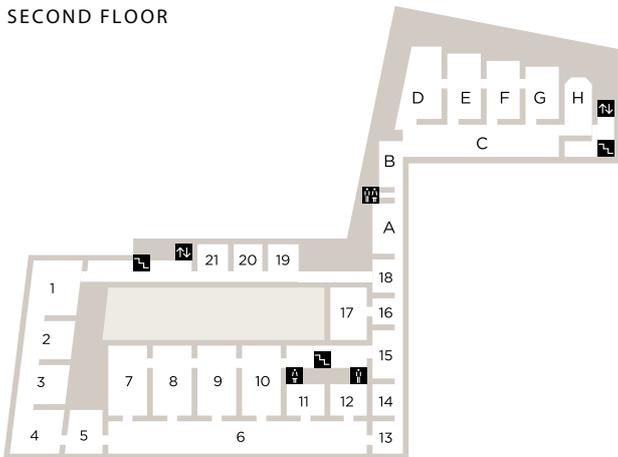
duce the telephone into our survey, another key invention in the history of humanity. Marcel Proust described the strange sensation of speaking to his mother when he was nowhere near her and how he could grasp the inflections in a voice that was separated from the face and gestures of the person speaking. Having said this, internet and the mobile phone are undoubtedly the inventions that have most changed the lives of our generation.

Estes' painting brings to an end this survey, which has aimed to offer an appreciation of the selected works of art from a different viewpoint and to encourage a reflection on the possible connections, influences and relationships between art and technology.

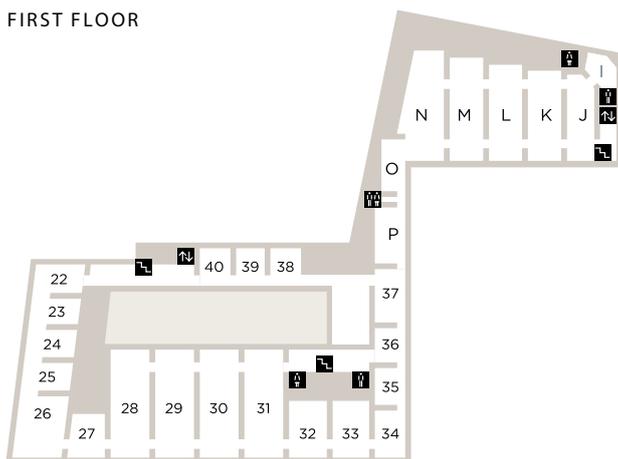
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SECOND FLOOR



FIRST FLOOR



GROUND FLOOR



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- 2 Gothic Painting
- 3 Early Netherlandish Painting
- 4 The Quattrocento (Italian art)
- 5 The Portrait (Early Renaissance)
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