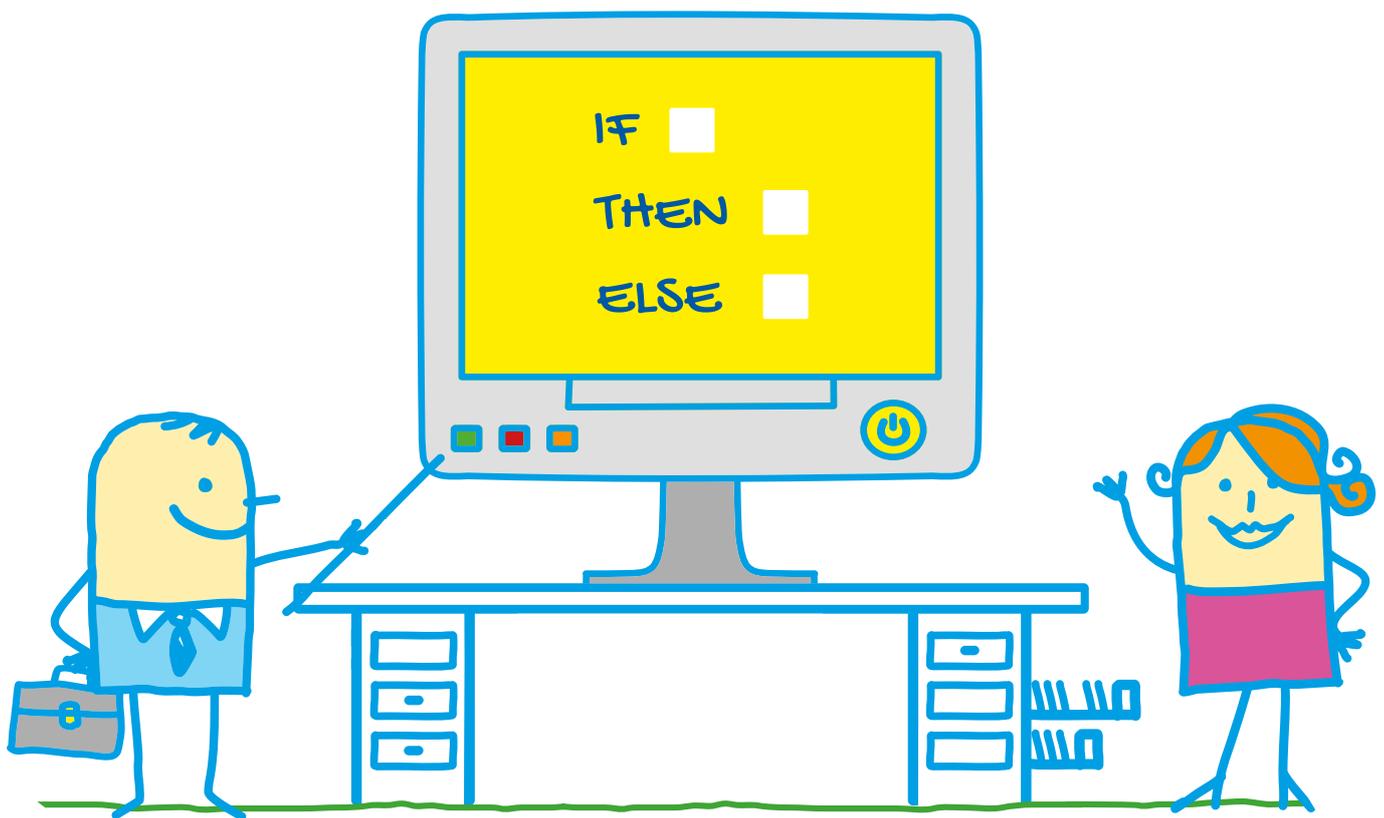
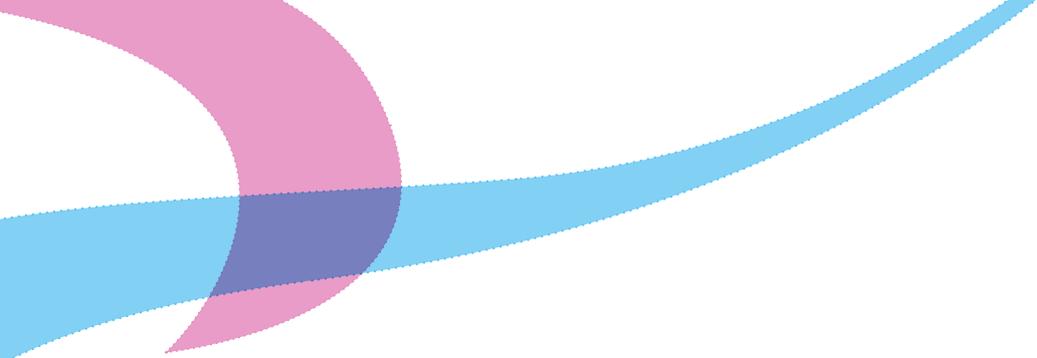


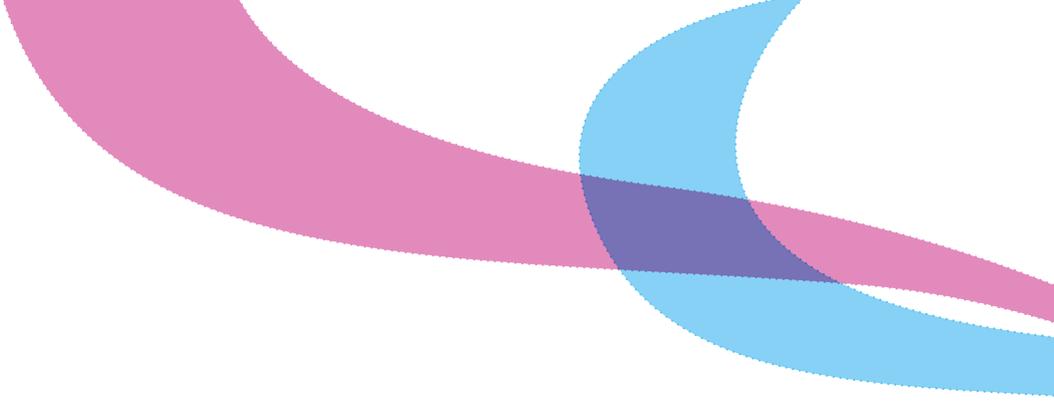
A Guide to Software Patents

**An introduction to software patenting
and other IPR protection**





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Preface

As a patent advisor at the Finnish Patent and Registration Office, I have often been asked about patents for software inventions, web pages and so on. I have needed appropriate material with examples to provide clear explanations to the public. In the absence of such material, I suggested to Jorma Lehtonen the idea of writing a guide on the subject and got the chance to write the guide myself.

Originally published in Finnish in 2021, the guide aims to describe the fundamentals of software patenting and other protection (copyright, trademark, design right, the utility model etc.) in an accessible way. The guide complements the PRH publications *Patenttiopas* ('Patent Guide') and *Hyödyllisyysmalliopas* ('Guide to Utility Models') available in Finnish. The guide provides simple basic rules to anyone considering protecting their software inventions and helps find sources of more detailed information.

My manuscript was commented on or otherwise improved at different stages by Kaarina Aarnisalo, Hanna Aho, Olli Ilmarinen, Jorma Lehtonen, Ari Peltola, Olli-Pekka Piirilä and Olli Sievänen. I thank you all warm-heartedly. The plan is to develop and extend the guide when needed, which is why I welcome any comments and improvements to my e-mail address timo.laakso@prh.fi.

15 June 2023

Timo I. Laakso

Patent examiner and patent advisor at the Finnish Patent and Registration Office (PRH)

1. Introduction

Jack has developed an elegant piece of software for image processing. The software allows you to apply splendid colour effects to pictures taken on a mobile device: you can dye your hair red or green, the

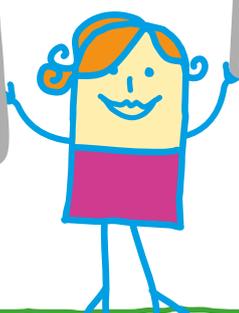
background can be a psychedelic, colourful landscape, and the pictures can have flickering frames with running figures. Jack's software is interactive: the user can edit the picture with various adjustments in the desired way.



Jack's invention for colouring images.

Jenny has developed a piece of software to help with transfer and storage of digital images. Images can take up a lot of storage space, so sending and saving images can be slow and difficult. Jenny's program zips

images so that they consume ten times less storage space. Images zipped in such a way are easier to store and transmit. However, picture quality is sometimes poorer, introducing snow and colour defects.

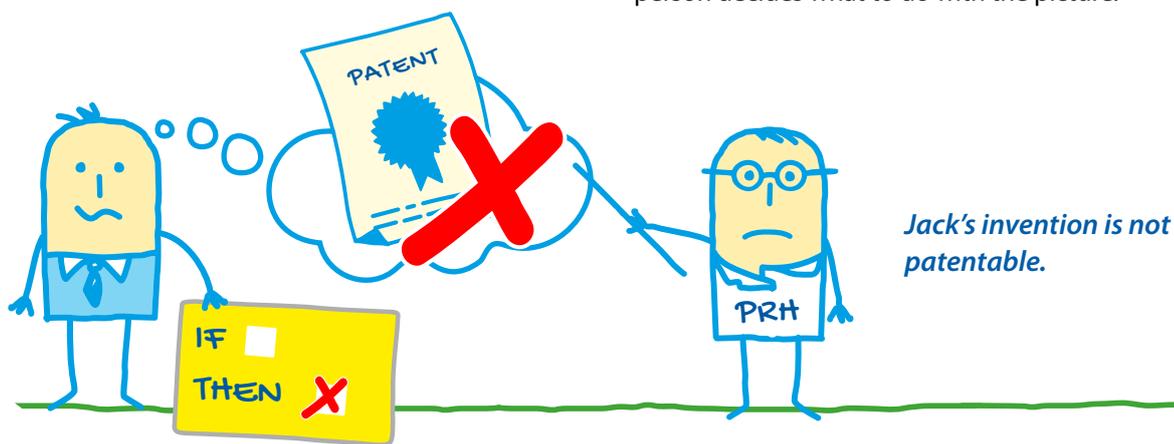


Jenny's invention for zipping images.

Jack and Jenny would like to apply for a patent for their inventions. However, they have heard that patenting software is difficult, often even impossible. What is the first reaction you would expect from the PRH patent advisor?

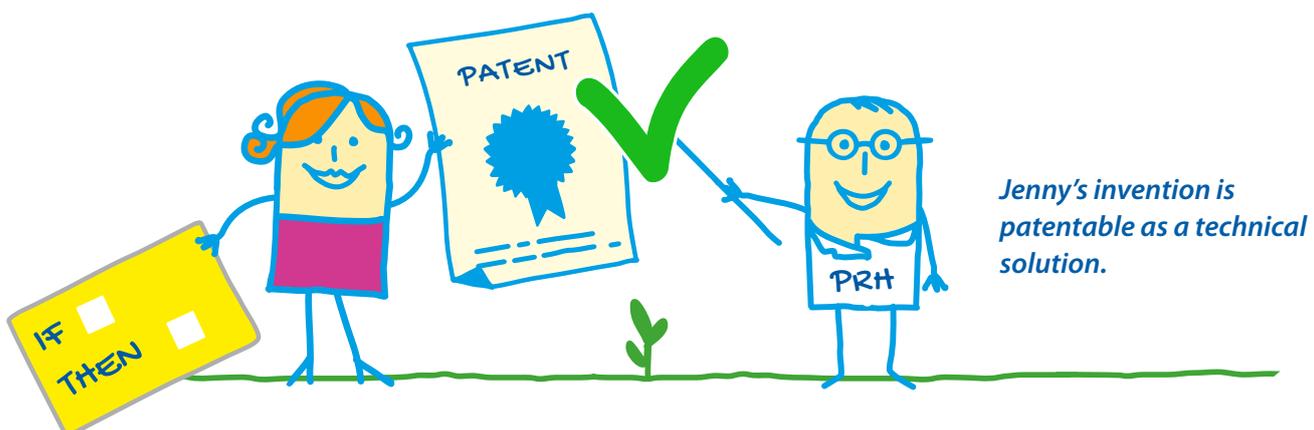
In short: it seems that Jenny's invention could be patented, whereas Jack's could not.

The generation of colour effects in Jack's invention sounds like the aims of the invention are **aesthetical** (that is, to make a picture better-looking or more fun according to the editor's liking) rather than technical. **Only a technical invention can be patented.** If no specific technical problem can be distinguished in Jack's software, patenting seems impossible. The interactive nature of the software suggests that it only works if a person decides what to do with the picture.



On the other hand, Jenny's invention involves addressing a clear **technical problem**: zipping images into a smaller form for file storage and transfer. This means Jenny's software seems to be patentable. Before granting a patent, it must be ensured that a patent application has been filed appropriately and that no-one else has come up with a similar or nearly similar invention before

(that is, the invention is new and involves an inventive step). The fact that an invention does not always work better than other corresponding zipping programs (because of poorer picture quality) usually poses no problem for patenting. The law does not require the invention to be better than formerly known solutions.

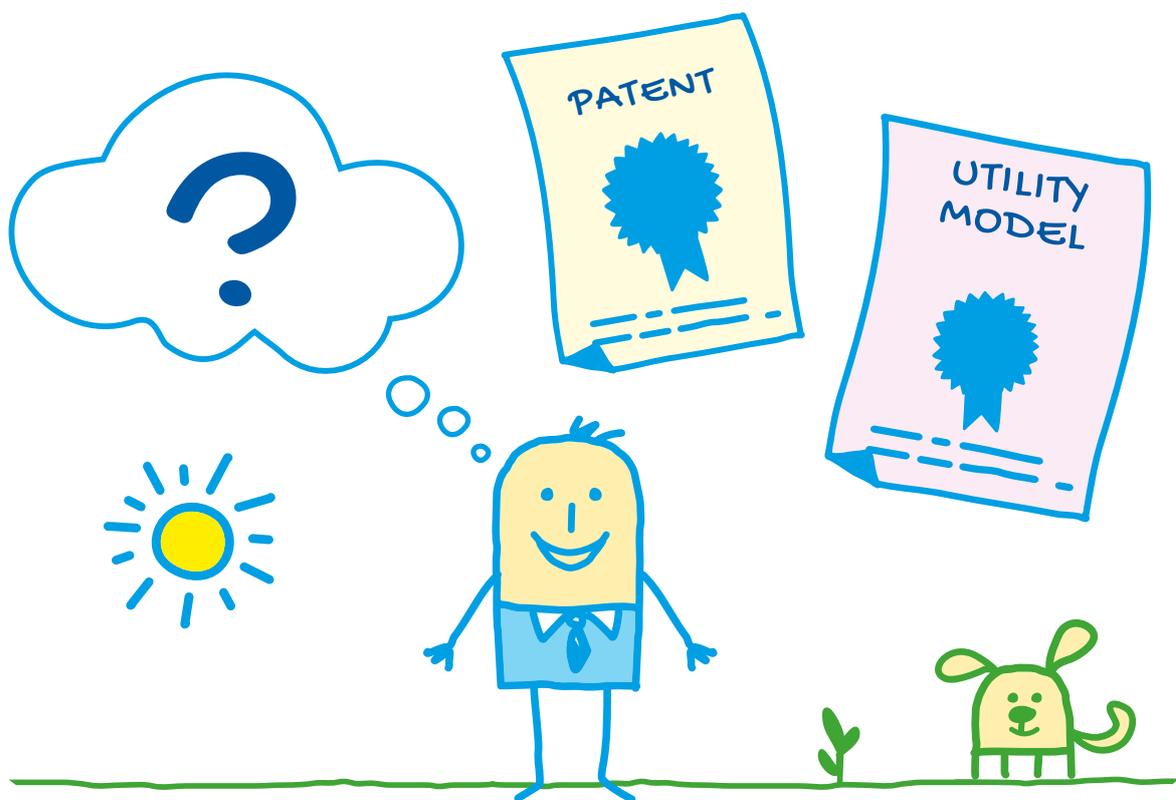


It is good to bear in mind that patentability of an invention can only be assessed after an appropriately filed patent application. **Patent claim** formulations are crucial for a patent application, because they define an invention precisely. At times, the precise wordings of patent claims can be decisive for patentability of an invention.

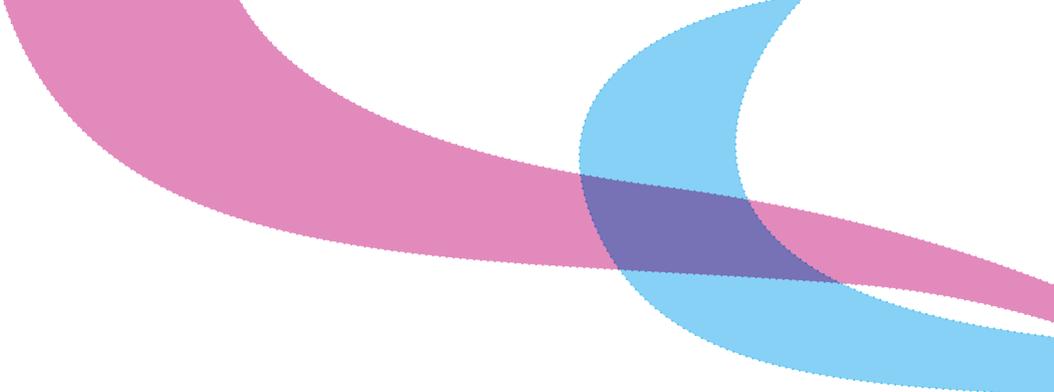
This guide aims to spell out the issues of software patentability. To solve these issues, we need to take a closer look at the Patents Act and the principles by

which the PRH's patent examiners assess whether a piece of software can be granted a patent. (We don't deal with patent application processing in other countries here. However, the criteria for patentability are very similar everywhere, particularly within Europe.)

Focusing on software protection, the latter part of the guide provides a survey of other possible forms of protection, such as utility models, design rights, trademarks and copyrights.



Should I protect my invention with a patent or a utility model?



2. Patents

2.1 PATENTS ACT: WHAT CANNOT BE PATENTED

According to section 1 of the Finnish Patents Act, any **invention in the field of technology with an industrial purpose is patentable**. We must interpret 'industrial' broadly: inventions regarding agriculture and handicraft are also patentable. This formulation of the Patents Act is usually interpreted to mean that an invention must be technical. This means a technical solution to a precisely defined technical problem. The concept of 'technical' is difficult to define exhaustively. However, the Patents Act gives us a list of exceptions that are not considered technical inventions (see the direct quotation below) to facilitate our interpretations:

"The following, **as such**, shall not be regarded as inventions: (1) discoveries, scientific theories and mathematical methods; (2) aesthetic creations; (3) schemes, rules and methods for performing mental acts, playing games or doing business, and **programs for computers**; (4) presentations of information." This list will be referred to as the list of exceptions.

Next, we will deal separately with these exceptions listed above. The order differs slightly from that of the legal text.

2.2 PATENTING SOFTWARE

Unfortunately for us, the list of exceptions also contains software (referred to as programs for computers on the list of exceptions). Luckily, it is preceded by the words "as such". This must be interpreted so that mere software cannot be patented. However, if a piece of software is part of a device or a system that solves a technical problem, it may be patentable, provided that it is also new and involves an inventive step.

In connection with software inventions, patent experts sometimes refer to computer-implemented inventions (CII) to emphasise that a computer and software are used together for problem-solving.

For example, Jenny's file-zipping invention described in the introduction deals precisely with such a piece of software used to solve technical problems. In contrast, Jack's picture-colouring invention is closer to an artistic creation described in part (2), where the primary focus is aesthetic criteria. Instead of the patent, artistic creations and other works are protected by **copyright law**.

Jack is vexed at the fact that his invention could not be patented according to the PRH patent advisors after all. However, one of the patent advisors advises him to try to think about the invention from a new viewpoint and define the picture-colouring invention by setting a precise technical aim. The consulting engineer advises him that a traditional painting (an artwork) cannot be patented, whereas a suitable **tool** to make it (e.g., a brush with certain characteristics) could be.

Jack goes on to consider his colouring program. Colouring the backgrounds posed a difficulty. The background colour easily spreads onto the human figures in the pictures, so the colouring has always required retouching by hand. How could human contours be easily distinguishable from the background? It dawns on Jack that the people in the picture could first be recognised by facial recognition, after which the contours that belong to each face could be resolved. (As you know, many smartphone cameras show the face in the picture, which means they apply facial recognition.) The patent advisor thinks finding the contours of the human figures in the picture sounds like a precisely defined technical problem, the solving of which could be patentable. Jack is excited to work on the development of his invention.

2.3 PATENTING MATHEMATICAL METHODS

Mathematical methods mentioned in subsection (1) of the list of exceptions pose a similar situation as with software: a mathematical formula or algorithm, as such, is not patentable. However, the invention is patentable as a technical solution if a formula or algorithm is applied to solving a technical problem (as is apparently the case with Jenny's image-zipping invention).

2.4 COMPUTER GAME PATENTS

Schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers in subsection (3) of the list of exceptions generally mean abstract rules and operating plans with no concrete technical characteristics. For example, the idea or the rules of the board game Monopoly could not be patented. Instead, playing gear and similar items are patentable if they are also new and involve an inventive step.

The corresponding rules also apply to computer games. Computer game rules and events cannot usually be granted patent protection. Instead, e.g. figures and the story of a game usually enjoy **copyright protection**. In addition, the name and the logo of a game can usually be granted **trademark protection** (see later chapters).

Patenting computer games involves special issues, which we will cover in a later, extended version of this guide.

2.5 BUSINESS METHOD PATENTS

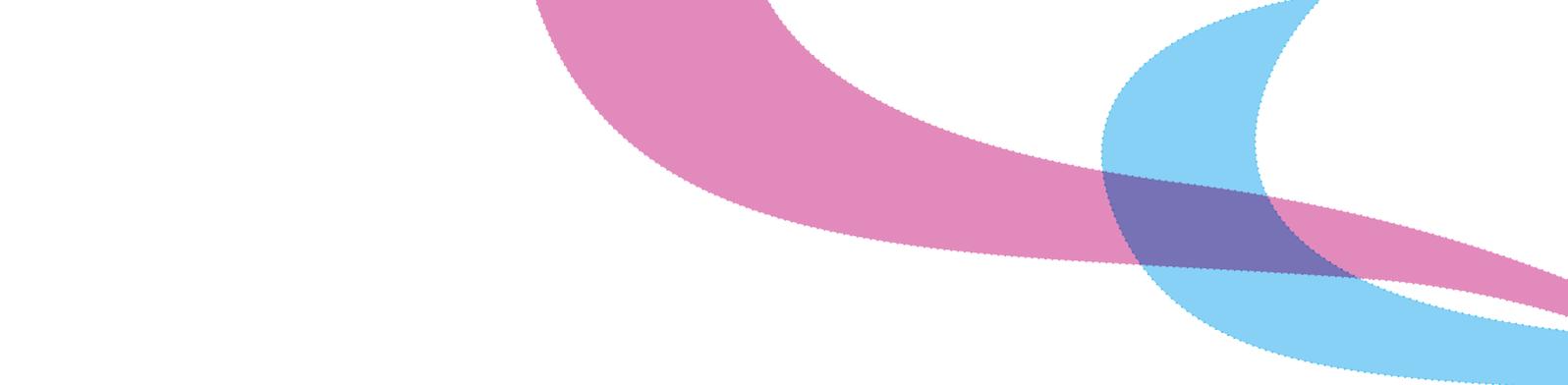
In terms of patentability, business as described in subsection (3) (e.g., marketing strategies) corresponds to similar, abstract compilations of rules as games – they are not patentable as such. Instead, technical instruments for implement business methods can be patentable if they are technical solutions to a technical problem.

Patenting business methods involves special issues, which we will cover in an upcoming, extended version of this guide.

2.6 PRESENTATION OF INFORMATION AND PATENTING

Presentation of information as described in subsection (4) can be related to many things involving computers. Software allows different kinds of data to be easily visualised by plotting, drawing pie charts, etc. However, such activity is not usually considered technical and is thus not patentable, no matter how useful or deft it feels. It is usually required that data, such as results of measurements, are processed in accordance with a precisely defined technical operation (e.g., filtering out noise and other interferences with a digital filter) in order to meet the requirements of technicality.

For example, **creating a website** usually also means presenting the desired information in an apt, structured way. A website layout can be protected by copyright, but websites rarely involve any new, patentable technical solutions.



2.7 ARTISTIC CREATIONS AND PATENTING

As already mentioned, an artistic creation focusing on aesthetical criteria cannot be granted patent protection. Instead, artistic creations are protected by **the law of copyright**. There is reason to consider that many drawn and written works, such as program code, are copyrighted (see the relevant section below).

A result of an artistic creation (a work of art) is usually not patentable, unlike the implements and instruments used to produce it. In such a case, it might be worthwhile to come up with a concrete and precise problem that an invention should solve.

2.8 GOOD TO REMEMBER WHEN FILING A SOFTWARE PATENT APPLICATION

Software patenting applies the same basic rules as patenting in general (for further information, read *Patenttiopas* in Finnish on www.prh.fi). A patent is valid for 20 years at a maximum. It is especially important to remember that publishing an invention is not allowed before filing the patent application. For this reason, it might be worthwhile to consider carefully where and with whom you discuss the invention. However, the PRH's consulting engineers always respect professional confidentiality.

It might also be worthwhile to consider consulting a patent agent to file an application, especially for the first patent application. Consulting a patent agent involves extra costs, but it may be a false economy to cut corners in this area. At worst, a poor patent application publishes the essential ideas for others to exploit and fails to protect the invention in practice.

3. Examples of patented software inventions

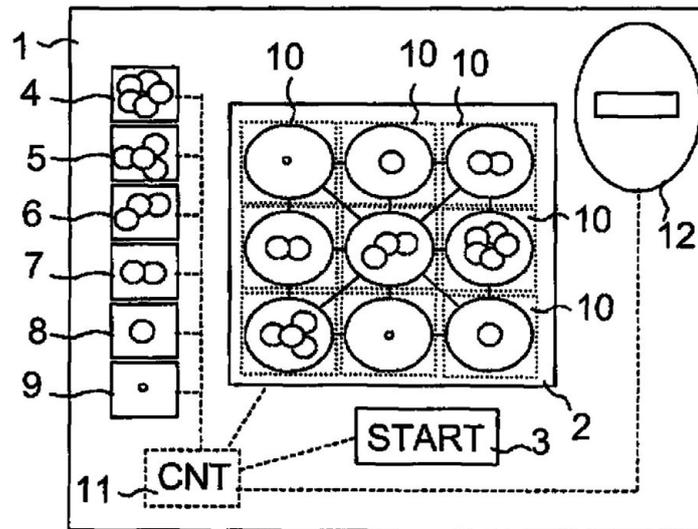


Figure 1. Slot machine.

Next, we will show examples of real inventions related to software and games. As with inventions in general, the inventions involve patent applications, correspondence related to the processing of applications and information on the present state of the application or granted patent. All of the aforementioned is chiefly public and can be found in the Patent Information Service provided by the PRH. As you might know, one purpose of granting patents is that the inventor publishes the invention in exchange for the granted patent. The invention will be freely available for public use after the patent expires.

The information on the inventions is based on the information on each patent, but the titles and descriptions have been written informally for the guide. The **application number**, for accessing further information in the Patent Information Service, is mentioned first. All the inventions shown here have been granted a patent.

20031817 Slot machine

The technical aim is to realise a fruit machine that allows the user to lock a desired number of symbol discs during

the game and has an easier-to-use interface than the traditional solutions. The invention is a possible digital implementation of the traditional mechanical fruit machine.

The target of the invention is a slot machine involving the following:

- **Charge collection devices** to receive a payment for the game
- **Screen** to show the symbols of the symbol discs to the slot machine user
- **Interface** to launch the slot machine's game and for choosing the locking
- **Control station** arranged to change the visible symbols of the symbol discs to bring new symbols onto the screen after the launch of the game.

In order to achieve an interesting, user-friendly and easy-to-implement slot machine for the user, the slot machine locks the chosen symbol using the interface so that all the similar symbols shown on the screen during the locking are locked in place for the next game.

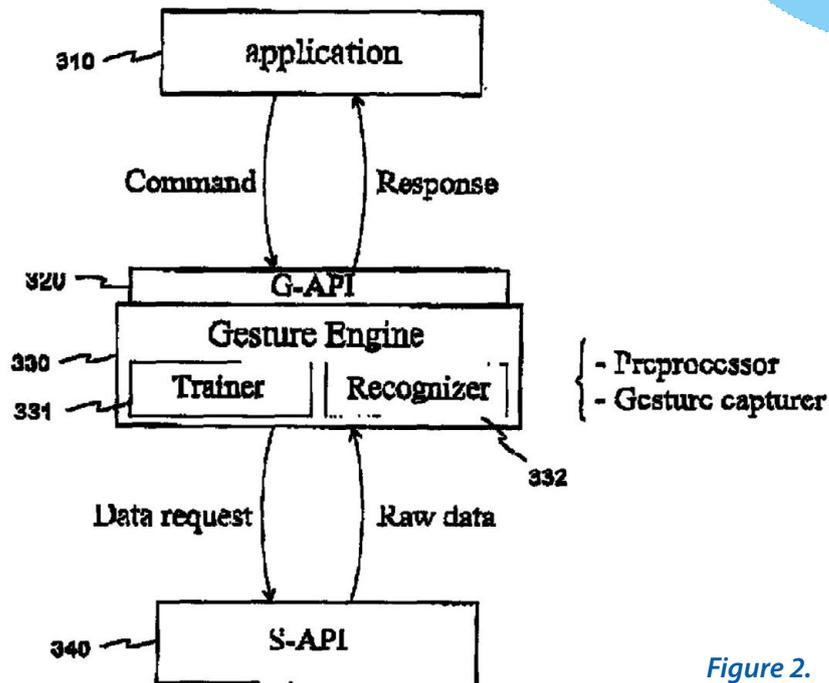
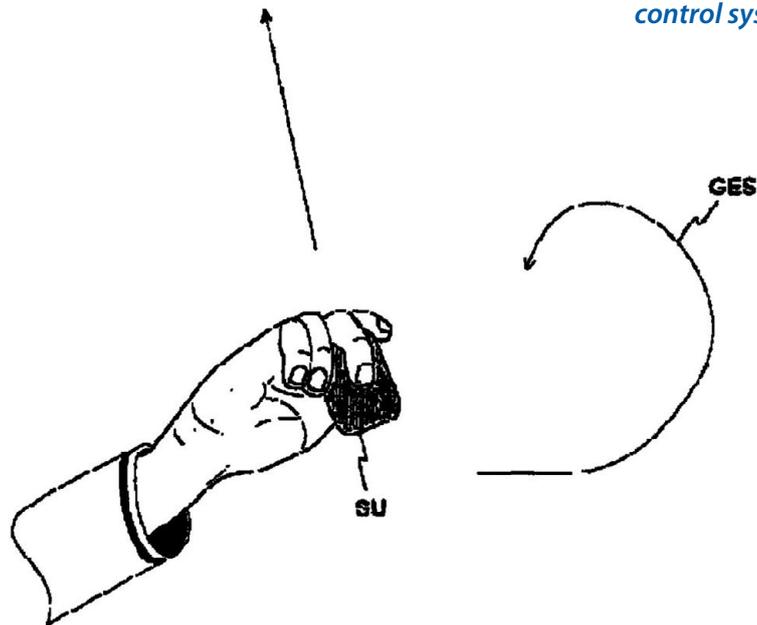


Figure 2.
Gesture-based control system.



20040184 Gesture-based control system

The invention's technical problem is to implement a gesture-based control system for mobile stations.

The gesture-based control system contains a multi-purpose communications interface with commands for applications. The software for processing the gesture signal includes a tutorial that saves free-form gestures

made by the user in a gesture library and a recognition program that compares user-made gestures to saved gestures and chooses the most closely matched gestures. This enables gestures to be used as commands to control whichever application is programmed to receive commands.

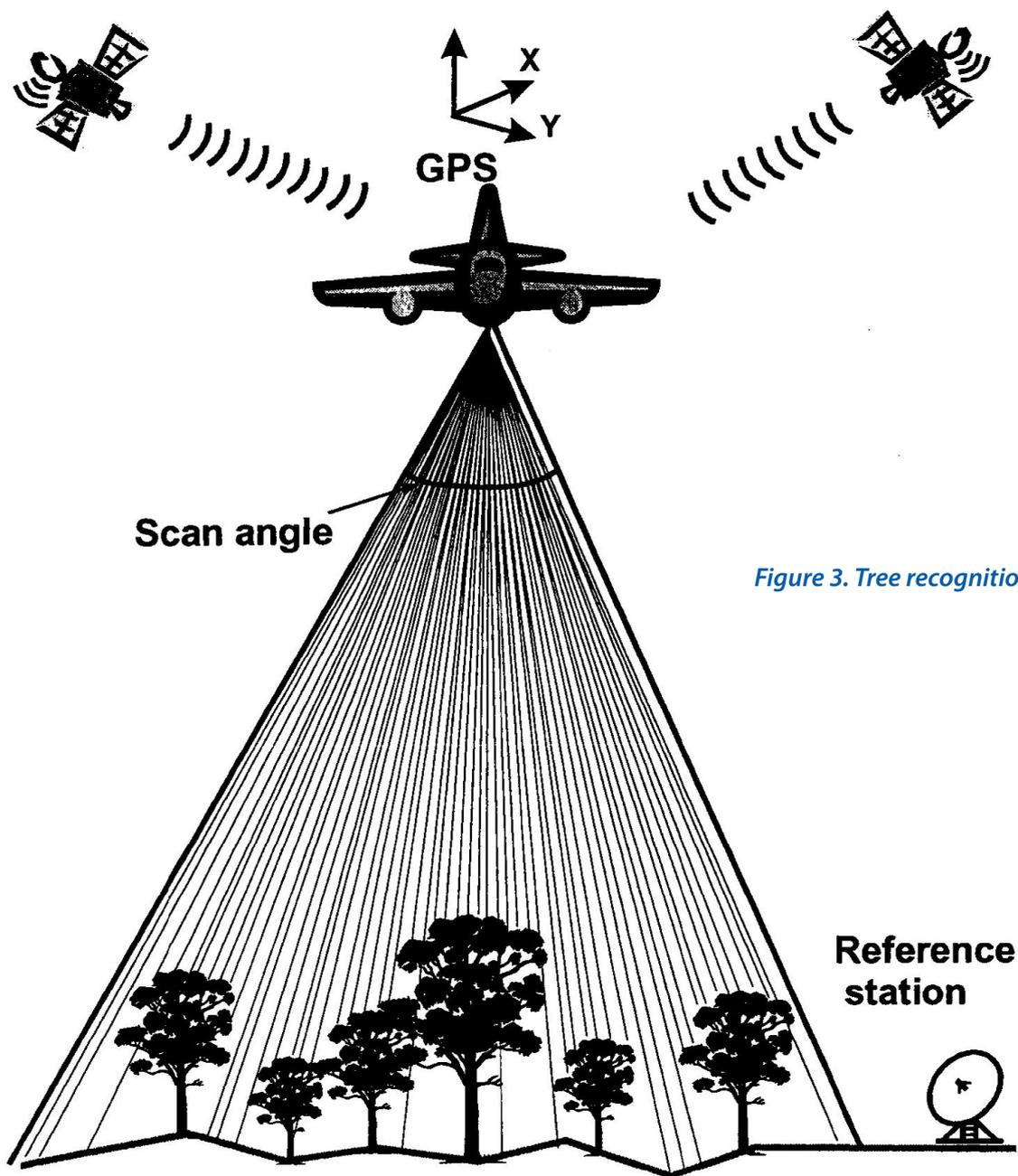


Figure 3. Tree recognition.

20040396 Tree recognition

The invention's technical problem is to recognise tree species in the terrain using laser scanning technique.

The target of the invention is a method and a piece of software for forest survey and tree symbol determination. The method helps determine information on tree species, sample areas, patterns or wider forest areas

by measuring or deducing the essential indicators of individual trees. The method uses a laser beam and pictures that cover each other. The pictures help make the flocks of laser points denser, and the denser flocks thereby obtained are used to recognise individual trees or tree clusters.

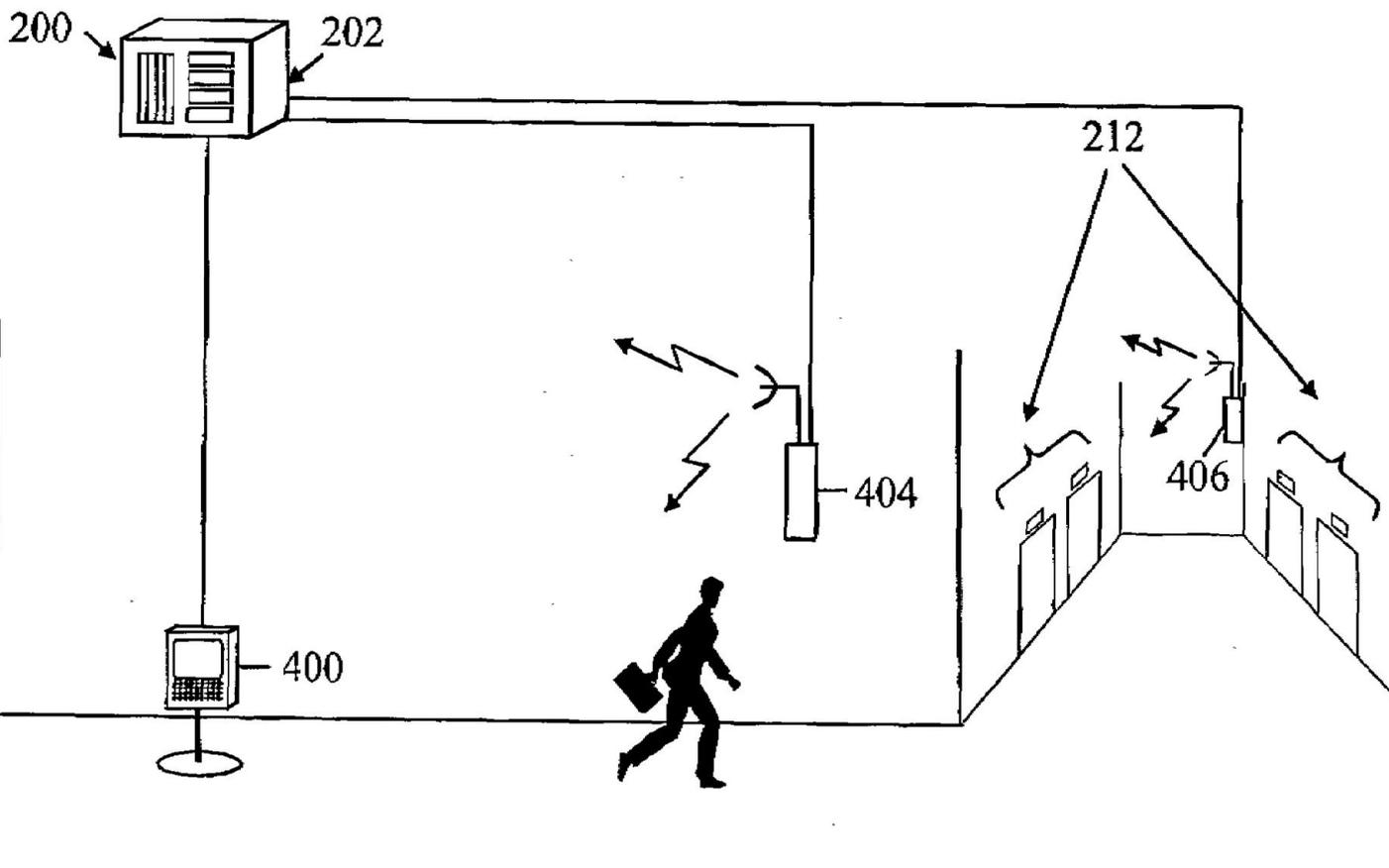


Figure 4. Predictive lift system.

20070245 Predictive lift system

The invention's technical problem is to call for a lift predictively for a passenger that approaches the lift.

The invention consists of a method, a piece of software and a system for estimating the duration of a passenger's walk in the lift system to the target floor. The passenger calls a lift for the target floor using a device intended

for this purpose. The passenger is then allocated a lift according to the call and informed of the allocation on the same device. The duration of the passenger's walk to the lift is estimated dynamically, and the lift system is controlled dynamically according to the estimated duration of the passenger's walk.

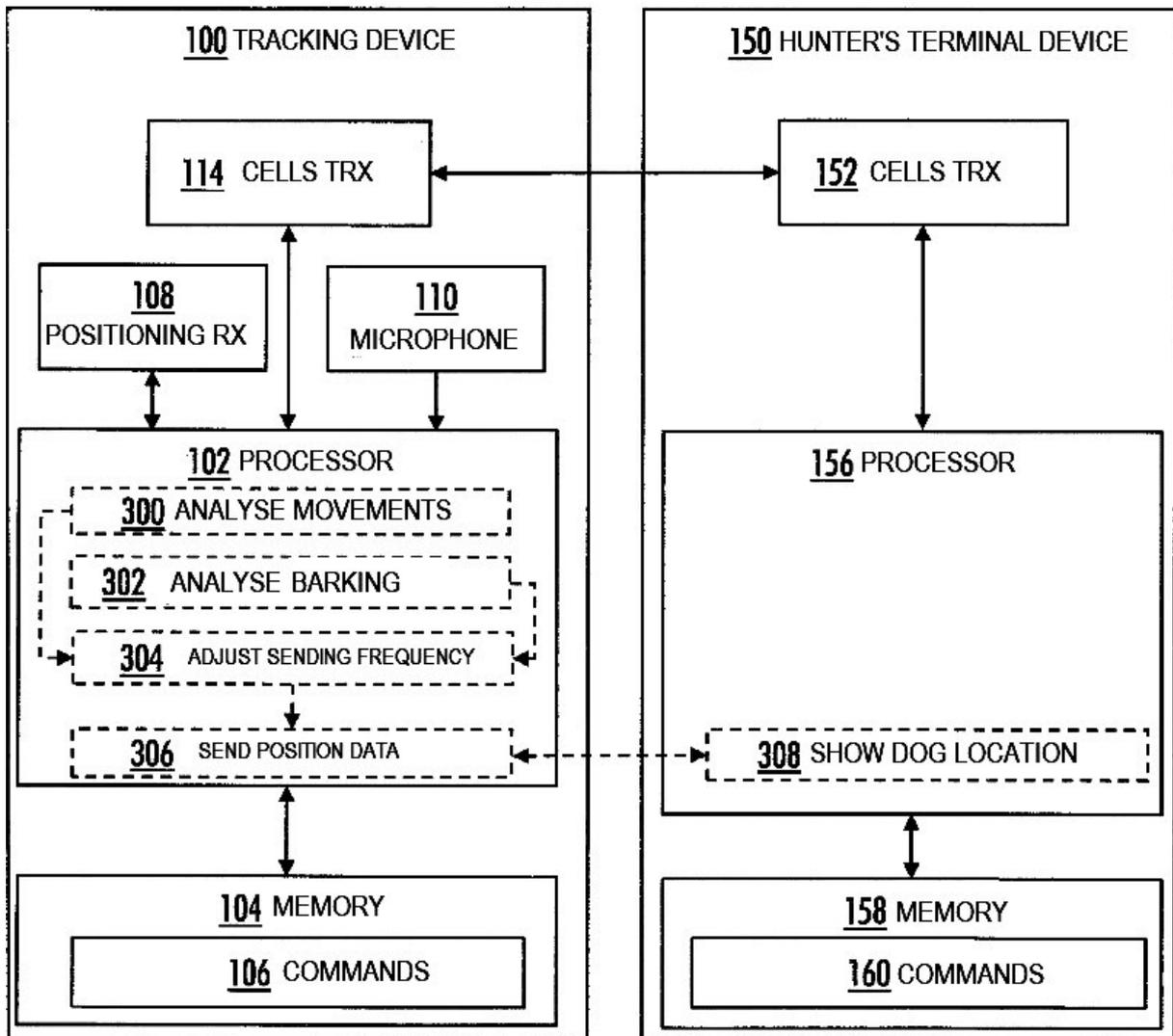


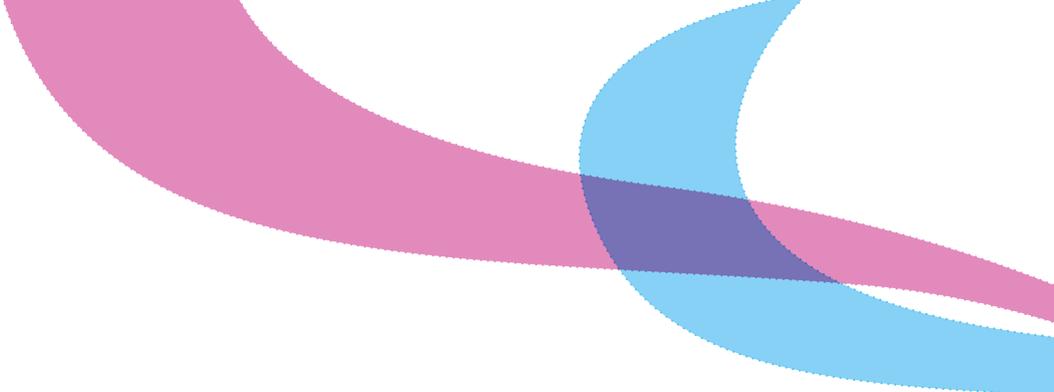
Figure 5. Tracking device to be fastened to a hunting dog.

20116147 Tracking device to be fastened to a hunting dog

The invention's technical problem is to use a radio to track a hunting dog's movements and to inform the hunter of the dog's location and barking, allowing the hunter to conclude whether the prey is near.

The invention consists of a tracking device to be fastened to a hunting dog, a method and a piece

of software. The tracking device contains a battery, positioning radio receiver, processor and memory. The memory contains saved commands. By executing a command, the processor makes the tracking device adjust the positioning data sent to the main device by the hunter so that adjustments are made according to the hunting dog's speed of movement based on the positioning data.



4. Utility model

Despite its Finnish name *hyödyllisyysmalli*, a utility model should not be confused with design right (*mallioikeus*). Like a patent, a utility model protects an invention's technical characteristics, but the utility model is less expensive and has a quicker registration process.

Unlike a patent, a utility model only has a 10-year protection period. Moreover, utility model applications only undergo a formal search. No technical search is usually carried out. If any party, such as a rival company, thinks that a utility model should not have been registered, they can lodge an invalidation claim of the utility model. Unlike with patents, the originality remains the inventor's responsibility.

In principle, filing a utility model application is very similar to filing a patent application. A separate Finnish-language guide *Hyödyllisyysmalliopus* ('Guide to Utility Models') for filing a utility model application has been published on the topic.

When filing a utility model application, it is especially important to remember that a utility model cannot protect a method. In other words, utility model claims must be written in the form of a device or system, not as a method claim.

5. Examples of software inventions protected by a utility model

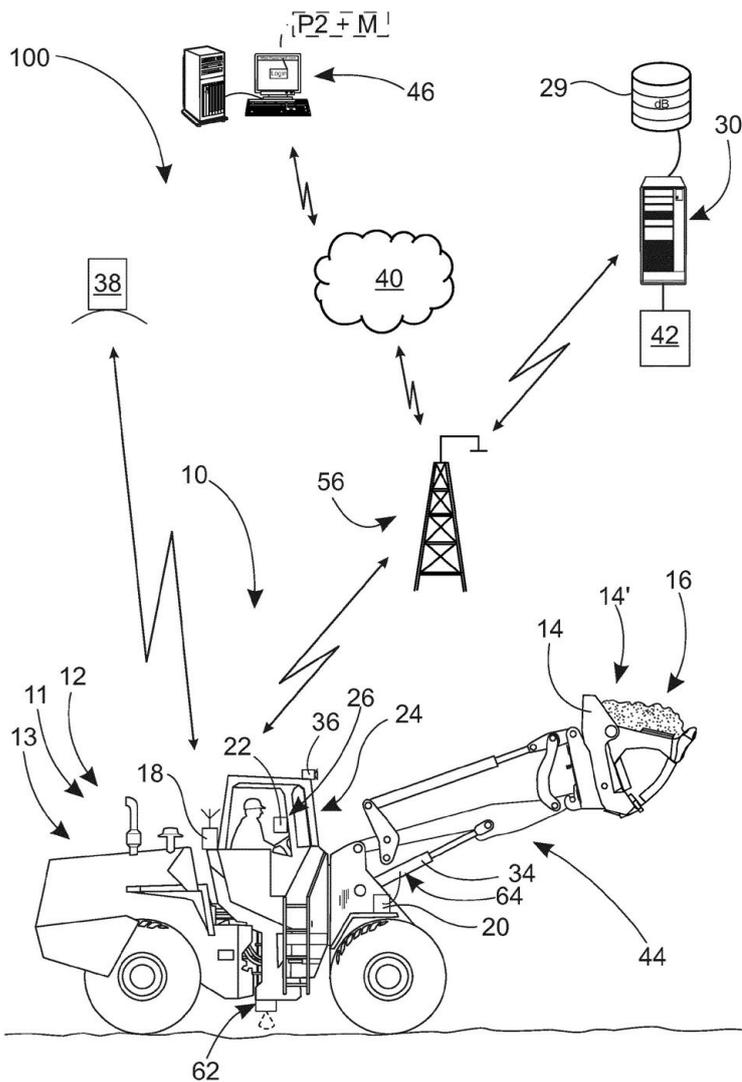


Figure 6. Road maintenance system.

This chapter demonstrates examples of inventions, including software and games, whose utility models have been registered. The utility models of the inventions are chiefly public, and you can find information on them in the Patent Information Service at prh.fi. Patents and utility models are available in the same database. A utility model can be identified by the letter U before the application number.

U20174043 Road maintenance system

The invention's technical problem is to achieve a road maintenance system for precisely documenting the material used in connection with the machine. The utility model's first protection claim defines the invention as follows:

1. A system for following the spreading of material in road maintenance consisting of (100) a machine (12) for picking and spreading material (16) consisting of a cargo base (14) for the material (16), positioning implements (18) fitted in connection with the machine (12) for defining the machine (12) position data (p1,p2) as a function of time, a computer (24) consisting of a memory (26) for position data (p1,p2) and weighing data (m2,m2), and weighing implements (20) fitted in connection with the cargo base (14) for weighing the material (16) in the cargo base and establishing weighing data (m2,m2) of the material based on weighing, characterised by the fact that the system (100) still involves programmatic implements (22) fitted to establish individual discharge event working data on initial weighing data (m1), final weighing data (m2) and position data (p1,p2) as the working data consists of mass data of an individual discharge event (M) and data of discharge position (P).

100

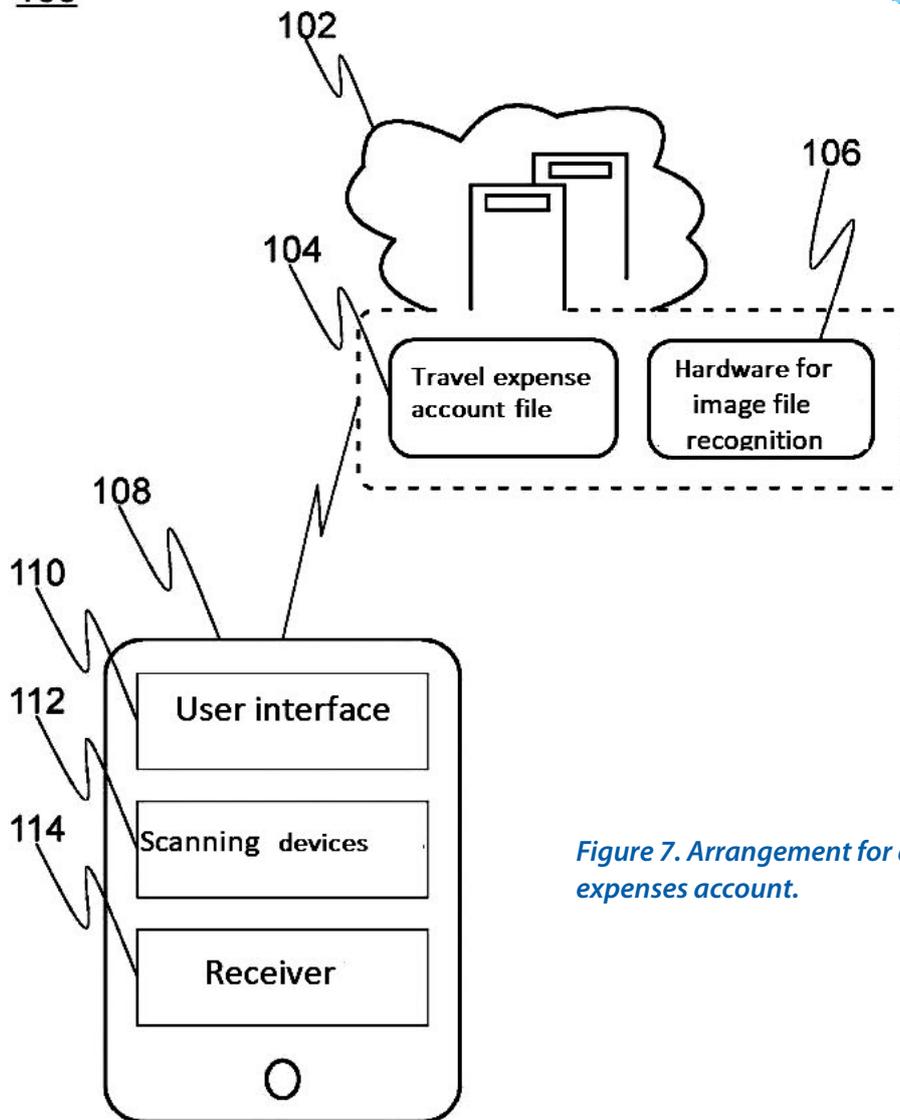


Figure 7. Arrangement for a travel expenses account.

U20174242 Arrangement for a travel expenses account

The invention's technical problem is to facilitate travel expense claims by reading expense receipts automatically using computer vision. The utility model's first claim defines the invention as follows:

An arrangement for establishing a travel expense account (100) consisting of

- An electric travel expense account form (104) arranged for the computer (102)

- Implements for recognising a picture file depicting the expense receipt (106)
- Characterised by the fact that the implements mentioned (106) have been arranged to recognise the data on expense receipts from a picture file by reading the expense items on the expense receipt, and that the implements (106) are connected to the computer (102), and that the computer (102) has been arranged to establish the counted expense items as an input for the travel expense account form.

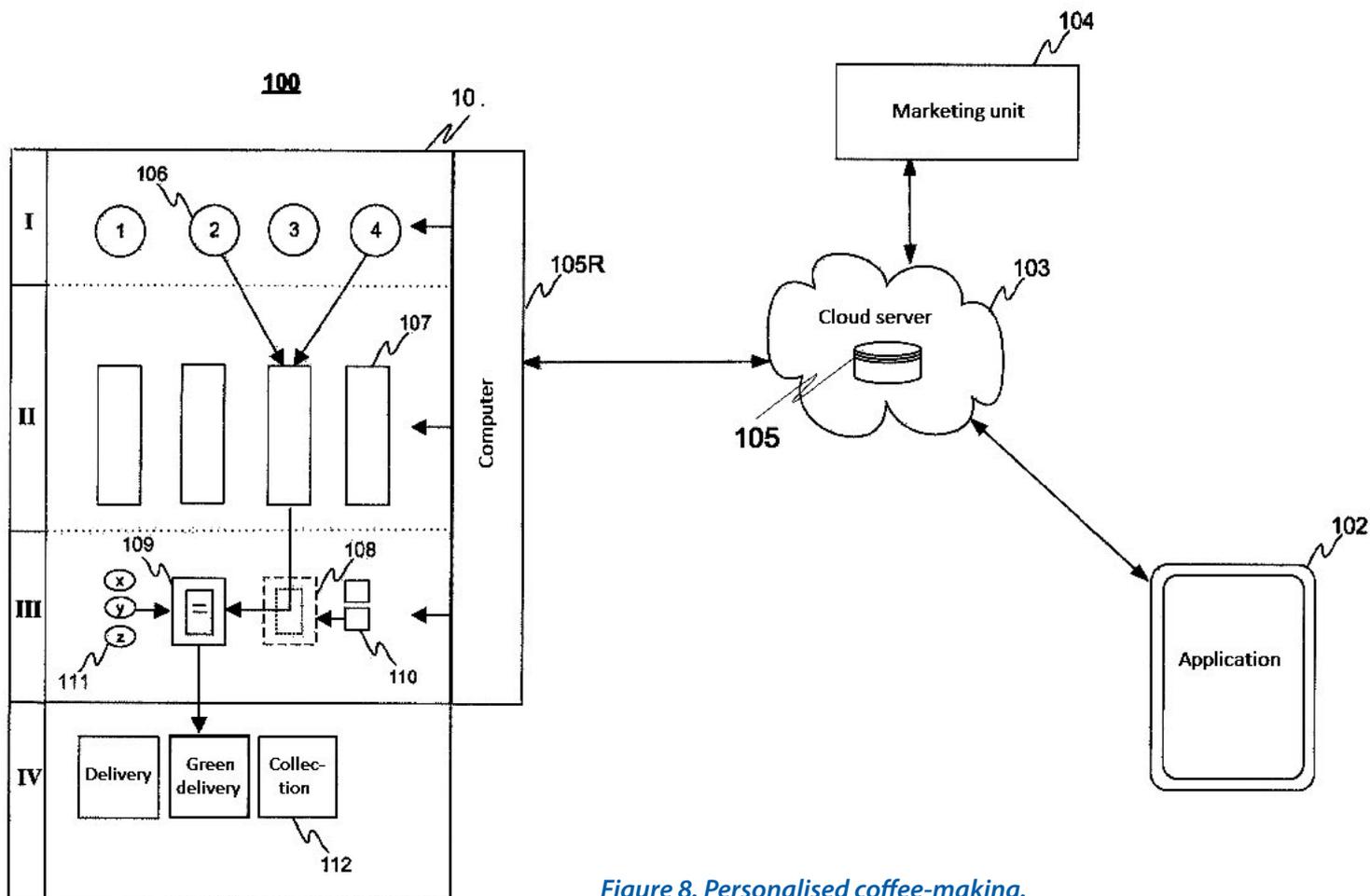


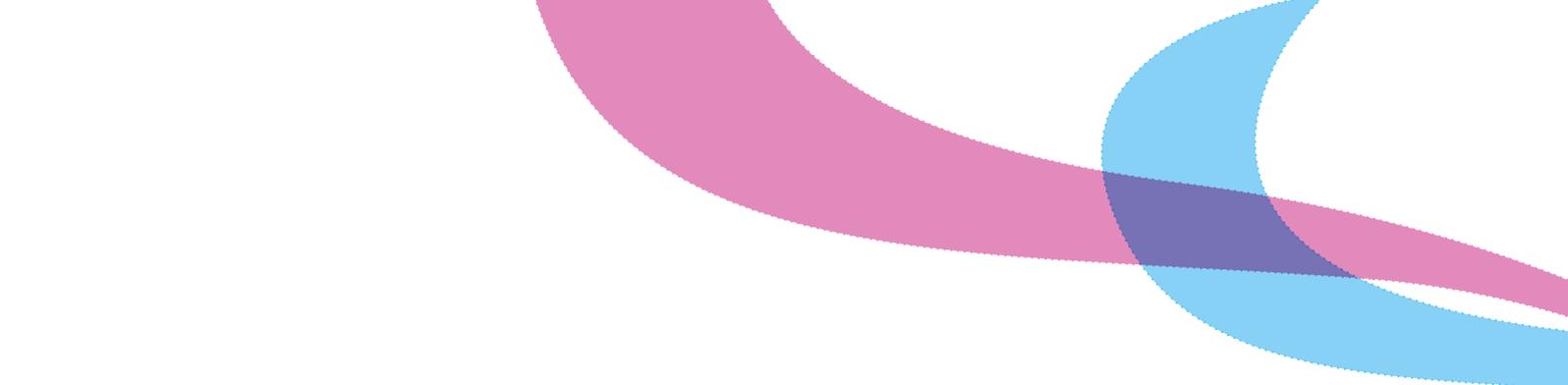
Figure 8. Personalised coffee-making.

U20194044 Personalised coffee-making

The invention's technical problem is to achieve an arrangement for making personalised coffee or other foodstuffs so that a consumer can choose a product of the desired type. A consumer can choose the coffee bean, roasting, grinding, packing, delivery, etc., from various alternatives. The first utility model claim defines the invention as follows:

An arrangement (100) for personalised coffee-making from coffee beans, characterised by the arrangement consisting of a data collection device (102) to collect user-specific data and to deliver the data mentioned to a controlling computer (105) for producing personalised

coffee, a roasting system (101) consisting of roasting devices (106–109) which are: funnels (106) involving a selection of coffee varieties, a roasting unit (107) for roasting the selected coffee varieties, a grinding unit (108) for grinding the selected coffee varieties, and a packing unit (109) for packing the roasted and/or ground coffee varieties, where the said controlling computer (105) has been configured to receive the user-specified data personalised to make roasted coffee and to establish control parameters based on the user-specific data and to control the functions of at least one roasting device (106–109) with the control parameters to make the personalised roasted coffee.



6. Other protection forms

6.1 DESIGN PROTECTION

Design rights exclusively protect a product's appearance, irrespective of its technical solutions. If a piece of software's visual implementation involves characteristics for which protection is desired, we recommend that you consider design protection. For further information on design rights and how to apply for them, please visit www.prh.fi.

6.2 TRADEMARK

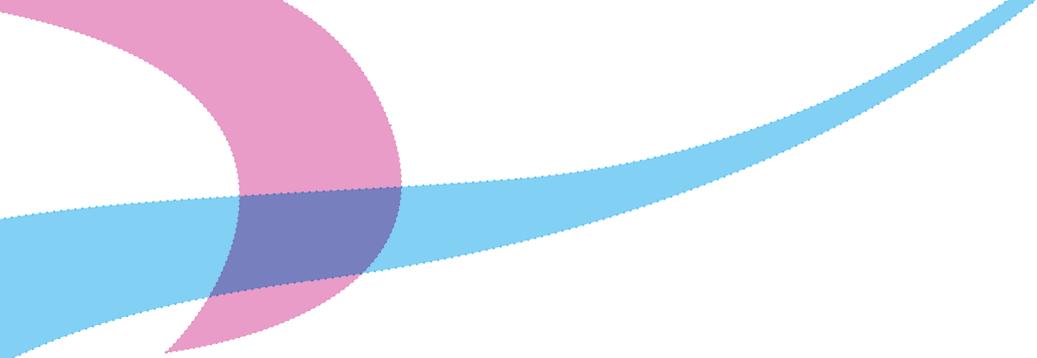
A trademark is a sign that distinguishes one company's goods and services from similar goods and services from other companies. A trademark can consist of a word or several words together, a figure, slogan, a combination of these, a sound mark or a three-dimensional mark, in which case an item or its covering serves as a trademark. A trademark can also consist of moving pictures, a product package or even a colour. For example, a trademark can also be a multimedia mark or a position mark.

Read more about trademarks and how to apply for a trademark on www.prh.fi.

6.3 COPYRIGHT

Copyrights protect written and artistic works, such as books, films, records, drawings, musical works, plays and buildings. Written works include software, maps and works with a graphic design.

A copyright belongs to a natural person who has created a work. The protection is established automatically and requires no registration. A copyright is valid from the moment of creation, for the entire lifetime of the creator and 70 years after the creator's death. In order to obtain protection, a work must be a sufficiently independent and original result of creation. That is, it must surpass the threshold of originality. Organisations such as the Ministry of Education and Culture provide more information about copyright in Finland.



7. Combining various protection forms

Patents, utility models, design rights and trademarks each protect different things. However, this does not mean they could not be applied for the same object simultaneously. For instance, you can apply for a patent or a utility model for the same invention. Because the utility model is granted more quickly than the patent, it can sometimes be necessary to apply for both so that the utility model enters into force first. The right can be abandoned later if the invention is also granted a patent.

A patent application can also be changed to a utility model application during the application process. However, a utility model application cannot be changed to a patent application.

Moreover, an invention protected by a patent or a utility model can involve a visual appearance for which an applicant wants a design right. For marketing purposes, a product usually needs a name and possibly another code, which can be protected by a trademark.

8. Example of combining different forms of protection: OURA RING

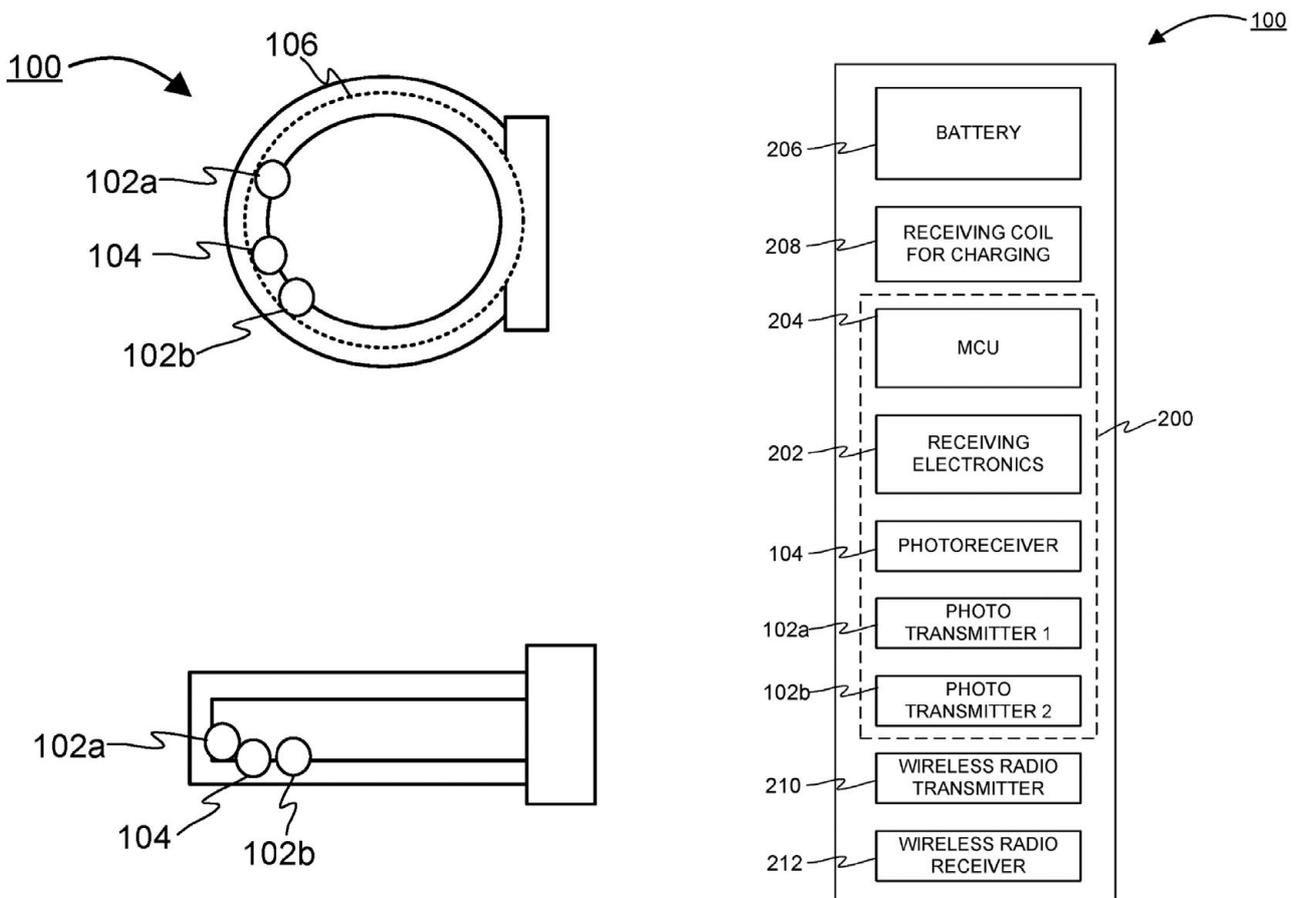


Figure 9. Technical picture of Oura Ring in the patent application 20185483.

Oura Ring is a health-tracking device in the size and shape of a ring. The inner surface of the ring has sensors that track the user's heart rate, body temperature and other variables. The ring has a battery and a Bluetooth connection that delivers the information by radio to the user's smartphone for analysis.

Oura Ring has been protected by several patents, such as 20185417 (Photodetector circuit), 20185418 (Device and method for battery status indication),

20185483 (Wearable optical sensor system), 20185580 (Method and device for optimising a wake-up alarm for several people) and 20205071 (Method for optimising stretching actions).

These patented inventions essentially involve a computer device and a piece of software that controls the sensor activity and result analysis. Besides the Finnish patents, Oura Health Oy has also applied for patents in the US, among other countries.

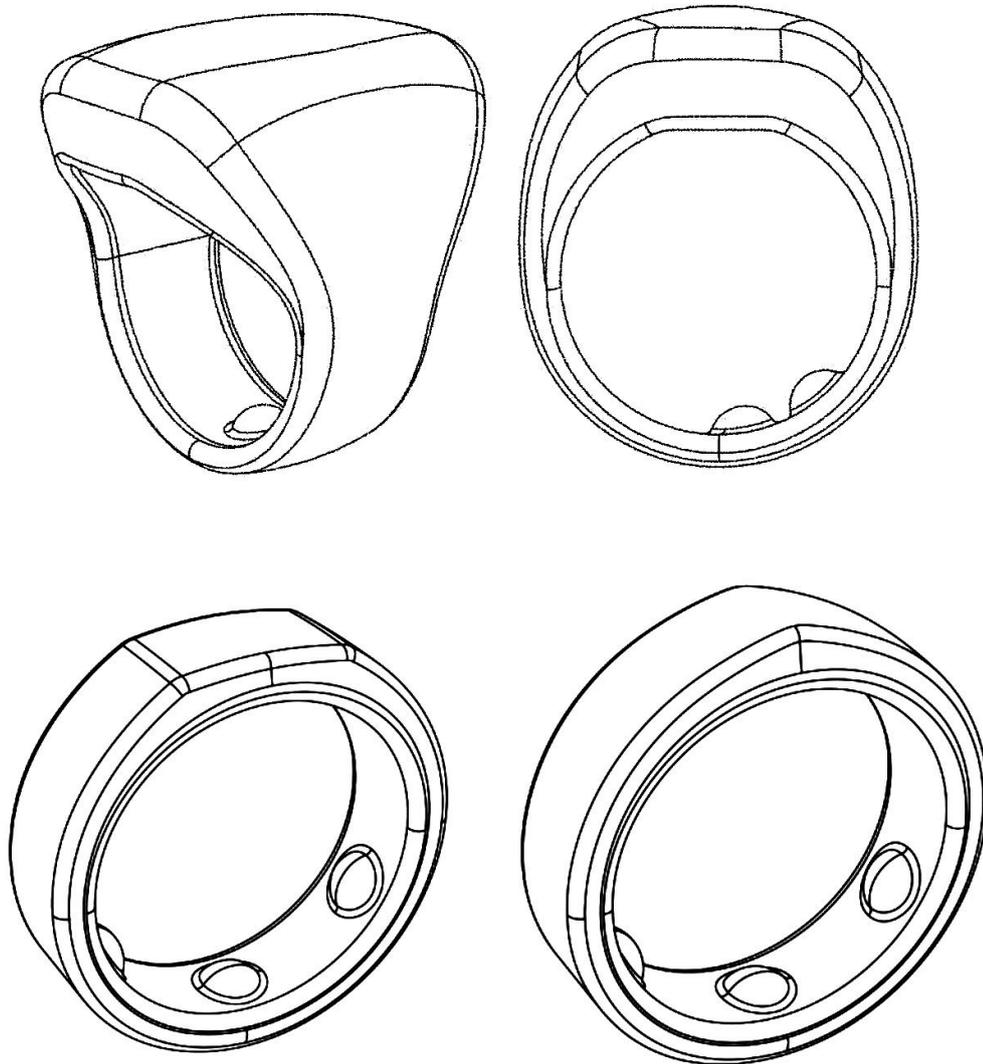


Figure 10. Pictures of Oura Ring design protection.

In addition, Oura Ring has protected the ring's appearance with EU, US, Japanese and Korean design rights, among others.

Sana: OURA
Sana: ŌURA

Oura Ring has also been protected by trademarks, which include visual symbols for the logotype O and OURA (with a line above the letter O). In addition, the word "OURA" (with and without the line above the letter O) has been protected by a trademark.

The program code, demonstration material, etc., related to Oura Ring are automatically protected by copyright.

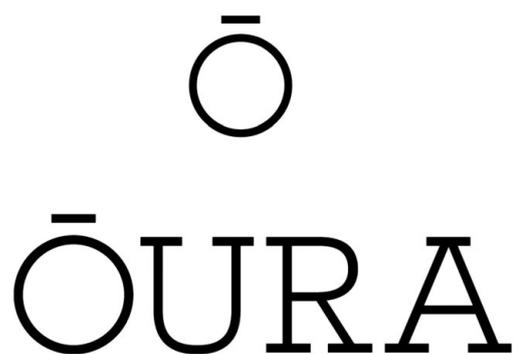


Figure 11. Oura Ring trademarks.

9. Further reading

Patents: www.prh.fi/patents

- Patenttiopas, the PRH 2018 (available in Finnish)
- Patenttikäsikirja, the PRH January 2021, especially chapters I.3 Tietokoneohjelmien patentointi and I.4 Muut PatL 1 §:n 2 momentin 3 kohdan mukaiset menetelmät (available in Finnish)
- Hyödyllisyysmalliopas, the PRH 2022 (available in Finnish)

Trademarks: <https://www.prh.fi/en/trademarks.html>

Designs: <https://www.prh.fi/en/mallioikeudet.html>

Copyright: <https://okm.fi/en/copyright> and <https://tekijanoikeus.fi/> (in Finnish and in Swedish)

Guidelines for Examination in the European Patent Office (EPO), March 2021
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The EPO online course Patentability of computer-implemented inventions at the EPO:
<https://e-courses.epo.org/wbts/cii/index.html>



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