(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 505 862 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.07.2019 Bulletin 2019/27

(51) Int Cl.:
F41J 9/18 *(2006.01)*

(21) Application number: **18215692.7**

(22) Date of filing: **21.12.2018**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **02.01.2018 GB 201800021**

(71) Applicant: **Centurion Computers Ltd**
Hexham Northumberland NE46 3RU (GB)

(72) Inventors:
- **Knowles, Peter Matthew**
  Hexham, Northumberland NE46 3RU (GB)
- **Baldock, Ben**
  Hexham, Northumberland NE46 3RU (GB)

(74) Representative: **Definition IP Limited**
The Core
Newcastle Helix
Bath Lane
Newcastle Upon Tyne NE4 5TF (GB)

(54) TRAP CONTROL MODULE

(57) A control module for controlling one or more traps is provided. The control module comprises a processor and transceiver unit adapted to generate a wireless local area network in accordance with a wireless communication standard enabling user devices to communicate control data to the control module in accordance with the wireless communication standard. Responsive to receipt of control data, said processor is adapted to generate relay control signals for selectively energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

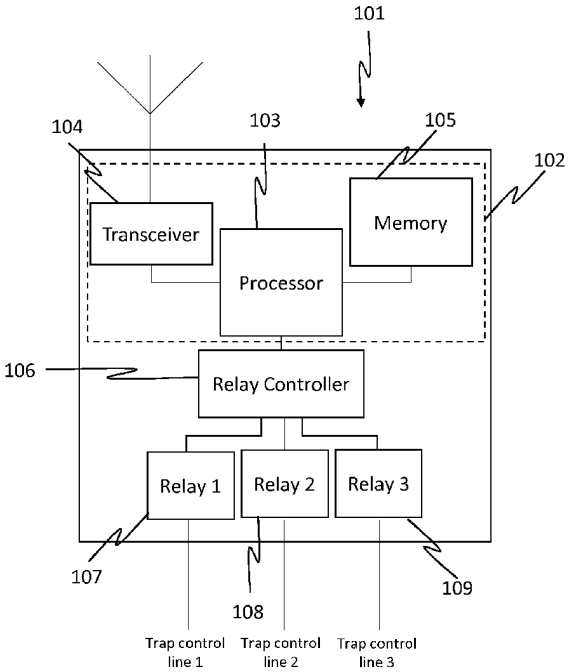

Fig 1

EP 3 505 862 A1

Description

Technical Field

[0001] The present invention relates to control modules for controlling the firing of automatic traps such as clay pigeon traps.

Background

[0002] Clay pigeon traps or throwers are typically spring-operated traps for projecting targets (typically "clay pigeons", "clays" or "skeets") into the field of fire of sporting guns. Clay pigeon traps are conventionally required to operate in either of two modes. In a first mode, targets are projected laterally across the line of sight of the guns, to simulate the flight of birds such as pheasants. In the second mode, the targets are projected along the ground, in the fashion of a bolting rabbit, or vertically upwards in the manner of a springing teal.

[0003] In general, automatic clay pigeon traps include a throwing mechanism and a release mechanism. The release mechanism can be activated or actuated. For example, clay pigeon traps may consist of a frame or body on which is pivoted a swinging arm or blade for projecting a target at a velocity approximating, for example, the speed of flight of a game bird or the speed of a bolting rabbit. The blade is often spring-loaded by means of a strong tension spring anchored at one end to the body and at the other end to the blade. The blade is usually designed to be swung by the spring through an arc. The blade is formed with a flange or fence on its upper surface against which targets to be projected slide outwards from the pivot during the "throw" or projection swing of the blade. The rigid frame or body can be secured to a larger stand or base for firm support on the ground. In most cases, an operator will direct the activation of one or more of the traps depending on the requirements of the users.

[0004] Whilst the described clay pigeon trap set ups work well for large shooting parties or events where an operator is present close to the traps to both reload and fire multiple traps as and when is required by the shooters, their use by individuals or smaller parties who do not have a dedicated operator can be laborious. Even for larger shoots the described systems are not ideal either for convenience or for safety reasons. One option for individuals or smaller parties is to use a remote operating device where a wire can be run from the trap to a user such that they can actuate the trap from a distance by sending an electrical signal down the wire. However, this is usually limited to the user actuating a single trap (although there are some systems where multiple traps are hard wired together, so they can be actuated from a single user) and there are challenges in setting the trap up, particularly when the terrain is uneven or covered in scrub, bushes etc. as will often be the case for such activities which are commonly carried out in a countryside environment.

[0005] Another option, as described in US 4302749 is to use voice activated commands, however this runs the risk of unwanted or incorrect firing of the trap and is generally only used for specific shooting disciplines such as DTL. Similar incorrect firing issues are also found with RF wave transmissions which can pick up other RF signals and interference.

[0006] There have also been some recent attempts to use Bluetooth™ to trigger traps via a triggering unit. However, this has limitations due to the inclusion of Bluetooth™ in that the triggering unit must be very close to the user and limits the system to a single user at a time. Such attempts also require significant processing on the user device with no processing occurring at the triggering unit such that preferred timings, multiple shot commands cannot easily be accessed by other users.

[0007] Although the present document refers to clay pigeon traps, it will be understood that the term "trap" or "traps" can refer to physical moving target projection devices in general or, more preferably moving target projection devices for shooting.

[0008] The present invention aims to obviate or mitigate limitations associated with the prior art.

Summary of the Invention

[0009] In accordance with a first aspect of the invention there is provided a control module for controlling one or more traps. The control module comprises a processor and transceiver unit adapted to generate a wireless local area network in accordance with a wireless communication standard enabling user devices to communicate control data to the control module in accordance with the wireless communication standard. Responsive to receipt of control data, the processor is adapted to generate relay control signals for selectively energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

[0010] Optionally, the control data indicates a specific trap and the processor is adapted to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

[0011] Optionally, the one or more relays are housed within the control module.

[0012] Optionally, each relay is connectable to a trap via a trap control line.

[0013] Optionally, the processor and transceiver are adapted to communicate data to and from one or more slave control modules via the wireless local area network and the processor and transceiver are operable to determine if the control data relates to a trap connected to a slave control module, and if so generate and transmit a trap fire command via the wireless local area network to that slave module which when received by the slave control module causes the slave control module to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

[0014] Optionally, the processor is adapted to run software providing a web server and host thereon a website accessible to user devices, wherein the user devices can communicate control data to the processor via the web-server.

[0015] Optionally, the website is displayable on web-browser software running on user devices to provide a control interface and control data can be input by a user via the control interface.

[0016] Optionally, the website requires a user to enter a predetermined authorisation code to gain access to the web-browser.

[0017] Optionally, the processor is arranged to generate relay control signals and to transmit trap fire commands to slave control modules responsive to control data from a single user device at any one time.

[0018] Optionally, the wireless communication standard is an 802.11 standard.

[0019] Optionally, the control module is adapted to receive a power input from a trap.

[0020] In accordance with a second aspect of the invention, there is provided a slave control module for controlling one or more traps. The slave control module comprises a processor and transceiver unit adapted to receive, via a wireless local area network established in accordance with a wireless communication standard, a trap fire command transmitted from a master control module. Responsive to receipt of said trap fire command, said processor is adapted to generate relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

[0021] Optionally, the trap fire command indicates a specific trap and the processor is adapted to generate a relay control signal for selectively energising a relay associated with the trap indicated by the trap fire command.

[0022] Optionally, the one or more relays are housed within the control module.

[0023] Optionally, each relay is connectable to a trap via a trap control line.

[0024] In accordance with a third aspect of the invention, there is provided a method of operating a control module for controlling one or more traps. The method comprises generating a wireless local area network in accordance with a wireless communication standard enabling user devices to communicate control data to the control module in accordance with the wireless communication standard, receiving control data from a user device, and responsive to receipt of the control data, generating relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

[0025] Optionally, the method further comprises determining if the control data relates to a trap connected to a slave control module, and if so generating and transmitting a trap fire command via the wireless local area network to that slave module which when received by the slave control module causes the slave control module to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

[0026] In accordance with a fourth aspect of the invention, there is provided a method of operating a slave control module for controlling one or more traps. The method comprises receiving, via a wireless local area network established in accordance with a wireless communication standard, a trap fire command transmitted from a master control module, responsive to receipt of said trap fire command, and generating relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

[0027] In accordance with a fifth aspect of the invention, there is provided a computer program comprising computer readable instructions which when executed by a processor, causes the processor to perform a method according to the third aspect or the fourth aspect.

[0028] In accordance with a sixth aspect of the invention, there is provided a trap control system comprising a control module according to the first aspect and one or more slave control modules according to the second aspects and a plurality of traps, at least one of the plurality of traps connected to the control module and another trap of the plurality of the traps connected to the one or more slave control module.

[0029] In accordance with an aspect of the invention, there is provided a control module for controlling the firing of one or more traps. Advantageously, the control module establishes a wireless local area network (for example an 802.11 based wireless local area network) on which is received control data for controlling the firing of traps connected to the control module. Conventional user devices, such as smartphones and tablets equipped with suitable transceivers (e.g. "Wi-Fi enabled" devices) can readily identify and communicate control data for controlling the firing of traps on such a network. Further, advantageously, and in contrast to certain prior art techniques relying on peer-to-peer communication provided, for example by Bluetooth, by virtue of the control module providing a wireless local area, multiple user devices can communicate data with the control module.

[0030] Advantageously, in certain embodiments, the control module is adapted to implement a web server and host a website accessible by user devices. The website, displayable on conventional user device browser software provides a convenient means for providing a control interface for communicating control data conventional user devices to the control module.

[0031] Advantageously, in certain embodiments, the control module, acting as a master control module, is adapted communicate trap fire commands to one or more slave control modules via the wireless local area network. This extends the number of traps that can be controlled beyond those physically connected to the master control module.

[0032] Various further features and aspects of the in-

vention are defined in the claims.

Brief Description of the Drawings

[0033] Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, where like parts are provided with corresponding reference numerals and in which:

Figure 1 provides a schematic diagram of a trap control module in accordance with certain embodiments of the invention;

Figure 2 provides a schematic diagram depicting a trap control module, corresponding to the trap control module shown in Figure 1, in use in a system comprising several traps connected to the trap control module;

Figure 3 provides a schematic diagram showing a user interface of a user device which is within range of a wireless LAN established by a trap control module according to certain embodiments of the invention;

Figure 4 provides a schematic diagram depicting the user interface of the user device displaying a web browser on which is shown a trap control web page hosted by the webserver implemented on the controller unit in accordance with certain embodiments of the invention;

Figure 5 provides a schematic diagram of a system comprising a master trap control module and a first and second slave trap control module in accordance with certain embodiments of the invention, and

Figure 6 provides a schematic diagram illustrating a user interface on a user device showing a web-browser displaying a web page provided by a web server hosted on a master trap control module connected to two slave trap control modules as depicted in Figure 5.

Detailed Description

[0034] Figure 1 provides a schematic diagram of a trap control module 101 in accordance with certain embodiments of the invention.

[0035] The control module 101 includes a controller unit 102 comprising a processor unit 103 connected to a radio transceiver unit 104 and a memory unit 105. The memory unit has stored thereon software which the processor is arranged to retrieve and run. The processor unit 103 of the controller unit 102 is further connected to a relay controller 106 which is connected to a number of trap relays 107, 108, 109 which each provide a trap control line (Trap control line 1, Trap control line 2, Trap control line 3).

[0036] In the embodiment shown in Figure 1, the control module 101 includes three trap relays. However, in other embodiments, other numbers of trap relays can be provided, for example four, five or six.

[0037] Typically, the controller unit 102 is provided by a suitably programmed single-board computer equipped with wireless transceiver hardware such as a Nano Pi NEO Air. However, it will be appreciated that any suitable hardware can be used including "custom" hardware, for example one or more application-specific integrated circuits (ASICs).

[0038] Using techniques known in the art, the controller unit 102 is adapted to establish a wireless local area network (WLAN) in accordance with a wireless networking standard, typically the 802.11 standard. Further, the controller unit 102 is adapted to act as an access point for the network. In this way data can be communicated to and from remote devices, e.g. tablets and smartphones equipped with 802.11 (e.g. Wi-Fi) compatible hardware and software.

[0039] Furthermore, the software run by the processor unit 103 enables the controller unit 102 to implement a webserver which is accessible to remote devices via the wireless LAN. The memory 105 has stored thereon webpage data enabling the webserver to host one or more web pages (a website) via which the relay controller 106 can be controlled. Specifically, the relay controller 106 can be controlled by the processor unit 103 to energise individual trap relays and to thereby generate a trap trigger signal on the corresponding trap control line.

[0040] Typically, the relay controller is an electronic component (e.g. an IC) adapted to receive relay control signals from the processor unit which identifies a specific relay (for example by outputting one of a number of predetermined sequence of bits, where each sequence of bits identifies a specific relay), and then generates a suitable energising input (e.g. an energising current or voltage) to the relay identified by the relay control signal.

[0041] The control system 101 is typically housed in a discrete housing with a trap control line port providing control line jacks, allowing trap control lines to be plugged into the control module 101.

[0042] In certain embodiments, each trap relay comprises two electrical relays, where a first relay is connected to the relay controller, a second relay is connected to the first relay. In use, the first relay is triggered by the relay controller and the second relay is triggered by the first relay. This arrangement reduces the likelihood of "false firing" where a trap trigger signal is generated unintentionally, for example when the control module is powered on. The electrical relays can be provided by any suitable means, for example suitable electromechanical relays or solid state relays.

[0043] Figure 2 provides a schematic diagram depicting a trap control module 202, corresponding to the trap control module 101 shown in Figure 1, in use in a system 201 comprising several traps connected to the trap con-

trol module.

[0044] The trap control module 202 is connected to a number of traps 203, 204, 205, (for example electrically actuated clay pigeon traps) via corresponding trap control lines 206, 207, 208. As described above, the controller unit of the trap control module provides a wireless LAN enabling user devices 209, 210 (for example 802.11 compatible tablets or smartphones) to communicate data to and from the trap control module 202. More specifically, the user devices can access a website hosted on the webserver implemented by the controller unit of the trap control module and thereby communicate trap control information (data) to the trap control module 202. Responsive to receipt of this control information, the processor unit of the trap control module is arranged to generate corresponding relay control signals which are input to the relay controller. In accordance with the relay control signals, the relay controller then selectively energises the relays triggering the firing of the traps 203, 204, 205.

[0045] Figure 3 provides a schematic diagram showing a user interface 301 (e.g. touchscreen display) of a user device (e.g. a smartphone) which is within range of a wireless LAN established by a trap control module as described with reference to Figures 1 and 2. The user interface 301 is shown displaying a screen which enables a user to select a wireless network with which to connect. The trap control module, acting as an access point for the wireless LAN, broadcasts a network identifier which is received by the user device. In accordance with conventional operation, the user device extracts network name text information from the network identifier and displays a network name 302. The user can then select the network name 302 (e.g. by touch input to a corresponding area of the touchscreen display) and responsive to this, the user device and the trap control module, acting as an access point, establish a wireless connection.

[0046] Once the wireless connection is established, data can be communicated to and from the user device in the same way that data can be communicated to and from the user device when connected to a conventional wireless access point providing onward access to a network.

[0047] In accordance with embodiments of the invention, once a wireless connection is established in this way, control information can be communicated from the user device to the trap control module using a web interface.

[0048] More specifically, conventional browser software can be opened on the user device and used to generate an HTTP request (for example, by entering any web address or a predetermined IP address). On receipt of this request, the controller unit is adapted to return web data hosted on the webserver.

[0049] Figure 4 provides a schematic diagram depicting the user interface 301 of the user device displaying a web browser 401 on which is shown a trap control web page 402 hosted by the webserver implemented on the controller unit.

[0050] The trap control web page 402 includes a number of graphical elements 403, 404, 405 each of which can be selected (for example by touch input to a corresponding area of the user device touchscreen display). Each graphical element 403, 404, 405 corresponds to a trap that can be fired. For example, with reference to Figures 1 and 2, on selection of a first of the graphical elements 403, the web page 402 is such that the web browsing software communicates a first trap fire message to the web server. On receipt of this message, the software running on the processor unit 103 is adapted to control the processor unit 103 to send a relay control signal to the relay controller 106 which causes the first relay 107 to energise which generates a trap trigger signal on the first trap control line 206. This signal is received by the first trap 203 which then fires.

[0051] Similarly, on selection of a second of the graphical elements 404, a second trap fire message is sent to the web server. On receipt of this message, the processor unit 103 sends a relay control signal to the relay controller 106 which causes the second relay 108 to energise which generates a trap trigger signal on the second trap control line 207. This signal is received by the first trap 203 which then fires.

[0052] In certain embodiments, the number of traps that can be controlled can be increased by using further trap control modules. In such embodiments, one trap control module can be designated a master trap control module, and the other trap control modules are designated slave control modules.

[0053] Figure 5 provides a schematic diagram of a system comprising a master trap control module 501 and a first slave trap control module 502 and a second slave trap control module 503.

[0054] The master trap control module 501 is connected via trap control lines to a first set of three traps 504, 505, 506, the first slave trap control module 502 is connected via trap control lines to a second set of three traps 507, 508, 509 and the second slave trap control module 503 is connected via trap control lines to a third set of three traps 510, 511, 512.

[0055] The master trap control module 501 operates in the same way as the trap control module described above. However, the trap control web page hosted on the controller unit of the master trap control module 501, as well as enabling control of the first set of three traps 504, 505, 506, also enables trap fire messages to be generated and sent to the web server relating to the second set of three traps 507, 508, 509 connected to the first slave trap control module 502, and the third set of three traps 510, 511, 512 connected to the second slave trap control module 503.

[0056] The master trap control module 501 and each of the slave trap control modules 502, 503 have controller units which are adapted to communicate data to and from each other. In other words, data can be communicated between the master trap control module 501 and the first slave trap control module 502 and data can be commu-

nicated between the master trap control module 501 and a second slave trap control module 503. Typically, this is achieved by each slave module connecting to the wireless LAN provided by the master trap control module 501 in the same way that user devices connect to the master trap control module as described above (i.e. with the master control module acting as an access point to the network). Typically, each slave trap control module will be pre-programmed with the network identifier of the master trap control module and on power up will be arranged to establish a wireless connection with the master trap control module automatically.

[0057] In use, there is provided a master trap with a master trap control module and optionally one or more slave traps with slave trap control modules. In certain embodiments, the master or slave designation of a trap control module is set during manufacture. In other embodiments, each trap control module could be configured to act either as a slave trap control module or a master trap control module by a user selecting the configuration. This could be via a physical switch or via a suitable software control provided on the trap control web page.

[0058] When the master trap control module 501 receives, via the web browser running on the user device, a trap fire message relating to a trap to which one of the slave trap control modules is connected, the software running on the processor unit of the master trap control module is arranged to determine, for example using a pre-programmed look up table, to which of the slave trap control modules the trap in question is connected. The software then controls the processor to control the transceiver unit of the master trap control module to communicate a corresponding trap fire command to the relevant slave trap control module using the wireless connection established between them.

[0059] On receipt of this trap fire command, software running on the processor unit of the slave trap control module in question is arranged to determine to which trap the trap fire command relates, and control the processor unit to generate and send a relay control signal to the relay controller of the slave trap control module which causes the relay controller to energise the relay relating to the trap in question. A trap trigger signal on the relevant trap control line is thereby generated which causes the trap in question to fire.

[0060] In this way, the wireless LAN established by the master trap control module can be used both to receive trap control information from a user using a conventional user device, but can also be used to control any number of slave master trap control modules.

[0061] Figure 6 provides a schematic diagram illustrating a user interface 601 on a user device showing a web-browser displaying a web page provided by a web server hosted on a master trap control module connected to two slave trap control modules as depicted in Figure 5.

[0062] In certain embodiments the web page hosted by the web server may include additional functionality. For example, there may be score card functionality allowing, for example, name data associated with different shooters to be entered and displayed and score data relating to each shooter to be entered and displayed adjacent the corresponding name data. In certain embodiments, the web page may include a trap firing control page (as shown for example in figures 4 and 6) and a separate score card page. The user of the user device can switch between these pages allowing the score data to be updated after a given trap has fired. In certain embodiments, a combined view web page is provided that allows the traps to be fired and scores recorded from the same browser page.

[0063] In certain embodiments the web page may include authentication functionality requiring a predetermined password to be entered before a user can access the functionality provided by the web page.

[0064] In certain embodiments, the web page may include functionality to define different firing modes specifying different variables relating to the firing of the traps. For example, a first firing mode could control a trap to fire a single clay, a second firing mode could control a trap to fire two clays in sequence and a third firing mode could control a trap to fire three clays in sequence. Further variables could control the time delay between firing clays. Other variables could allow a sequence of trap firing. For example, fire two clays from the first trap separated by five seconds, followed by three clays from the fourth trap separated by three seconds and so on. Other firing modes may relate to random firing of one or more traps. In such embodiments, control information relating to such differing firing modes can be entered by a user via the trap control web page, processed by the software running on the processor unit to generate corresponding relay control signals (or trap fire messages for slave trap control modules, which in turn generate corresponding relay control signals at the slave trap control module) for firing the traps in accordance with the user defined firing mode.

[0065] In certain embodiments, functionality is implemented that ensures that only a single user can control the firing of traps at any one time. For example, one user is designated a "trap master" and the software running on the processor will only respond to trap control information (e.g. trap fire instructions) from that user. This can be achieved in any suitable way. In certain embodiments, this is achieved by identifying users via session cookies that are generated when a user logs in to the web page. For example, in certain embodiments, as each trap master has a login pin number, once a user logs in a session cookie is generated. This uses the standard http session protocols for identification of the logged in user and therefore only allows the trap master to generate fire commands for traps associated with that user.

[0066] In certain embodiments, trap control modules in accordance with embodiments of the invention are provided with power supply units adapted to receive power from a power output from a trap.

[0067] As described above, operation of a trap control

module in accordance with embodiments of the invention is controlled principally by software stored within memory and executed by a processor. In accordance with certain embodiments of the invention, there is provided computer software which can be stored on a memory unit and executed by a processor of a trap control module as described above. In accordance with certain embodiments, the computer software comprises instructions which when implemented on the processor, cause the processor to control a trap control module as a master trap control module as described above. In certain embodiments, the computer software comprises instructions which when implemented on the processor, cause the processor to control the trap control module as a slave trap control module as described above. The software can be written, compiled and stored using techniques known in the art.

[0068] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0069] It will be appreciated that features from one embodiment may be appropriately incorporated into another embodiment unless technically unfeasible to do so.

[0070] It will be appreciated that various embodiments of the present disclosure have been described herein for purposes of illustration, and that various modifications may be made. Accordingly, the various embodiments disclosed herein are not intended to be limiting, with the scope being indicated by the following claims.

Claims

1. A control module for controlling one or more traps, said control module comprising a processor and transceiver unit adapted to generate a wireless local area network in accordance with a wireless communication standard enabling user devices to communicate control data to the control module in accordance with the wireless communication standard, wherein responsive to receipt of control data, said processor is adapted to generate relay control signals for selectively energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

2. A control module for according to claim 1, wherein the control data indicates a specific trap and the processor is adapted to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

3. A control module according to any previous claim, wherein the processor is adapted to run software providing a web server and host thereon a website accessible to user devices, wherein the user devices can communicate control data to the processor via the webserver.

4. A control module according to claim 3, wherein the website is displayable on web-browser software running on user devices to provide a control interface and control data can be input by a user via the control interface.

5. A control module according to any previous claim, adapted to receive a power input from a trap.

6. A slave control module for controlling one or more traps, said slave control module comprising a processor and transceiver unit adapted to receive, via a wireless local area network established in accordance with a wireless communication standard, a trap fire command transmitted from a master control module, wherein, responsive to receipt of said trap fire command, said processor is adapted to generate relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

7. A slave control module according to claim 6, wherein the trap fire command indicates a specific trap and the processor is adapted to generate a relay control signal for selectively energising a relay associated with the trap indicated by the trap fire command.

8. A control module according to claim 1 or 2 or a slave control module according to claim 7, wherein the one or more relays are housed within the control module.

9. A control module or a slave control module according to claim 8, wherein each relay is connectable to a trap via a trap control line.

10. A control module according to claim 8 or 9, when dependant on claims 1 or 2, wherein the processor and transceiver are adapted to communicate data to and from one or more slave control modules via the wireless local area network and the processor and transceiver are operable to determine if the control data relates to a trap connected to a slave control module, and if so generate and transmit a trap fire command via the wireless local area network to that slave module which when received by the slave control module causes the slave control module to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

11. A method of operating a control module for controlling one or more traps, said method comprising:

generating a wireless local area network in accordance with a wireless communication standard enabling user devices to communicate control data to the control module in accordance with the wireless communication standard,
receiving control data from a user device
responsive to receipt of the control data, generating relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

12. A method of operating a control module according to claim 11, further comprising:

determining if the control data relates to a trap connected to a slave control module, and if so generating and transmitting a trap fire command via the wireless local area network to that slave module which when received by the slave control module causes the slave control module to generate a relay control signal for selectively energising a relay associated with the trap indicated by the control data.

13. A method of operating a slave control module for controlling one or more traps, said method comprising:

receiving, via a wireless local area network established in accordance with a wireless communication standard, a trap fire command transmitted from a master control module,
responsive to receipt of said trap fire command, generating relay control signals for energising one or more relays to generate a trap trigger signal which when received by a trap causes the trap to fire.

14. A computer program comprising computer readable instructions which when executed by a processor, causes the processor to perform a method according to claim 11 or 12, or claim 13.

15. A trap control system comprising a control module according to claim 5 and one or more slave control modules according to claim 6 and a plurality of traps, at least one of the plurality of traps connected to the control module and another trap of the plurality of the traps connected to the one or more slave control module.

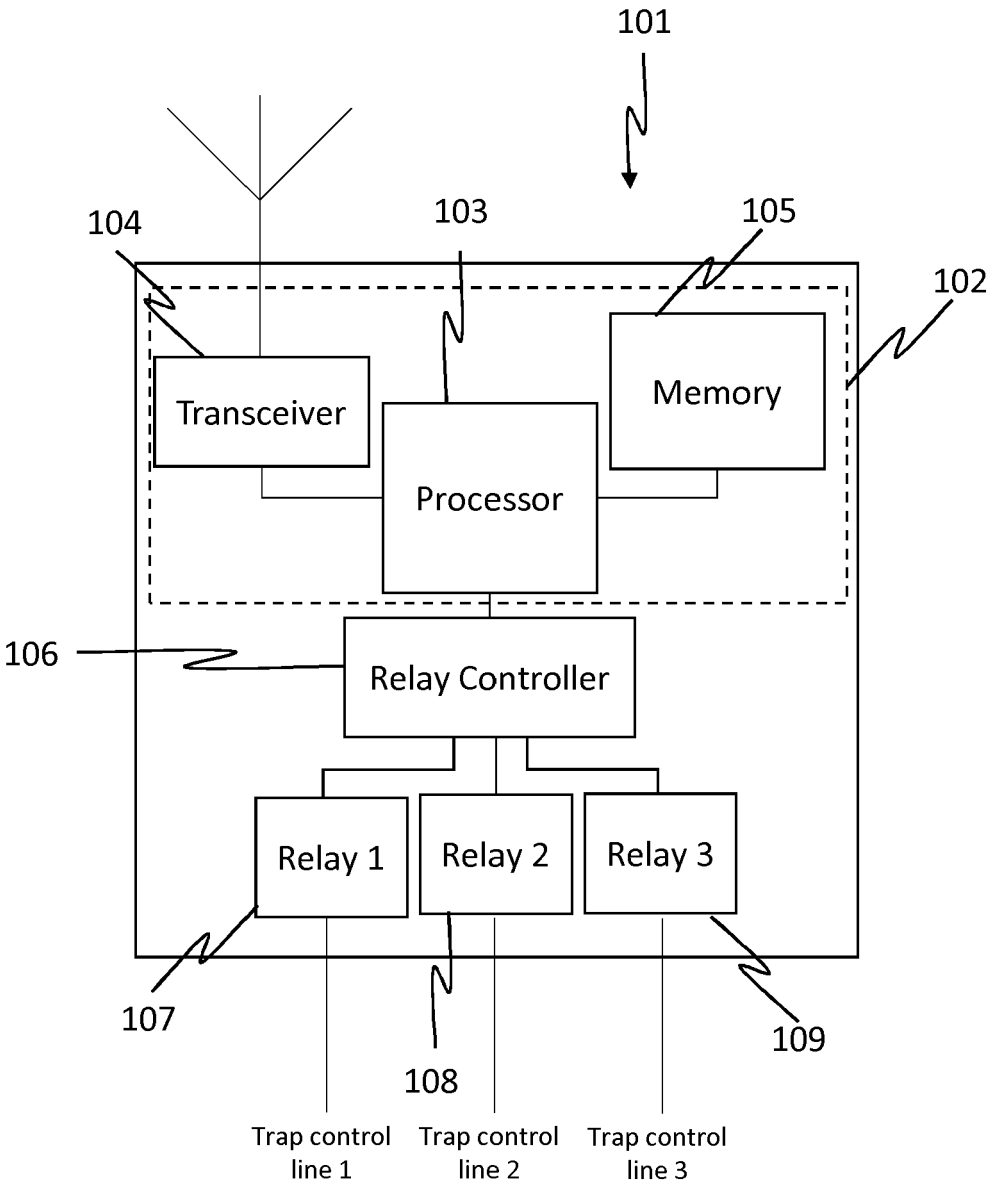
101
104
103
105
102
Transceiver
Processor
Memory
106
Relay Controller
Relay 1
Relay 2
Relay 3
107
108
109
Trap control line 1
Trap control line 2
Trap control line 3

Fig 1

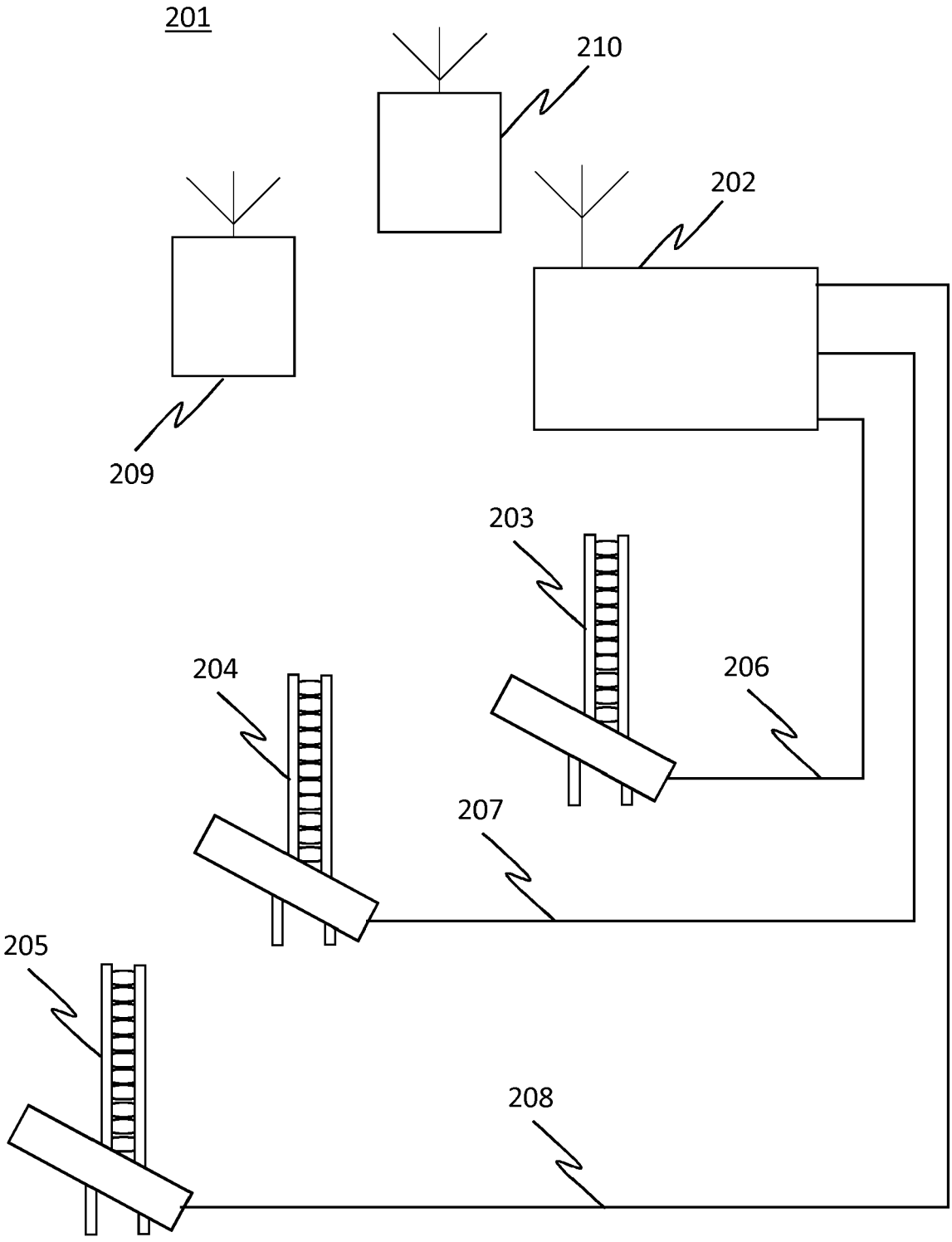

Fig 2

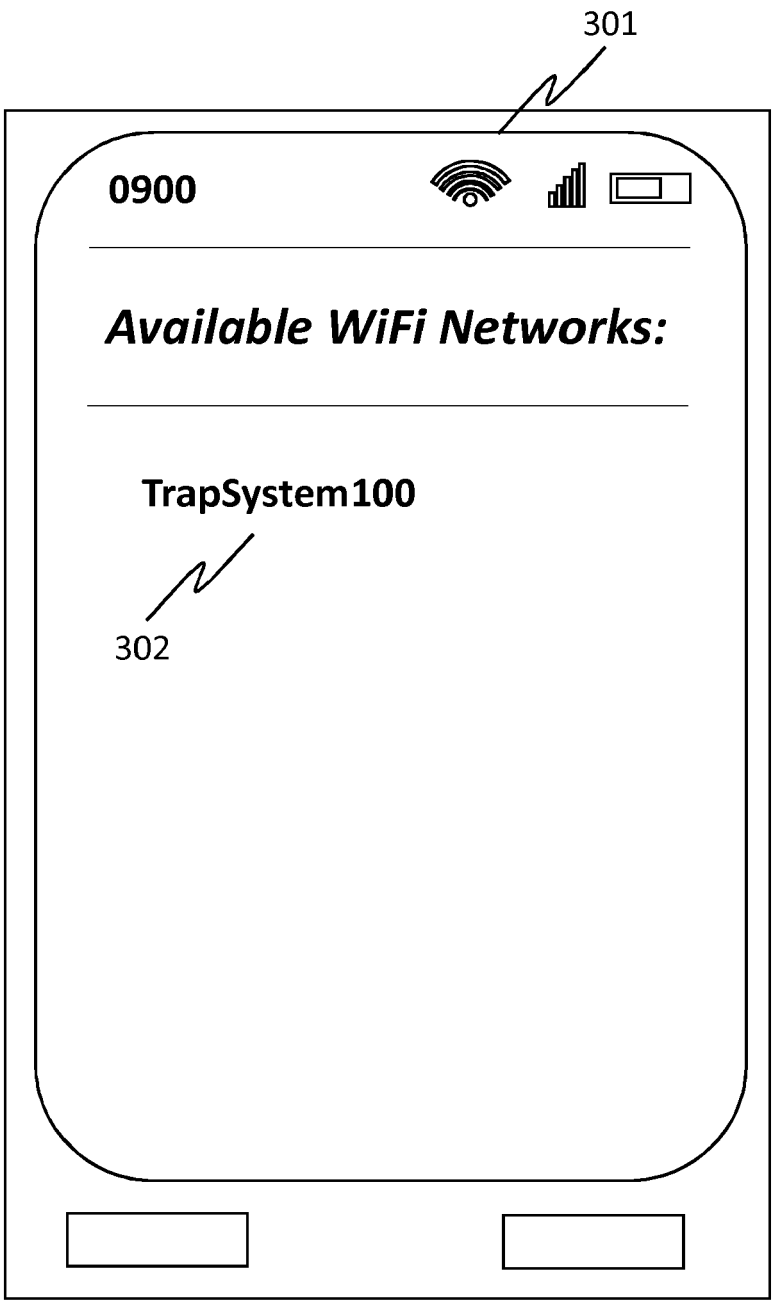

Fig 3

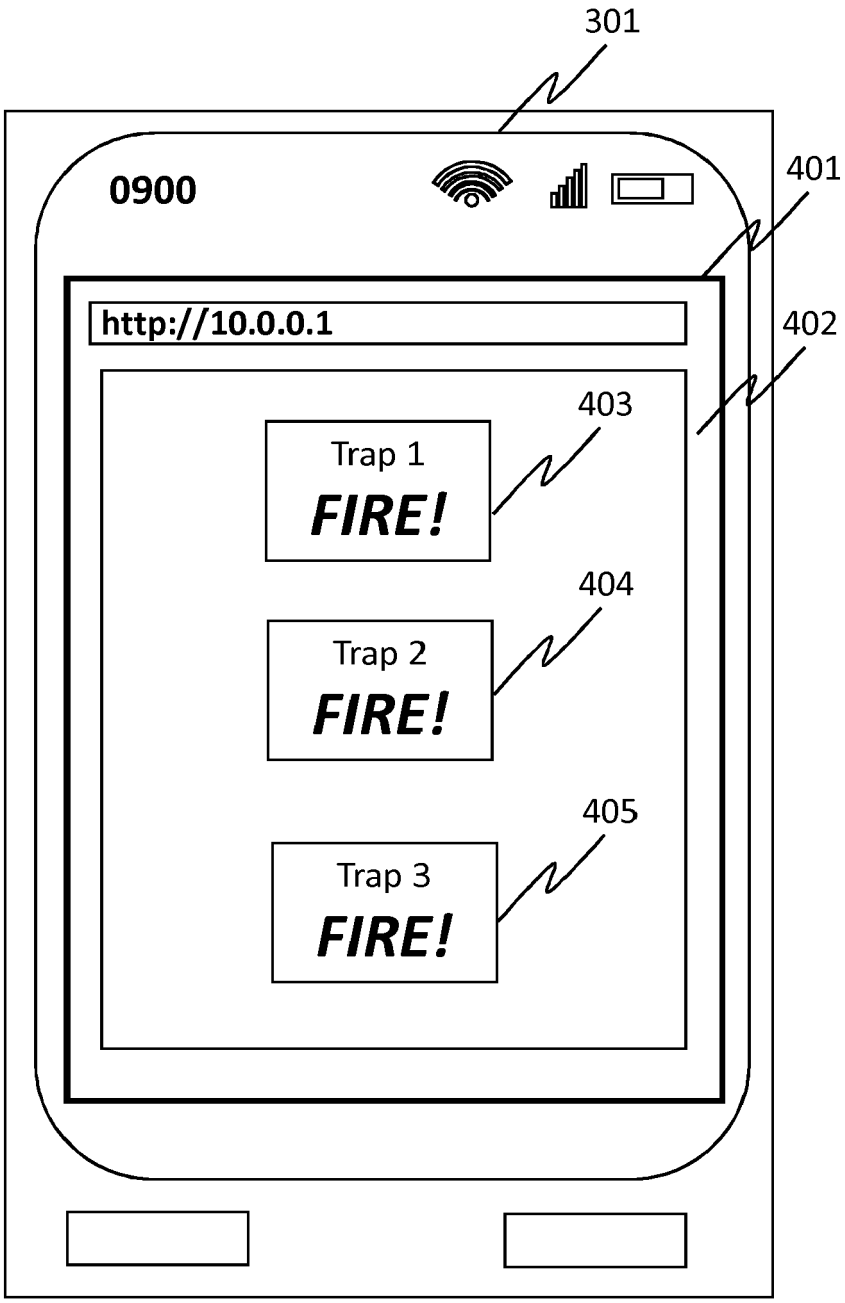
301
0900
401
http://10.0.0.1
402
403
Trap 1
FIRE!
404
Trap 2
FIRE!
405
Trap 3
FIRE!

Fig 4

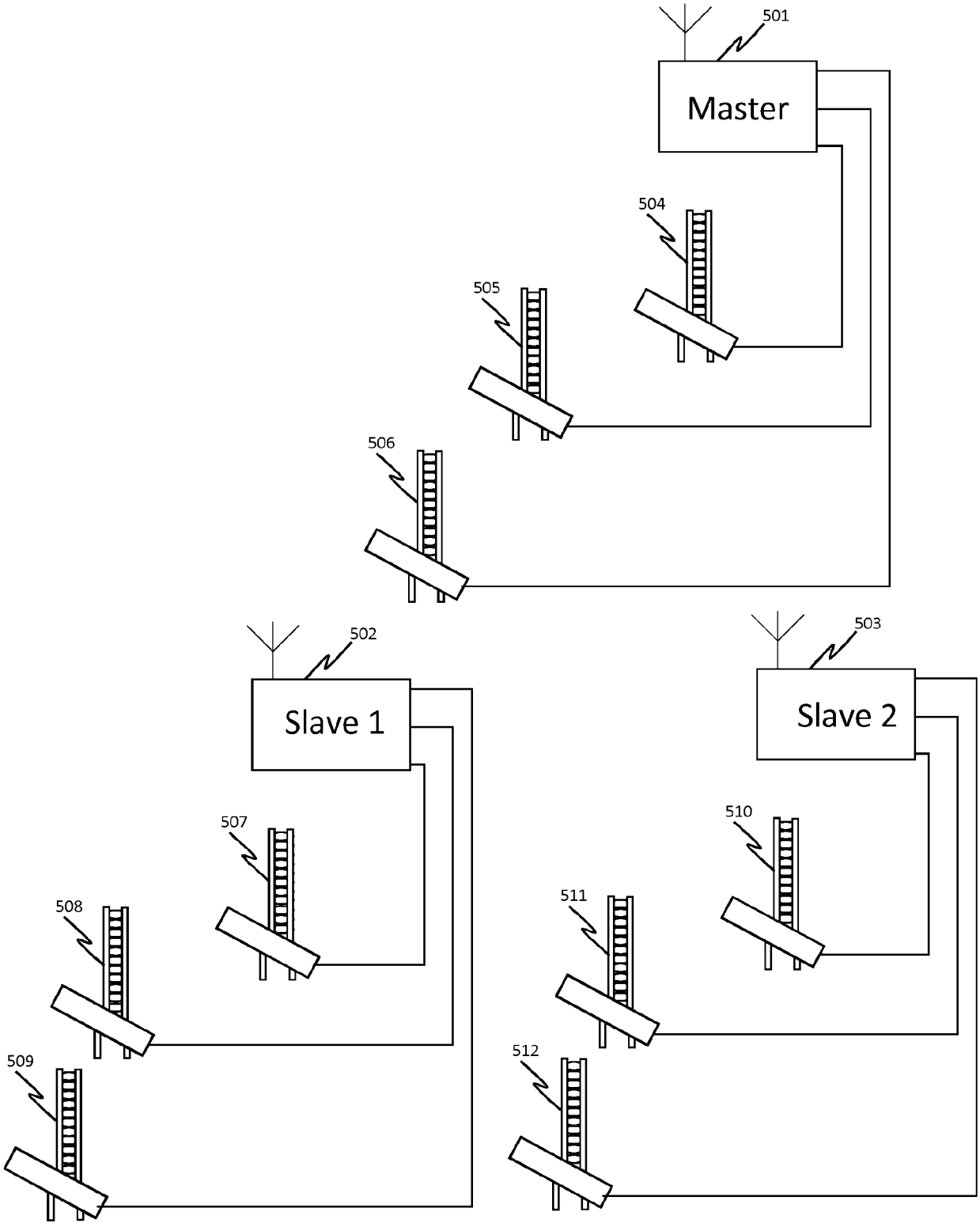
501
Master
504
505
506
502
Slave 1
503
Slave 2
507
508
509
510
511
512

Fig 5

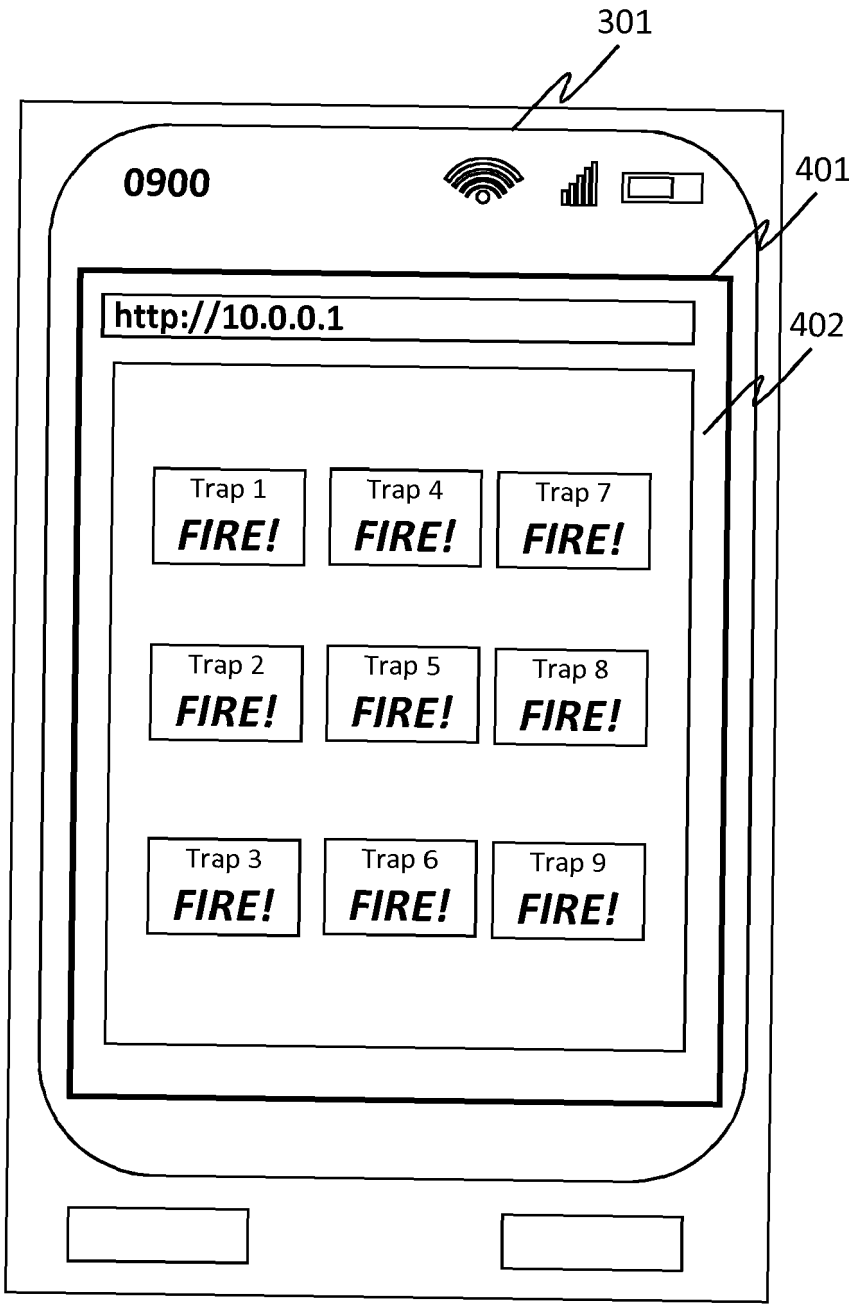
301
0900
401
http://10.0.0.1
402
Trap 1
FIRE!
Trap 4
FIRE!
Trap 7
FIRE!
Trap 2
FIRE!
Trap 5
FIRE!
Trap 8
FIRE!
Trap 3
FIRE!
Trap 6
FIRE!
Trap 9
FIRE!

Fig 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 18 21 5692

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2015/091252 A1 (CHADWICK NEIL [US]) 2 April 2015 (2015-04-02) * paragraphs [0020] - [0049]; figures 1-6 * -----	1-15	INV. F41J9/18
A	WO 2017/005833 A1 (OKM GMBH [DE]) 12 January 2017 (2017-01-12) * pages 6-14; figures 1-8 * -----	1-15	
A	US 2014/217674 A1 (KOCHUBA BRENT [US]) 7 August 2014 (2014-08-07) * paragraphs [0038] - [0095]; figures 1-12 * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) F41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 May 2019	Kasten, Klaus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 21 5692

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-05-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2015091252 A1	02-04-2015	NONE	
WO 2017005833 A1	12-01-2017	CN 107735641 A	23-02-2018
		DE 102015212678 A1	12-01-2017
		EP 3320302 A1	16-05-2018
		US 2018180390 A1	28-06-2018
		WO 2017005833 A1	12-01-2017
US 2014217674 A1	07-08-2014	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4302749 A **[0005]**