(54) Title: INTELLIGENT POWER SOCKET WITH ABILITY TO DISCONNECT THE STANDBY DEVICES AND DISPLAY THE COST OF ELECTRICITY

FIG. 1

(57) Abstract: This intelligent power socket which makes digital connection through electronic devices, calculator and display, helps consumer to obtain the amount of consumption for each outlet considering the type of electronic device utilized in a specified time interval (eg, a day or a week) in terms of currency and if necessary, adjust the electronic device to announce Warning that the electronic device number one and electronic device two must not work more than one and two hours each day respectively, or elec - tronic device tree must not be utilized at peak time. Also, warn the user when the user utilizes highly consumed electronic devices at peak times. In addition, by examining the amount of consumed electrical current, this device estimates the standby mode of the elec - tronic device and after a few minutes in a case that electronic device does not operate, it removes that from circuit. If each one of the sockets disconnect automatically, with pressing and holding of each button of any the remote control, the socket will be connect to the power and it is ready to use.

INTELLIGENT POWER SOCKET WITH ABILITY TO DISCONNECT THE STANDBY DEVICES AND DISPLAY THE COST OF ELECTRICITY

DESCRIPTION

FIELD OF THE INVENTION

This invention relates to the field of electronics which demonstrates the extracted statistical information to a consumer through digital connection through electronic devices, electronic calculator and display.

TECHNICAL PROBLEM

Considering the importance of the issue of saving electricity, it is significant to know how many hours do electrical devises work during a day, and how much electricity they consume and also how much they cost for the person. Currently, there is no way to distinguish how much electricity is consumed by each device in different times and as a result, there is not a tangible and clear way for saving.

Furthermore, electrical devices in standby mode consume electricity as well. There is an assumption that these devices consume less electricity, however if this little consumption is multiplied to the number of these devices in all buildings, the figure is definitely remarkable. It is important to note that people tend to ignore the electricity consumption in peak hours despite public education regarding the consumption of electricity or while consuming electricity, they forget whether they are in peak hours or not. By ignoring this fact, they not only must pay more but also put pressure on power network.

BACKGROUND OF THE INVENTION

Currently, electricity bill is the sole way to see power consumption of which one is not able to extract statistical information and thus planning would be useless. Although relative power consumption is written on each electrical devise, calculating the consumption considering the time of use and the simultaneous use of several devises can be such a hard task for people with not much expertise. In addition, some electrical devices consume more electricity as they are being utilized more. Meanwhile, there is no automatic way to remove standby electrical devices from electric power circuit.

Also, the available three way electronic power sockets ultimately display voltage and prevent sudden connections of electronic devices to the network after switching power. Moreover, there is no warning system to remind the consumption peak hours.
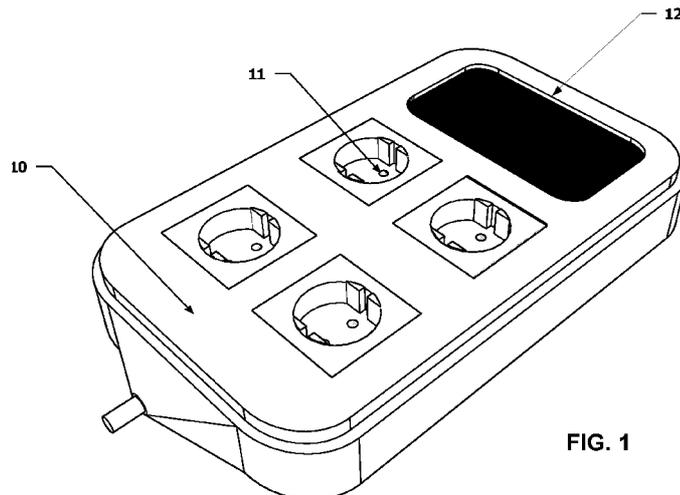
SUMMARY OF THE INVENTION:

This intelligent power socket which makes digital connection through electronic devices, calculator and display, helps consumer to obtain the amount of consumption for each outlet

considering the type of electronic device utilized in a specified time interval (eg, a day or a week) in terms of currency and if necessary, adjust the electronic device to announce Warning that the electronic device number one and electronic device two must not work more than one and two hours each day respectively, or electronic device tree must not be utilized at peak time. Also, warn the user when the user utilizes highly consumed electronic devices at peak times. In addition, by examining the amount of consumed electrical current, this device estimates the standby mode of the electronic device and after a few minutes in a case that electronic device does not operate, it removes that from circuit. If each one of the sockets disconnect automatically, with pressing and holding of each button of any the remote control, the socket will be connect to the power and it is ready to use.

BEST MODE FOR CARRYING OUT THE INVENTION:

This device is utilized in houses or official buildings and any place where electrical devices are used. With the help of this device, standby devices are disabled out of circuit and the person realizes how long any of the devices has been used in *specified interval,* and considering their utilizations, what price is paid which results in planning for those electrical devices as mentioned earlier.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a perspective diagram of the assembled structure according to a preferred embodiment of this invention.

FIG. 2 is a perspective diagram of the disassembled parts of the structure according to a preferred embodiment of this invention.

FIG. 3 is a schematic circuit diagram of the current detection of this invention.

FIG. 4 is a schematic circuit diagram of the Infrared receiver of this invention. This part is used for reconnect the disconnected socket.

FIG. 5 is a schematic circuit diagram of the Calculate and display the current consumption of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS:

Fig. 1 shows a general view of this intelligent power socket which outer frame **10,** sockets **11** and touch screen LCD **12.** There are four sockets **11** in this figure which are possible to increase or decrease in numbers as well as other samples.

Fig. 2 shows a view of the open part, upper frame is shown in this figure **13,** and beneath it, is LCD screen which touch screen panel **14** is also mounted on it, to perform adjustments of each outlet by user. Other related boards **15** are installed in an integrated form and in the lower end of the frame **16** which is connected to the upper part.

Fig. 3 is the main circuit which shows the relay **17** is to switch the total consuming current and chassis or negative circuit **18.** Also a sensor is placed to check the current rate which its outer pin is shown in the figure **19**. By current passage, voltage drop will change at two ends of the circuit due to sensor's **21** constant resistance. To supply the required current, the AC voltage source circuit 20 is also connected.

In other part of the circuit, there is an Opamp IC activator transistor **22** which with the increase of the sensor's two ends resistance potential difference the current of this transistor will traverse from disconnected point to connected one and following is Opamp IC **23** which is to amplify and compare current.

Power transistor **25** is set up to activate relay coil circuit and when it starts working, relay coil is activated **24** and consuming current is disconnected. The positive pole of the delay capacitor **26** is utilized to restart the circuit. The delay capacitor **27** is to disconnect the consuming current after few seconds which the delay time is adjustable. Finally, AC output **28** is set up to connect to electrical device which will be connected to the outlet **11.**

Fig. 4 in this circuit, power transistor **29** is utilized to draw delay capacitor current to zero which by initial current increase, this transistor will move to saturated zone by Opamp IC **23** and draws delay capacitor current near zero and this leads to the restart of the circuit.
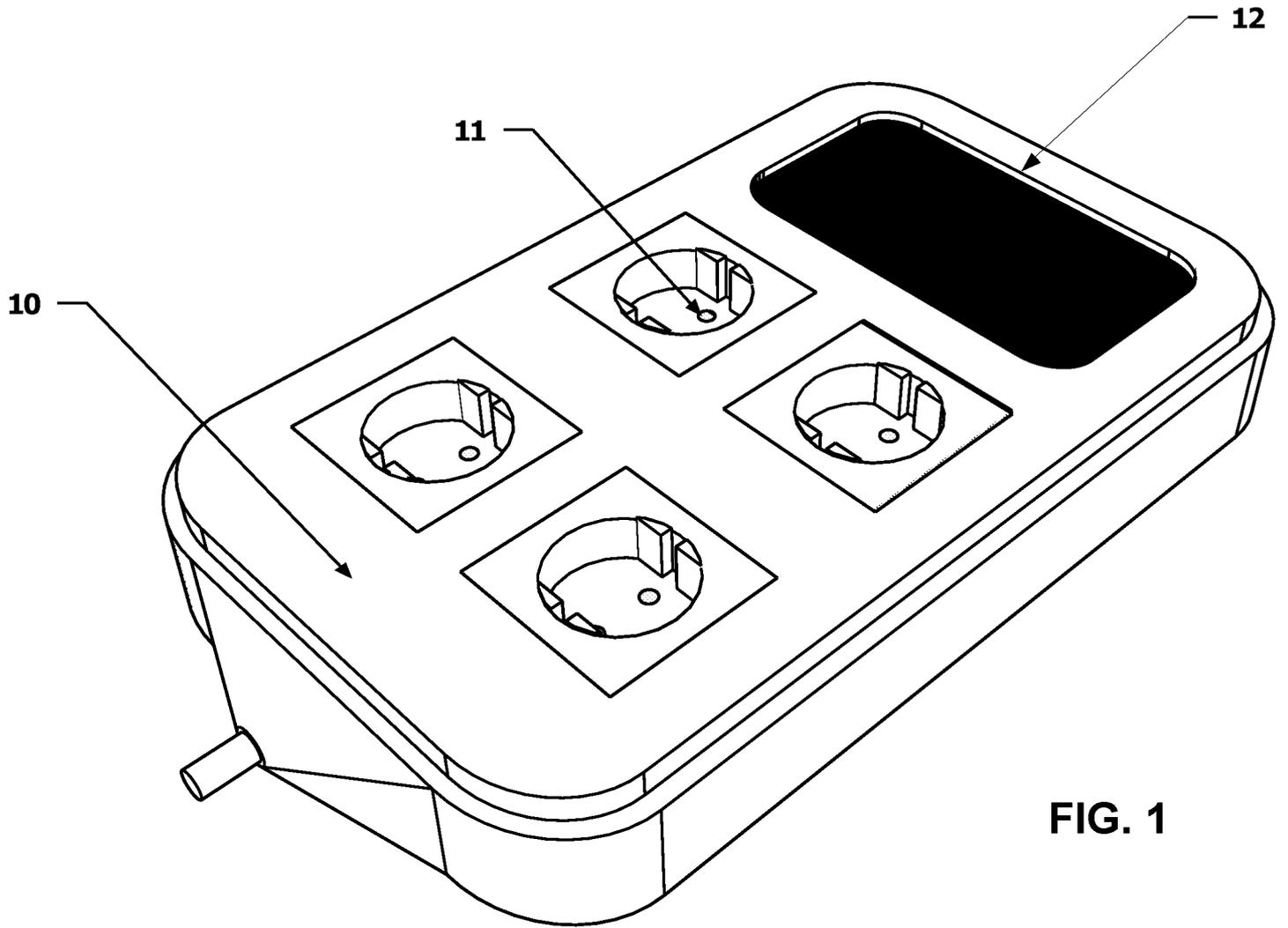
Also in this circuit, Opamp IC **30** is used to amplify infrared receptors' current. Infrared receptor diode **31** to receive IR wave are seen in other part of the figure and in point **32** the connection between this circuit and delay capacitor positive pole exists.

Fig. 5 in this circuit, 5 volt source's positive pin **33** and micro IC's input pin **34** are seen from current sensor exit. The touch screen part **35** is set up to make connections through user, intelligent power socket and related adjustments. Programmable micro controller, Atmega23 IC **36** is placed on this board to calculate power consumption cost and to warn when high consuming devices are used at peak times. Graphical LCD 32x64 **37** by potentiometer or unstable resistance **38** is noticeable in this figure to change display's light rate. Source voltage LCD **39** is supplied from this point with 5 volt current. And in the end, buzzer **40** is set up at desired location to announce acoustic alarm by the IC.

INTELLIGENT POWER SOCKET WITH ABILITY TO DISCONNECT THE STANDBY DEVICES AND DISPLAY THE COST OF ELECTRICITY

CLAIMS

1. An intelligent power socket, comprising:

   A base, having a casing for covering the top of said base, and said casing can having one or more sockets.

   A printed circuit board, being installed at the inner bottom of said base, and comprising a "current detection", "infrared receiver" and a "calculate and display the current consumption ".

2. The intelligent power socket of claim 1, calculate the cost of electricity of each socket by microcontroller IC.

3. The intelligent power socket of claim 1, calculations by microcontroller IC Is displayed on LCD and user can change setting by touch screen.

4. The intelligent power socket of claim 2, by examining the amount of consumed electrical current, this device estimates the standby mode of the electronic device and after a few minutes in a case that electronic device does not operate, it removes that from circuit.

5. The intelligent power socket of claim 3, If each one of the sockets disconnect automatically, with pressing and holding of each button of any the remote control, the socket will be connected to the power and it is ready to use.

6. The intelligent power socket of claim 4, warn the user when the user utilizes highly consumed electronic devices at peak times.
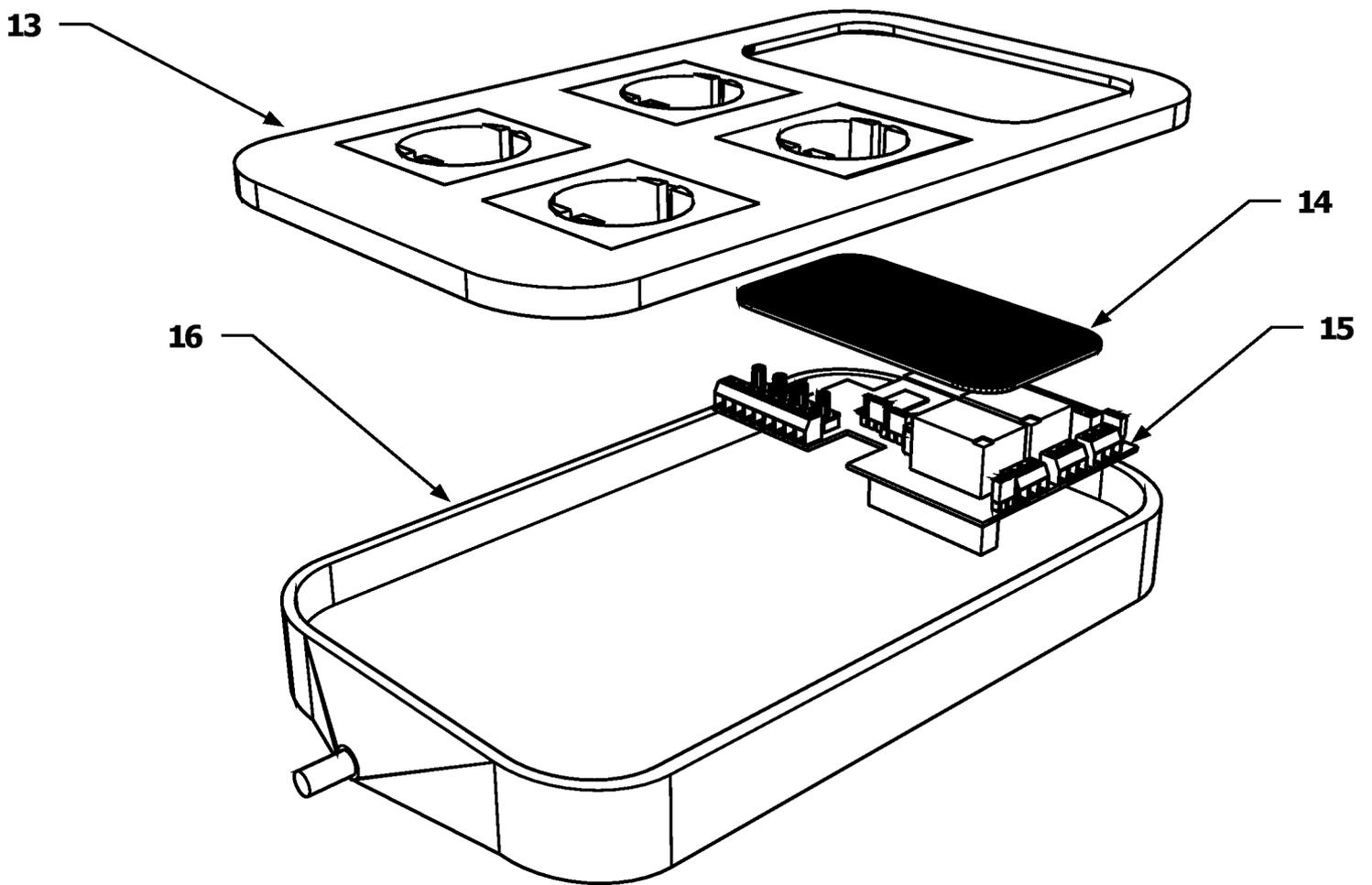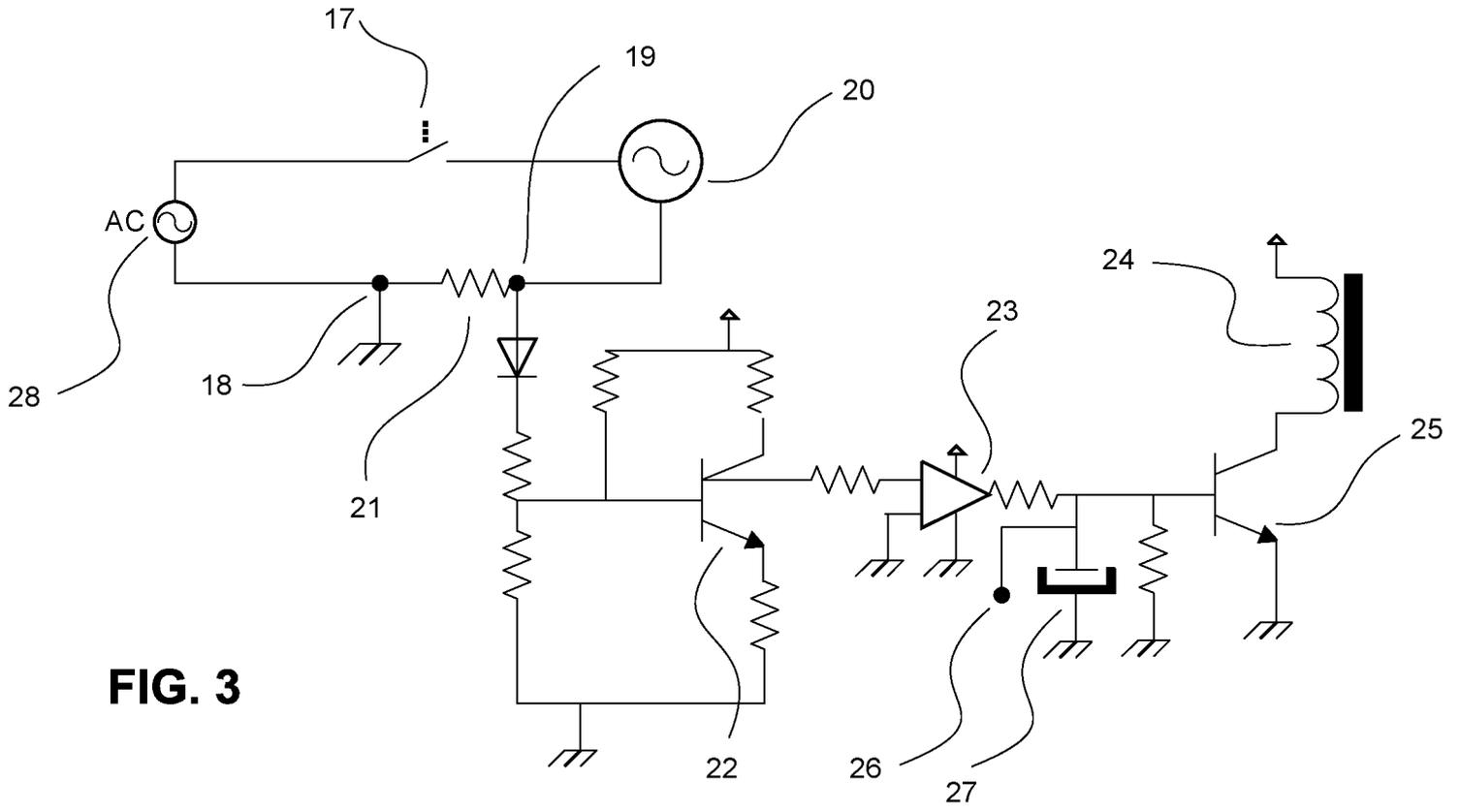
FIG. 1

13

14

16

15

FIG. 2
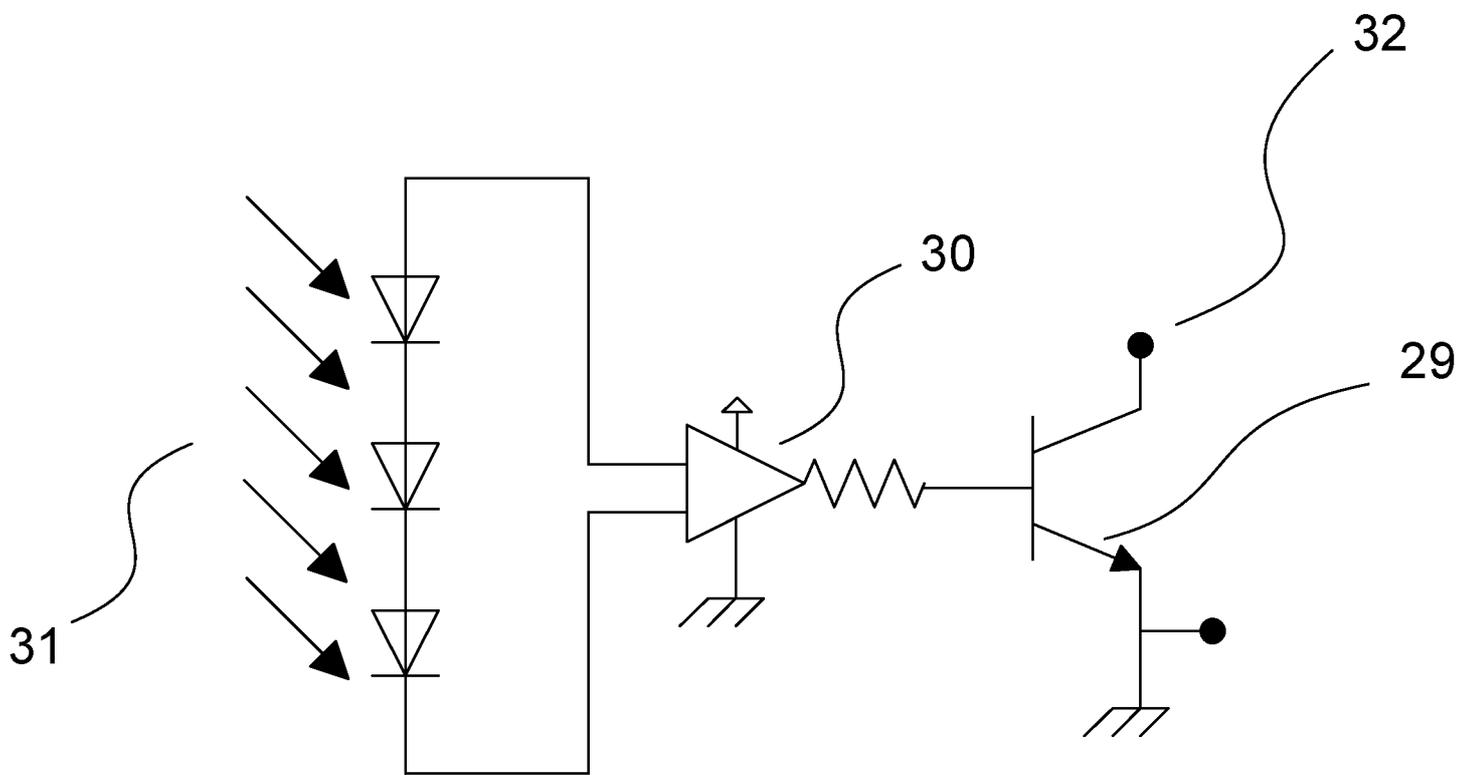
FIG. 3

FIG. 4

38

39

33

34

40

LCD

37

Atmega23

35

36

Touch

FIG. 5