

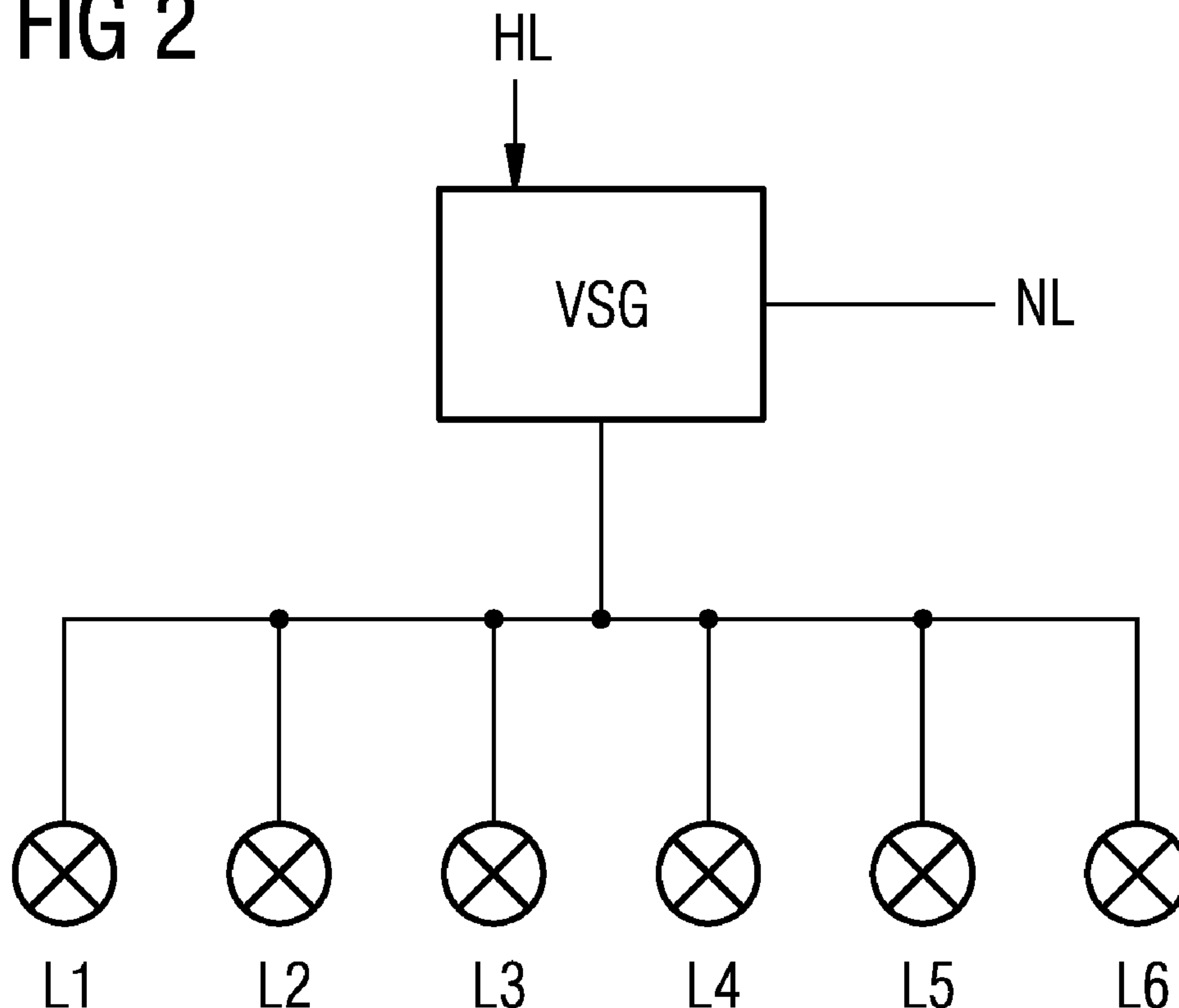


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 (71) Demandeur/Applicant:
SIEMENS AG OESTERREICH, AT
 (72) Inventeurs/Inventors:
AMBROZ, ANTON, AT;
ULREICH, KLAUS, AT
 (74) Agent: SMART & BIGGAR

(54) Titre : ECLAIRAGE DE SECOURS DE VEHICULE SUR RAILS
 (54) Title: RAIL VEHICLE EMERGENCY LIGHTING

FIG 2



(57) **Abrégé/Abstract:**

The invention relates to rail vehicle emergency lighting for a rail vehicle, comprising a main lighting unit composed of light-emitting diodes, wherein, when the main light power supply (HL) is active, all the luminous elements of the main lighting unit are illuminated with a main light intensity (HLS) and, when the main light power supply (HL) is absent, all the luminous elements of the main lighting unit are illuminated with an emergency light intensity (NLS).

Abstract

The invention relates to rail vehicle emergency lighting for a rail vehicle, comprising a main lighting unit composed of light-emitting diodes, wherein, when the main light power supply (HL) is active, all the luminous elements of the main lighting unit are illuminated with a main light intensity (HLS) and, when the main light power supply (HL) is absent, all the luminous elements of the main lighting unit are illuminated with an emergency light intensity (NLS).

Description

Rail vehicle emergency lighting

Technical field

The invention relates to rail vehicle emergency lighting.

Prior art

Rail passenger vehicles are equipped with electrical emergency lighting which allows the passengers to orientate themselves in the vehicle. These emergency lighting systems are usually supplied from dedicated batteries and illuminate the interior of the vehicle when an external power supply is unavailable. The emergency lighting uses individual selected lamps of the main lighting which are supplied from the emergency circuit and therefore remain operative even when the lamps supplied by the main power supply go out. In rail passenger vehicles, 20% to 30% of the lamps are typically supplied from the emergency circuit. The light sources used are usually fluorescent lamps or incandescent light bulbs. Said light sources emit light over a large surface area and do not therefore cause dazzle. In an emergency lighting situation when only some of the lamps are in operation, there is usually even less risk of passengers being dazzled. This dazzle effect must be limited to a particular value as defined in the EN 13272 standard applicable to rail passenger vehicles. Because of their long service life and energy efficiency, light emitting diodes (LEDs) are more recently being used as light sources in preference to the above. These LEDs have properties which appear to lend themselves particularly well to use in rail vehicles. In addition to providing long service life and

energy efficiency, LEDs are extremely robust and compact. The high energy efficiency of the LEDs further manifests itself in low heat generation and therefore simplified installation. However, LEDs cannot be connected directly to the power supply of a rail vehicle, but require an electronic ballast which provides the required (low) operating voltage. Nevertheless, the small size of LED light sources means high luminance which can cause dazzle. However, the current design of emergency lighting systems in which only some of the lamps remain operative during emergency lighting mode results in unacceptable dazzle if LEDs are used.

Summary of the invention

The object of the invention is therefore to specify rail vehicle emergency lighting which minimizes the dazzle effect on passengers even when LEDs are used as light sources.

This object is achieved by rail vehicle emergency lighting having the features as claimed in claim 1. Advantageous embodiments are set forth in the subclaims.

According to the basic concept of the invention, all the LED light sources of a rail vehicle passenger compartment lighting system are used as emergency lighting and are supplied from different emergency light circuits. The same lamps or light sources are used as both main lighting and emergency lighting. In emergency lighting mode, all the light sources used for the main lighting remain in operation, but with reduced luminous intensity.

As a result it is advantageously possible to construct a dazzle-free rail vehicle emergency lighting system using LEDs as light sources.

The present invention enables the relative light distribution in a rail vehicle to be left unchanged when the emergency lighting comes on, thereby ensuring that passengers can orient themselves spatially without being dazzled.

Another advantage of the invention is that the transition of the luminous intensity between main and emergency lighting can be freely designed. In particular, a delayed reduction in luminous intensity, a stepless transition or a time-phased, multi-step transition from the main lighting intensity to the emergency lighting intensity are advantageous.

As an electronic ballast which, among other things, reduces the normal rail vehicle electrical system voltage to the LED operating voltage is required for operating LEDs, the electronic circuitry required for reducing the luminous intensity can be incorporated in said ballast.

It is additionally advantageous to take the energy supply of the rail vehicle passenger compartment lighting from the emergency power supply and feed the main power supply as a control signal to the electronic ballast. This ensures reliable emergency lighting, as energy is always supplied to the entire lighting system from the constantly available emergency power supply. During normal operation (with main power supply operative) the battery of the emergency power supply is continuously charged so that said battery is not discharged by the power consumption of the main lighting.

Brief description of the drawings

By way of example:

Fig.1 shows a block diagram of a rail vehicle passenger compartment lighting system.

Fig.2 shows a block diagram of a rail vehicle passenger compartment lighting system having emergency lighting according to the invention.

Fig.3 shows the transition between the main and the emergency lighting luminous intensity as a function of time - immediate transition.

Fig.4 shows the transition between the main and the emergency lighting luminous intensity as a function of time - stepless transition.

Fig.5 shows the transition between the main and the emergency lighting luminous intensity as a function of time - delayed transition.

Fig.6 shows the transition between the main and the emergency lighting luminous intensity as a function of time - stepped transition.

Embodiment of the invention

Fig.1 shows by way of example a block schematic diagram of a rail vehicle passenger compartment lighting system. The lighting shown comprises six lamps L1...L6, wherein the lamps L1, L3, L4 and L6 are supplied from the main lighting power supply HL and the lamps L2 and L5 from the emergency lighting power supply NL. If the main lighting power supply HL is unavailable, the emergency lighting comes on, in which mode the lamps L2 and L5 are in operation. Due to the reduced number of lamps or light sources in operation, dazzling may

occur. Particularly when LED light sources are used, this effect is virtually unavoidable.

Fig.2 shows by way of example a block schematic diagram of a rail vehicle passenger compartment lighting system with emergency lighting according to the invention. The lighting shown comprises six lamps L1...L6, a ballast VSG, a main lighting power supply HL and an emergency lighting power supply NL. The ballast VSG provides the operating voltage required for operating the lamps L1...L6, which voltage can be much lower than the voltage of the main lighting power supply HL and of the emergency lighting power supply NL particularly when LED light sources are used. When the main lighting is in operation, all the lamps L1...L6 are lit with the main lighting intensity HLS. In emergency lighting mode, all the lamps L1...L6 are lit just as in main lighting mode, but with a different (lower) emergency lighting intensity NLS from that of the main lighting intensity HLS.

Fig.3 schematically illustrates by way of example the transition between the main and the emergency lighting luminous intensity as a function of time. It plots how the luminous intensity LS of a rail vehicle passenger compartment lighting system changes over time. The vertical axis represents the luminous intensity LS, the horizontal axis represents the time t. At a failure instant t_a , the luminous intensity LS is reduced from the main lighting intensity HLS to the emergency lighting intensity NLS.

Fig.4 schematically illustrates by way of example the transition between the main and the emergency lighting luminous intensity. Similarly to Fig.3, it shows the transition of the luminous intensity LS from the main lighting

intensity HLS to the emergency lighting intensity NLS. In this exemplary embodiment there is a stepless transition from the main lighting intensity HLS to the emergency lighting intensity NLS.

Fig.5 schematically illustrates by way of example the transition between the main and the emergency lighting luminous intensity as a function of time. In this exemplary embodiment, a transition from the main lighting intensity HLS to the emergency lighting intensity NLS is time-delayed with respect to the failure instant t_a .

Fig.6 schematically illustrates by way of example the transition between the main and the emergency lighting luminous intensity as a function of time. In this exemplary embodiment, there is a stepped transition from the main lighting intensity HLS to the emergency lighting intensity NLS.

List of reference characters

LI ...L6	Lamp 1 ... lamp 6
HL	Main lighting power supply
NL	Emergency lighting power supply
VSG	Ballast
t	Time
ta	Failure instant
LS	Luminous intensity
HLS	Main lighting intensity
NLS	Emergency lighting intensity

Claims

1. A rail vehicle emergency lighting system for a rail vehicle, comprising a main lighting system consisting of light emitting diodes, characterized in that, when the main lighting energy supply (HL) is active, all the light sources of the main lighting are lit with a main lighting intensity (HLS) and, if the main lighting power supply (HL) fails, all the light sources of the main lighting are lit with an emergency lighting intensity (NLS).
2. The rail vehicle emergency lighting as claimed in claim 1, characterized in that a ballast (VSG) is provided which supplies the operating voltage required for operating the light sources and controls the luminous intensity of the light sources between the main lighting intensity (HLS) and the emergency lighting intensity (NLS) depending on whether the main lighting energy supply (HL) is available.
3. The rail vehicle emergency lighting as claimed in claim 2, characterized in that the energy for operating the light sources is drawn from the emergency lighting power supply (NL) during both main lighting mode and emergency lighting mode
4. The rail vehicle emergency lighting as claimed in one of the preceding claims, characterized in that the transition between the main lighting intensity (HLS) and the emergency lighting intensity (NLS) is stepless.
5. The rail vehicle emergency lighting as claimed in one of the preceding claims, characterized in that the transition between the main lighting intensity (HLS) and the emergency

lighting intensity (NLS) is time-delayed with respect to the failure instant (t_a) of the main lighting power supply (HL).

FIG 1

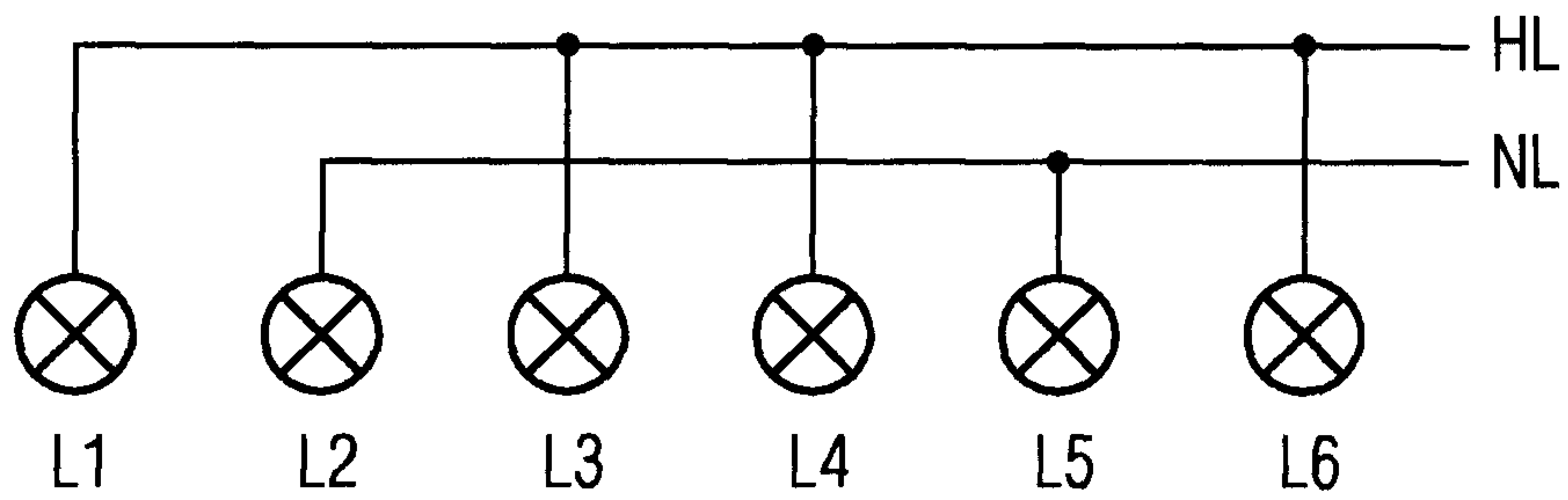


FIG 2

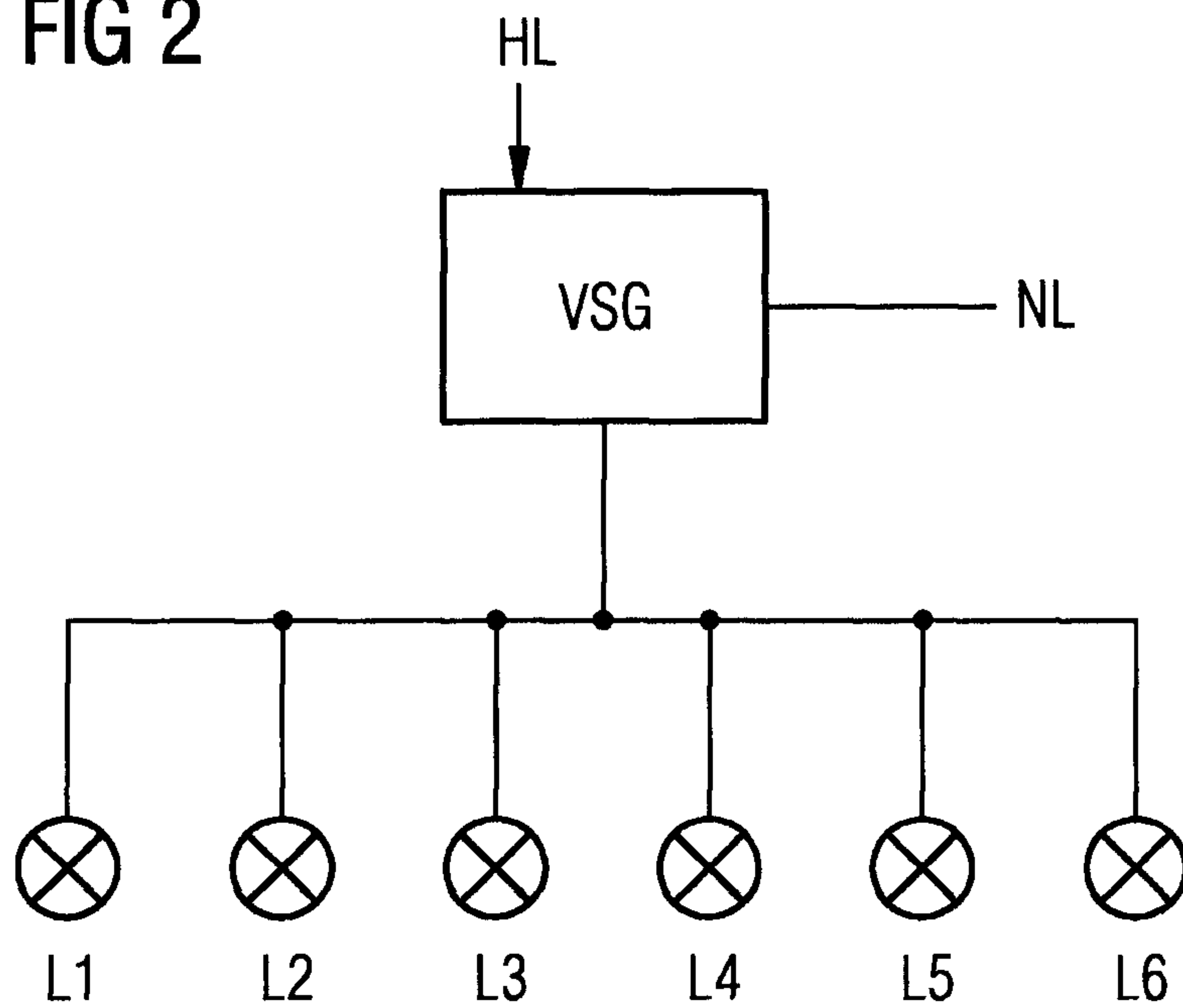


FIG 3

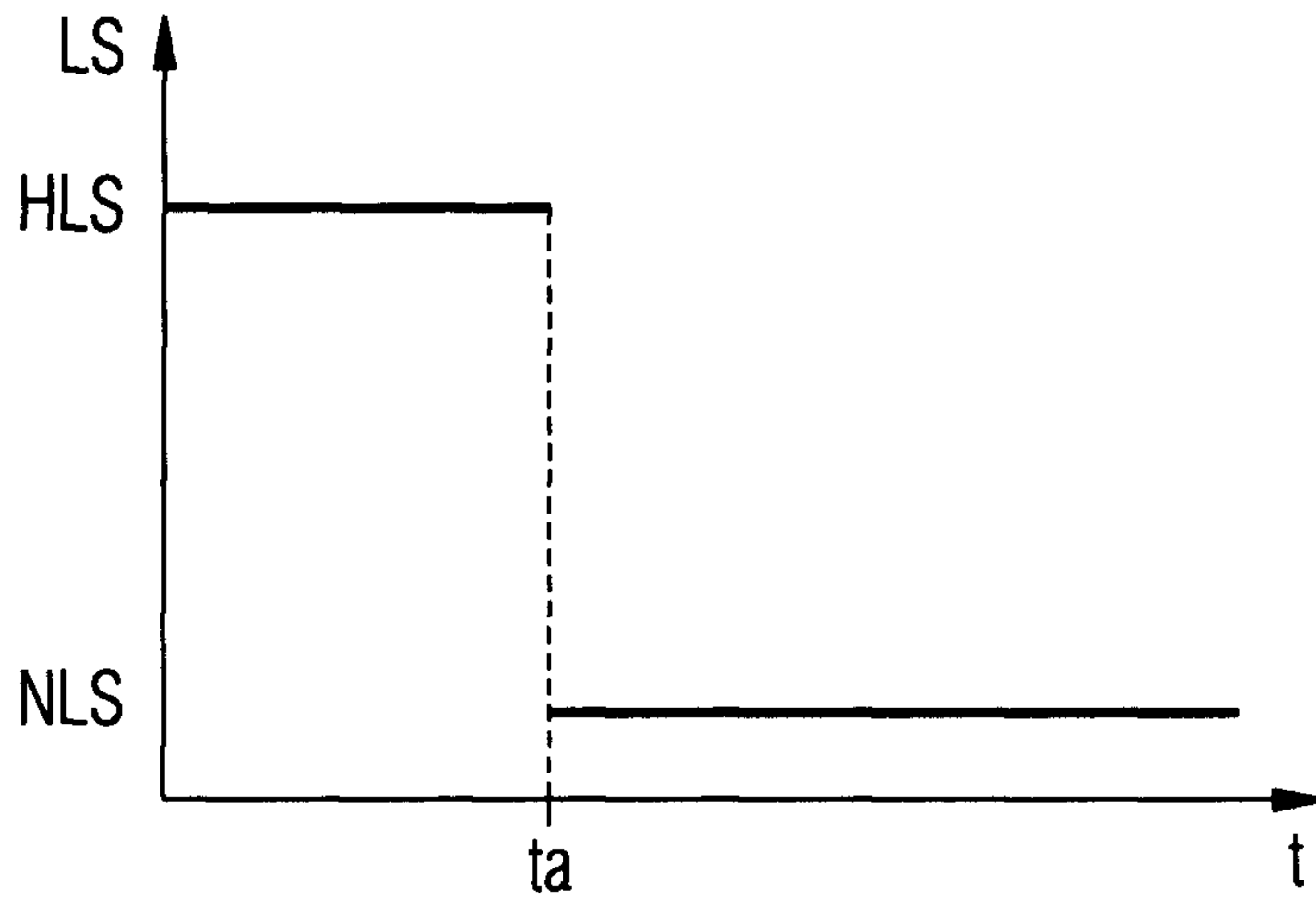


FIG 4

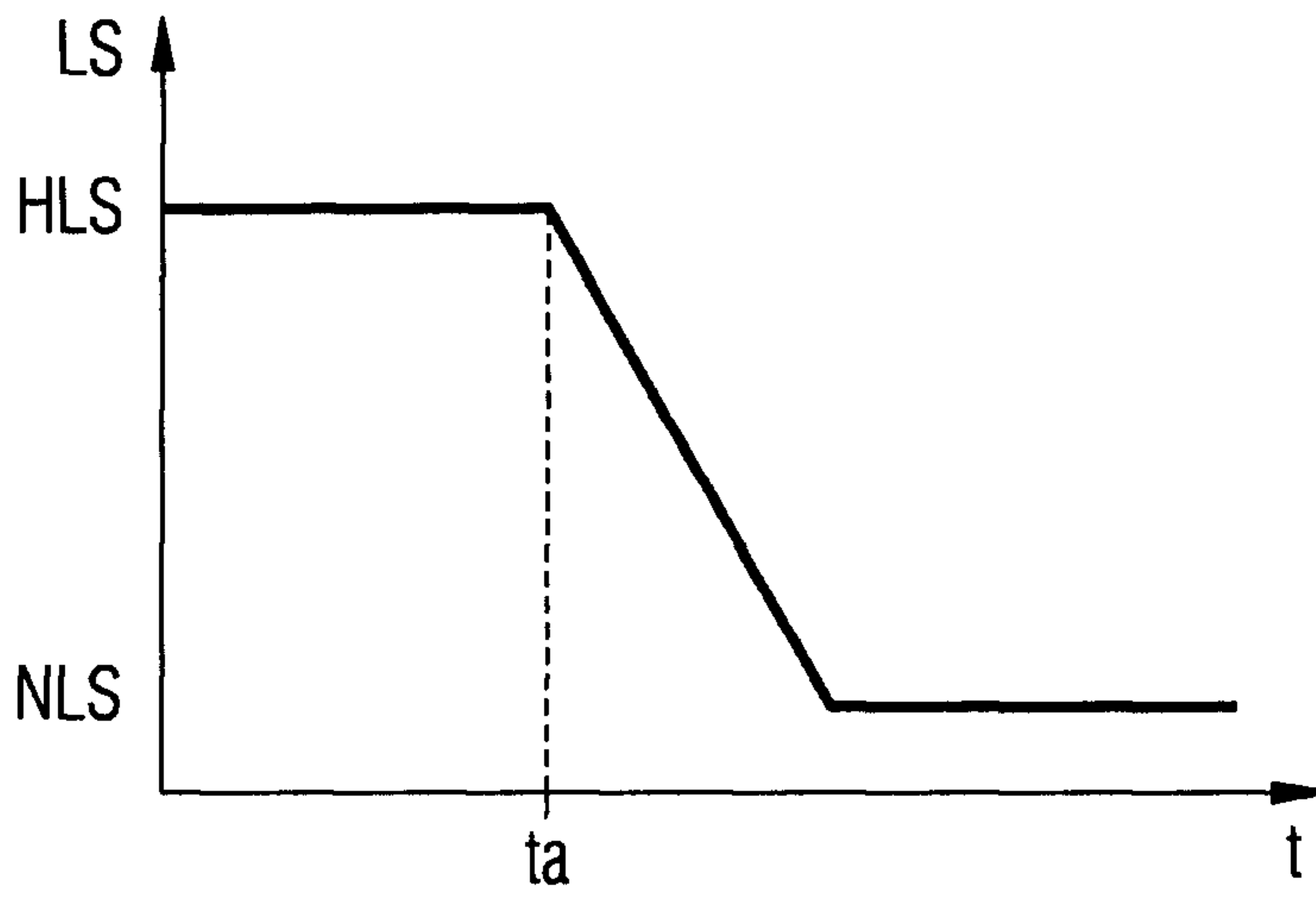


FIG 5

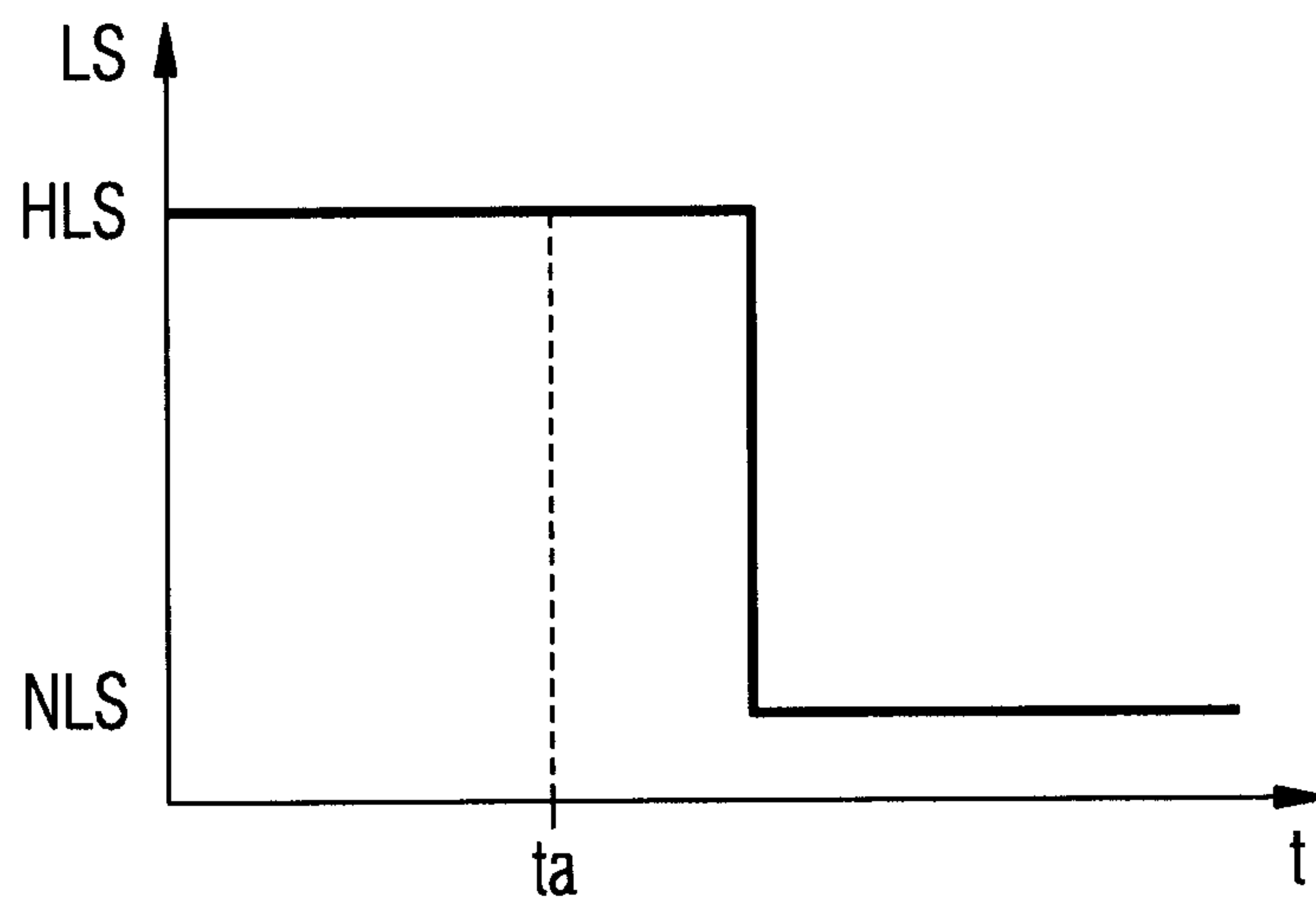


FIG 6

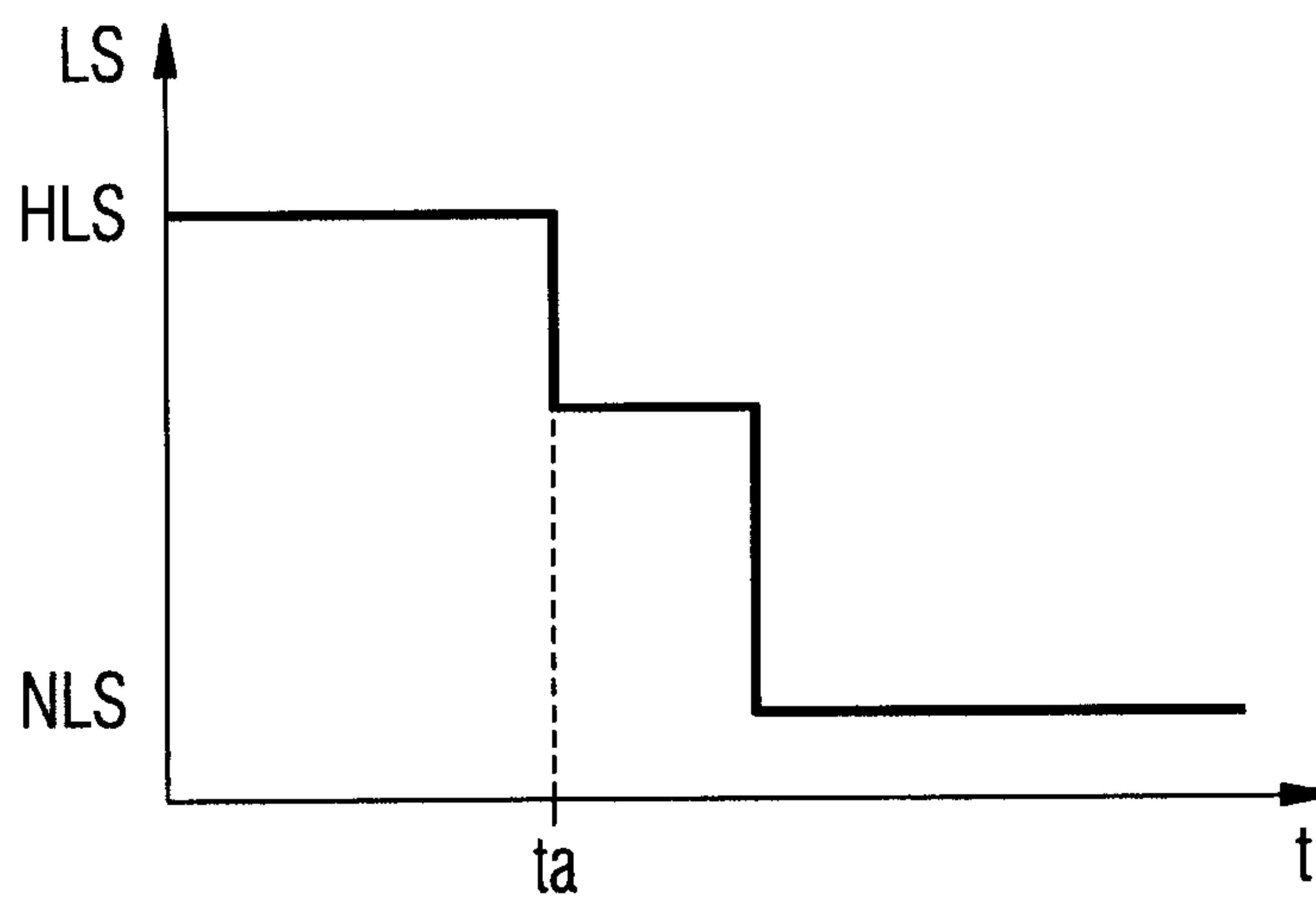


FIG 2

