



# Integrated Twin-Head Medical Diagnostic Torch – A Novelty

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## Abstract:

An integrated 'twin-head' medical diagnostic torch is an innovative, dual-purpose clinical light. It features a focused, in chromatic aberration, the eye refracts green light more than red light; consequently, green light focuses further forward, while red light focuses further back. Optimal Correction (Emmetropia): When the eye is emmetropic—or correctly corrected—the focal point of yellow light lies directly upon the retina. As a result, green light focuses slightly in front of the retina and red light slightly behind it, causing both to appear equally distinct. It determines the optimal sphere by balancing the eye's focus and utilizes chromatic aberration to assess for myopia or hyperopia by one head. Another head features are clinically, astigmatism results in blurred, blurry, or distorted vision at all distances due to an irregularly shaped cornea or lens, which prevents light from focusing properly. Common symptoms include eye strain, frequent headaches, blurred vision, and difficulty with night vision, such as halos around lights. Distorted vision, which causes problems with reading on a page or seeing road signs. The grating light focuses on cornea can detect astigmatism very easily. If the grating light reflected in round shape on the cornea, this means no astigmatism. If the grating light reflected oval, irregular or distorted, it will detect as astigmatism.

**Key words:** *ophthalmic diagnostic equipment; innovation; twin-headed torch light; red-green light; grating light;*

## Introduction:

In axial or longitudinal chromatic aberration, the eye refracts short-wavelength green light—within the range of approximately 495–570 nanometers (nm)—more strongly than long-wavelength red light, which falls within the range of approximately 620–750 nanometers (nm). This phenomenon is utilized to fine-tune the final spherical correction by assessing which side of a split-filter chart appears sharper.

In chromatic aberration, the eye refracts green light more than red light; consequently, green light focuses further forward, while red light focuses further back. Optimal Correction (Emmetropia): When the eye is emmetropic—or correctly corrected—the focal point of yellow light lies directly upon the retina. As a result, green light focuses slightly in front of the retina and red light slightly behind it, causing both to appear equally distinct.

The Duo chrome (Red-Green) test is a subjective refraction technique used to fine-tune the final spherical power of spectacles or contact lenses and to ensure optimal visual acuity (Maximum Plus to Maximum Visual Acuity, or MPMVA). It determines the optimal sphere by balancing the eye's focus and utilizes chromatic aberration to assess for myopia or hyperopia.



Astigmatism is a common, usually hereditary, condition in which the cornea or lens of the eye is irregularly shaped, like an egg, rather than round, causing light to focus incorrectly. It causes blurred vision at all distances and is often present at birth or develops later due to eye injury, eye disease (such as keratoconus), or complications of surgery.

Clinically, astigmatism results in blurred, blurry, or distorted vision at all distances due to an irregularly shaped cornea or lens, which prevents light from focusing properly. Common symptoms include eye strain, frequent headaches, blurred vision, and difficulty with night vision, such as halos around lights. Distorted vision, which causes problems with reading on a page or seeing road signs.

Uncorrected astigmatism significantly reduces vision, producing blurry, distorted images at all distances, causing headaches, eye strain, and reduced contrast sensitivity, especially at night. If left uncorrected in children, permanent amblyopia can occur.

Symptoms of astigmatism in childhood may not be aware that their vision is blurry, but symptoms include rubbing their eyes, squinting frequently, headaches, or poor performance in school.

In the clinic, astigmatism is diagnosed through a comprehensive eye examination focusing on corneal curvature and refraction to determine cylinder power and axis. Main diagnostic tools include keratometry to measure corneal curvature, corneal topography to create a 3D surface map, autorefraction to automatically measure and Jackson cross-cylinder for individual refraction and correction using a phoropter.

All traditional diagnostic methods or instruments for detecting astigmatism are time-consuming and require a lot of clinical setups. Early detection of astigmatism is very much important for an ametropic patient. The grating light focuses on cornea can detect astigmatism very easily. If the grating light reflected in round shape on the cornea, this means no astigmatism. If the grating light reflected oval, irregular or distorted, it will detect as astigmatism.

All eye specialists in the field of optometry and ophthalmology need to an initial diagnosis of astigmatism. Once the astigmatism detection is done properly, eye professionals can improve their objective and subjective correction more easily and satisfactorily, for the vision improvement of the sufferer.



**Purpose of the Invention:** The purpose of this invention is to enable instant detection of myopia – hypermetropia and astigmatism in optometry and ophthalmology clinics.

### Field of the Invention

The present design relates to a handheld medical diagnostic torch and more particularly to an integrated twin-head torch having a single body with dual illumination heads configured in a novel structural arrangement.

### Background of the Invention

Conventional medical diagnostic torches are typically single-headed devices having a cylindrical body and a uniform head structure. Where multiple light sources are required, separate torches are used, resulting in inconvenience and lack of integration. There exists a need for a single device incorporating multiple diagnostic light configurations within a unified structure while maintaining a distinctive external form.

### Summary of the Invention

The present design provides an integrated twin-head medical diagnostic torch comprising a single handle and a bifurcated upper body supporting two illumination heads. The heads are structurally integrated into one unit and are configured to provide distinct optical and surface characteristics. The device presents a unified, symmetrical or asymmetrical twin-head configuration, forming a single article with dual functionality.



## Detailed Description of the Invention

The device comprises an elongated handle adapted for manual gripping, within which a power source is accommodated. The handle extends upward into a bifurcated or forked structure forming two arms, each terminating in a circular head portion. A first head is provided with a surface having stepped concentric ridges formed as raised and recessed circular elements, creating a three-dimensional patterned face. A second head is provided with a diametrically partitioned surface defined by a raised dividing ridge extending across the face of the head, thereby forming two distinct sections. Each section may include differing surface textures, such as smooth and radially textured finishes, thereby enhancing visual distinction. The two heads may be arranged on the same side or in opposed orientation relative to the central axis of the handle. The heads may further be fixed, angled, or rotatable relative to the bifurcated body, contributing to the overall configuration of the device. A control element is positioned on the central body below the bifurcation for operation of one or both heads. The handle portion is configured to accommodate one or more power sources, including rechargeable batteries, dry cell batteries, or a combination thereof, within a common housing. The overall appearance is defined by the integrated twin-head configuration, the bifurcated body structure, and the distinct surface formations of the two heads, forming a unified medical diagnostic torch.

## Field of Design

The present design relates to the external shape, configuration, and ornamental appearance of a handheld illuminated diagnostic torch device having an integrated twin-head structure formed as a single object. The design is particularly applicable for ophthalmic, optometric, or diagnostic use where two different illuminated light sources are required in one instrument.

## Statement of Design

The design consists of a single handheld torch device in which two illumination heads are integrally formed on a common body, thereby creating a twin-head configuration within one unit. The device includes a handle portion, a branching upper portion, and two circular head portions mounted on the branching structure. The overall appearance is characterized by a forked or Y-shaped configuration in which both heads are supported by a single central body.

## Novelty of Configuration

The novelty of the design resides in providing two illumination heads in one integrated structure instead of using two separate torches. The twin heads are permanently connected to a common handle and form a single article. The heads may be positioned on the same side of the handle, on opposite sides of the handle, or in a symmetrical or asymmetrical arrangement. The heads may also be arranged in parallel, angled, or opposed directions, thereby producing different external appearances while remaining part of the same integrated unit.

## Rotatable and Reversible Head Structure

Each head may be mounted in a manner allowing rotation, turning, or reversible positioning relative to the central body. The heads may rotate partially or fully around their supporting arms, or may be fixed at different angles, thereby creating a distinctive twin-module appearance not found in conventional torch designs. The rotatable arrangement forms part of the visual configuration of the device.

## Twin Light Arrangement in One Body

The design incorporates two different illuminated light modules within the same object. One head may contain a circular grating light and the other head may contain a bichrome light, or any other diagnostic light, both being enclosed within the twin structure. The presence of two different light heads within one integrated body gives the device a binocular-like or dual-optical appearance which forms an important visual feature of the design. Power Supply Configuration The handle portion is designed to accommodate a power source within the same body. The power arrangement may include rechargeable batteries, dry cell batteries, or a combination of rechargeable and dry batteries within the same housing. The battery compartment may be arranged inside the handle and may include charging provision, replaceable battery provision, or dual-power provision, without altering the external twin-head configuration. The provision for multiple power types forms part of the structural layout of the device.



### **Single Control Body**

The device includes a central control portion located on the common body between the handle and the twin heads. The control portion may include one or more switches, buttons, or control elements for operating one or both heads. The placement of the control on the central body contributes to the distinctive appearance of the integrated twin structure.

### **Overall Visual Appearance**

The overall appearance of the device is defined by a single handle, a bifurcated upper portion, and two circular heads forming one combined article. The twin-head arrangement, the possibility of same-side or opposite-side positioning, the rotatable or angled mounting of the heads, and the provision for dual power supply together produce a new and original design not seen in ordinary single-head torch devices. The novelty resides in the integrated twin configuration and the unique structural form of the device as a single object.

### **Conclusion**

The novelty of this design lies in incorporating two light-emitting components (or 'heads') into a single, integrated structure, rather than using two separate torches. These paired components are permanently attached to a common handle and function as a unified unit. They can be positioned on the same side of the handle, on opposite sides, or arranged in either a symmetrical or asymmetrical configuration. Furthermore, while remaining part of the same integrated unit, they can be oriented parallel to each other, at an angle, or facing opposite directions, allowing for diverse external configurations. The design consists of a single handheld torch device in which two illumination heads are integrally formed on a common body, thereby creating a twin-head configuration within one unit. The device includes a handle portion, a branching upper portion, and two circular head portions mounted on the branching structure. The overall appearance is characterized by a forked or Y-shaped configuration in which both heads are supported by a single central body.

### **References**

No references were taken from anywhere.