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Slider Switch with Superior Liquid Ingress Protection

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ABSTRACT

This disclosure describes an effective slider switch mechanism that enables devices, e.g., smart glasses, to meet stringent liquid ingress requirements. The slider switch as described herein includes a mechanism that translates the linear motion of an external slider knob into rotational motion of a switch provided on an internal side of the device. A rotational seal such as a sealing O-ring is utilized to seal off the internals and provide liquid ingress protection. The described slider switch mechanism can provide unambiguous feedback to the user while providing liquid ingress protection.

KEYWORDS

- Slider switch
- Liquid protection
- Water resistance
- Liquid damage
- Ingress protection
- IPX rating
- Smart glasses
- Heads-up Display

BACKGROUND

Heads-up display (HUD) devices such as smart glasses can utilize a slider mechanism as a preferred switch (e.g., on/off) mechanism. Such a mechanism advantageously provides unambiguous feedback to the user regarding the power state of the device. This is an important

consideration and can mitigate the effects of when a user accidently turns the device on, thereby activating the camera and other sensors without intending to do so.

A slider switch can be challenging to implement on smart glasses since smart glasses require ingress protection against moisture, sweat, etc. A slider switch generally relies on linear travel of the switch for activation, which can be challenging to seal in a small form factor.

Some smart glasses (e.g., [1]) include a waterproof slider switch that relies on the use of grease to seal around the perimeter of the slider switch and the inside of the enclosure. The use of grease has its own challenges. For example, grease can migrate out of the device over time and the device can lose effectiveness at preventing liquid ingress. Dispensing of grease during a final assembly, test & pack (FATP) process can be challenging for mass production and can be a barrier to scaling up production. Additionally, voids can appear in the grease application that may allow liquid ingress into the device. With increased adoption, smart glasses may be required to meet stringent liquid ingress requirements, e.g., waterproofing requirements such as ingress protection ratings IPX6 and IPX7.

DESCRIPTION

This disclosure describes an effective switch mechanism for smart glasses (or other device) that enables the smart glasses to meet stringent liquid ingress requirements. A slider switch is described herein that is designed to translate linear motion of a slider knob of the switch into rotational motion. An O-ring can be utilized to provide a seal between the switch and the slider knob that the user can interact with to turn the device on or off.

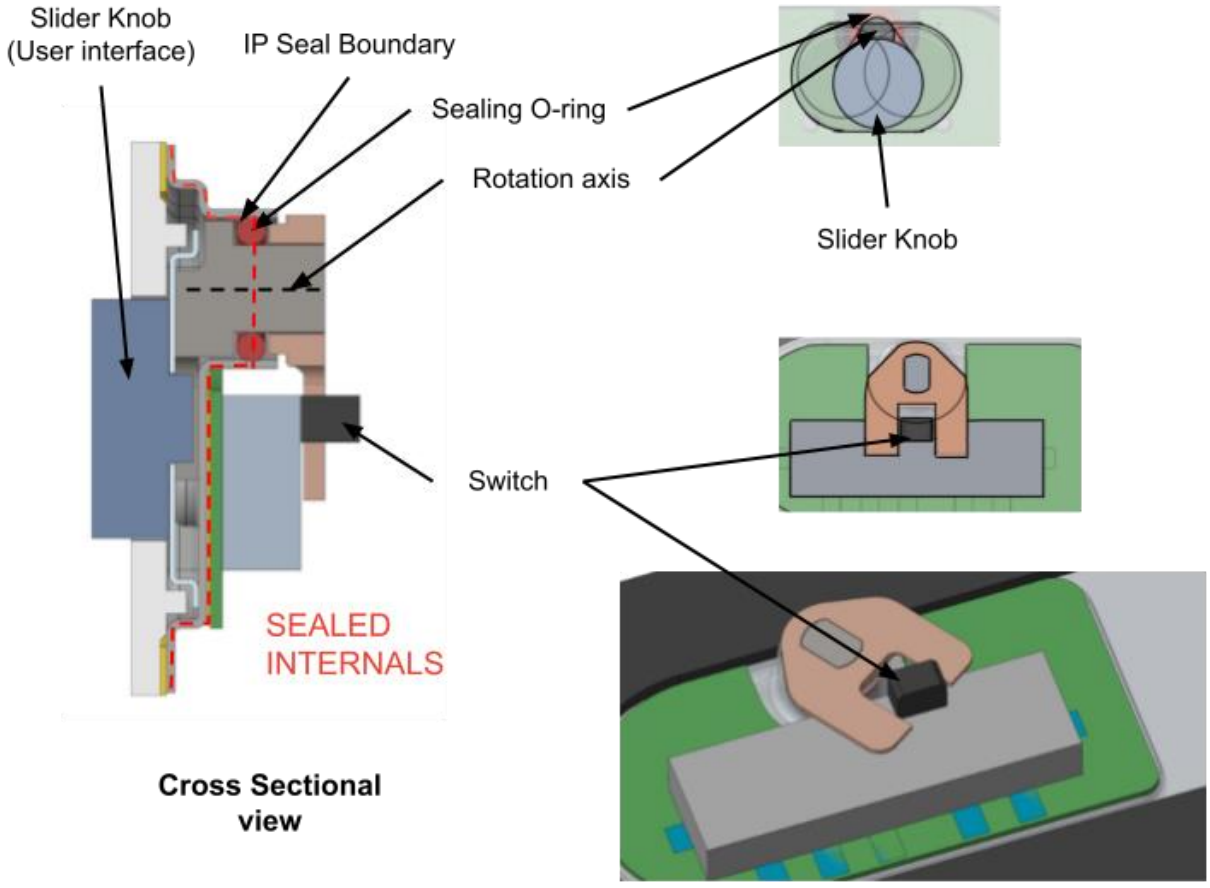

Fig. 1: Linear motion of a slider knob is translated to rotational motion of switch

Fig. 1 depicts an example slider switch mechanism, per techniques of this disclosure. As depicted in Fig. 1(a), a slider knob is provided on an external side of a device, e.g., smart glasses. A mechanism is provided that translates the linear motion of the slider knob to a rotation of a switch provided on an internal side of the device. A rotational seal, e.g., a sealing O-ring, is utilized to seal off the internal portion (internals) of the device, including electronic components. O-rings are commonly used for rotational seals and can attain high ingress protection (IPX) ratings. When the slider knob is adjusted by a user performing an action to turn the device on or off, the linear travel of the knob causes rotation of the switch. The described slider switch

mechanism can provide unambiguous feedback to the user, while still enabling superior liquid ingress protection.

CONCLUSION

This disclosure describes an effective slider switch mechanism that enables devices, e.g., smart glasses, to meet stringent liquid ingress requirements. The slider switch as described herein includes a mechanism that translates the linear motion of an external slider knob into rotational motion of a switch provided on an internal side of the device. A rotational seal such as a sealing O-ring is utilized to seal off the internals and provide liquid ingress protection. The described slider switch mechanism can provide unambiguous feedback to the user while providing liquid ingress protection.

REFERENCES

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