collar **240** meets the arcuate stop **268** of the rotating device member **234**. While ranges of rotation may vary to suit individual applications, the preferred embodiment provides positive and negative hard stop limits at +/−180° positions, for example.

[**0070**] Rotation is also controlled about the x-axis by a cam and follower arrangement as in the other embodiments. The cam and follower are, in the hinge **219**, accommodated within the cavity **222** instead of about flanges and a shaft as in the previous embodiments. Specifically, a cam **290** cooperates with a follower **292**. The follower **292** includes a shaft **294** rotationally supports the cam **290** through its hole **296**. A seat **298** about the hole **296** seats the spring **42**. A device interface **300** is formed at an end of the follower. When assembled, the shaft **294** has its end rotational held at one end of the cavity **222** (for example in the bore **28**) and a flange **302** is pressed against an end **304** of the x-axis extension, which has a hole **306** smaller than the flange **302** but large enough to permit the device interface **300** to extend therethrough. The cam **290** has its rotational position fixed relative to the body **13** by an extension **308** that engages a channel **310** (the underside of which is visible in **FIG. 10**) in the cavity **222**. The extension **308** and channel **309** permit the cam **290** to have an axial range of movement sufficient to permit cam/follower operation.

[**0071**] The interaction between the cam **290** and cam follower **292** provide rotational control and feel, and provide discrete bias positions defining fully opened and fully closed positions and self-open and self-close capability as in the other embodiments. The follower **292** rotates about the x-axis with one device part, e.g., the flip part **26**, and the hinge body **13** with the other part, e.g., the main part **24**.

[**0072**] **FIGS. 13 and 14** illustrate an exemplary installation of the hinge **219** in a handheld device **22**. In **FIGS. 13 and 14**, the flip part **26** rotates with the follower **292** and relative to the main body **13** during x-axis rotation. The flip part **26** rotates with the main body **13** and relative to the rotating device interface **234** during y-axis rotation. The opposite is true for x-axis and y-axis rotation of the main part **24**.

[**0073**] The main part **24** can include, for example, a recess **310** to accommodate the rotating device interface **234**. A pair of fasteners **312**, such as threaded fasteners to attach to the holes **250** in the radial arms through an underside of the main part **24**. The seat **224** is generally coplanar with a top surface of the main part **24** to avoid rotational interference of the remainder of the body **13** with the main part **24** during y-axis rotation.

[**0074**] The flip part **26** can include base and cover parts **314** and **316**. The base part **314** includes a knuckle that is configured to engage the device interface **300**, while the cover part preferably includes a shaped extension **320** that is shaped to engage the irregular shape of the hinge body **13**. For example, the hinge body can define a shelf **320** (see **FIG. 11**) that mates with the shaped extension **320**. In addition, the general irregular shape of the hinge body **13** permits fixation of the hinge body **13** relative to the flip part **26**.

[**0075**] The main hinge body **13** in preferred embodiments is generally hollow, with at least a portion of the axial bore **28** remaining unobstructed. Additionally, the bore **228** of the y-axis extension is at least partially hollow. Accordingly, as in other embodiments, the hinge **219** provides a path through which circuitry and other electronics may be wired. Advantageously, wiring may be installed during or immediately following assembly of the hinge device **10**, which may then be provided as a self-contained unit. For example, flex wire connections may be passed through the active elements of the hinge without interfering with hinge operation and allowing the flex circuit element to remain intact during operation of the hinge. A flex circuit connection provides a large number of data channels to connect electronics in the flip part **26** and the main part **24**. The number of communication channels provides the ability to conduct complex communications and move additional electronics into the flip part **24** of the handheld device **22**.

[**0076**] Artisans will appreciate the self-contained nature of the **FIGS. 10-15** hinge. In addition to the general operational and structural advantages, a low part count can be considered an important feature. The hinge **219** includes a total of 9 parts.

[**0077**] Turning now to **FIGS. 16-19**, a fifth preferred embodiment hinge **325** is illustrated. In the **FIGS. 16-19** embodiment, the x-axis subassembly and extension are highly similar to the **FIGS. 10-15** embodiment. Instead of the channel **309**, the cavity **22** includes an open slot **328** to accommodate the extension **308** of the cam **290**. The slot **328** permits axial movement of the cam **290** and fixes its rotational position relative to the body **13**. **FIG. 16** also illustrates the internal structure of the cavity **222**, which excepting the slot **328**, can be identical. A surface **330** provides resistance for compression of the spring **42** by the axial movement of the cam **290** caused by relative rotation of the cam and follower **292**. A slot **332** aids assembly, allowing the shaft **294** to be guided in the bore **28** to fix the radial position of the cam, follower and spring. The hinge **325** also includes a modified y-axis subassembly compared to **FIGS. 10-15**. The body **13** has a more irregular shape, including a raised base **334** to interface with a device part and permit rotation of the body **13** to clear the device part to which the rotating device member is attached during y-axis rotation. A locking clip **336** replaces the swaging member of the **FIGS. 10-15** embodiment. The clip **336** locks onto a channel **338** of the shaft **226**.

[**0078**] Artisans will appreciate the self-contained nature of the **FIGS. 16-19** hinge. In addition to the general operational and structural advantages, a low part count can be considered an important feature. The hinge **325** includes a total of 8 parts.

[**0079**] While specific embodiments of the present invention have been shown and described, it should be understood that other modifications, substitutions and alternatives are apparent to one of ordinary skill in the art. Such modifications, substitutions and alternatives can be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A dual axis self-contained hinge for a handheld device having a main part and a flip part being rotatable relative to each other about a x-axis and a y-axis of the hinge, the hinge comprising:

a hinge body;

an x-axis extension extending from said hinge body;