

power wiring harness **150** that runs within the main extrusion outer housing **640** and connects the lower casing assembly **250** with the upper casing assembly **500**. The upper casing assembly **500** has a manual access retraction shaft **541** attached to the stepper motor **515** that can be accessed through the manual retraction case access opening **548**. This opening to the manual retraction shaft **541** allows users of the viewing device **100** to retract the display in the event that there is a problem with the stepper motors **515** operation.

[0156] In another embodiment of the viewing device **100** the upper casing assembly **500** has a manual thumb drive wheel **522** which is attached to the knob drive shaft **527** on the electromagnetic clutch **510**. The clutch **510** is mounted to the drive support plate assembly **530** which allows the movement and position of display reel shaft **320** to be controlled by the user of the viewing device **100**. The drive shaft gear **529** that is attached to the clutch **510** drive shaft **511** has an attached drive shaft gear **529** which is keyed to match the output drive shaft gear **526** connected to output drive shaft **525**. The output drive shaft **525** extends through the output mount plate assembly **505** through sealed bearings **508** for a smooth rolling shaft. The output drive shaft **525** end is keyed to insert into the display cartridge assembly **300** drive slot **363** and provide the maximum power transition from drive assembly to the display reel shaft **320**. The electromagnetic power and control wiring harness **528** extends from the electromagnetic clutch assembly **510** and plugs into the quick connect data and power wiring harness **150** that runs within the central casing **640** and connects the lower casing assembly **250** with the upper casing assembly **500**.

[0157] In another embodiment of the viewing device **100** the upper casing assembly **500** has a spring **553** to drive the retraction of the display cartridge assembly **300**. The clutch **510** is mounted to the drive support plate assembly **555** which has brackets for the spring and clutch and allows the movement and position of display reel shaft **320** to be controlled by the user of the viewing device **100** by switching power to the clutch **510**. The drive shaft gear **529** that is attached to the clutch **510** drive shaft **511** has an attached drive shaft gear **529** which is keyed to match the output drive shaft gear **526** connected to output drive shaft **525**. The output drive shaft **525** extends through the output mount plate assembly **505** through sealed bearings **508** for a smooth rolling shaft. The output drive shaft **525** end is keyed to insert into the display cartridge assembly **300** drive slot **363** and provide the maximum power transition from drive assembly to the display reel shaft **320**. The electromagnetic power and control wiring harness **528** extends from the clutch assembly **510** and plugs into the quick connect data and power wiring harness **150** that runs within the central casing outer housing **640** and connects the lower casing assembly **250** with the upper casing assembly **500**.

[0158] All three of the described embodiments of the upper casing assembly **500** (motorized, manual thumb drive wheel, spring-driver) house the battery **523** for powering the viewing device **100**. A battery **523** is used when the viewing device **100** is not plugged into an AC outlet. When AC power is available, when the viewing device **100** can be charged and used by plugging the viewing device **100** into an AC wall socket through the AC power receptacle **524**. When an AC power source is used to recharge the device

battery **523** power travels through the AC/DC power inverter **547** before reaching the device battery **523**.

[0159] In another embodiment of the viewing device, the retractable flexible digital display assembly **400** connects to the display controller **220** via Flex-coil circuit jumper **351** or flexible printing circuitry (Commonly referred to as FPC). This FPC is wound within the flex-coil connector cartridge **350** mounted on the display cartridge spooling mechanism **300** shaft **320** in the opposite direction than the retractable flexible digital display assembly **400** is wrapped within the flex-coil connector cartridge **350** on the display cartridge spooling mechanism **300** shaft **320** with adequate revolutions within the flex-coil connector cartridge **350** to enable the retractable flexible digital display assembly **400** to extend fully without binding, stretching or detaching the flexible digital display assembly **400** and the flexible printing circuit from the controller **220**.

[0160] In embodiments of the invention, a shoulder strap allows easy transport of the display device **100**. The shoulder strap assembly **800** includes an adjustable shoulder strap **810**, an adjustable shoulder pad **805** and strap mount openings **825** using a stainless steel strap plate inserts **830** molded into the upper and lower case bumper assemblies. In another embodiment of the shoulder strap assembly, custom molded removable strap mounts **815** are used in place of the upper and lower case bumper integrated strap mounts inserts **830** and attached to the viewing device **100** using attachment screws **820**.

[0161] It will be appreciated that the invention may be scaled to the size and memory/power needs of the intended use of the invention. In addition, conventional or touch screen displays may be implemented. Further, additional accessories, such as wired or wireless keyboards, mouse controllers, joysticks, and the like may be used in connection with the present invention.

[0162] Those skilled in the art will further appreciate that flexible display components may be provided from companies such as E-Ink, Gyricon, Sony Philips, HP and others. Touch-screen components may be provided by E-Ink, 3M ENL and others. A protective display layer is available through 3M and others. Processors are available from several entities including Intel. Exemplary operating systems and applications used in the present invention may include, merely by way of illustration, Microsoft, Adobe, and AutoCADD. General electronics suppliers include JACO Electronics, Jameco Electronics and others. Electronics and wiring components are available from Techwave, E-Storage Technology and others. Exemplary retractable, rolling mechanisms include components provided by Reell, Inertia Dynamics, Hangzhou Bay Bearings, Helander Products, Rollermaker, Techna, Vlier, MicroMo Electronics, Faulhaber and others.

[0163] Although the present invention has been described in specific detail with reference to the disclosed embodiments, it will be understood that many variations and modifications may be affected within the spirit and scope of the invention. For instance, those skilled in the art will appreciate that present device is not limited for use of viewing drawings in association with the architectural and construction industries, but that the invention may be used for virtually any portable viewing need including, for example, replacing traditional laptop devices, used for view-