

Reverse engineering of a pen



Reverse Engineering of a Pen – Assignment Requirements 1) Plastic

Container: the plastic container is the framework for the pen. A) Has to be plastic so it is cost efficient and can be easily manufactured. With these two properties it can be mass-produced in order to profit. B) Must be cylinder shaped in order for the ballpoint ink cylinder to fit into the plastic cylinder. C) The plastic cylinder must be in two parts. The two parts are a bottom and a top. The top cylinder's wedges on the inside must be able to screw around the bottom cylinder's wedges on the outside. The bottom cylinder is 65 CM long including the wedged area. 52 CM not including the wedged area. The diameter of the bottom cylinder is . At the top (where wedged area goes into the top cylinder) and the diameter of the bottom cylinder is . COM (where the ballpoint goes in and out of in order for it to allow one to write). E) The top cylinder must be long and in diameter throughout the whole cylinder. On the outside of the top cylinder there is clip attached. The clip is used so one could clip it too, for example, the inside of the pocket of a shirt. Spring/Cool: The Pilot Easy Touch pen works because of the long spring. The spring's diameter is just slightly bigger than the ballpoint's body. Wide enough to lightly hug the cylinder shaped ballpoint body. The coil creates the tension necessary for the ballpoint of the pen to stay out. Clicking the end of pen when the ballpoint pen is out releases the tension causing the ballpoint to retract back into the plastic cylinder. 3) Ballpoint Body- The ballpoint body is the plastic cylinder that contains the ink inside. Can also be called an ink cartridge.

It is long and very slim but wide enough to perfectly fit into the cool. 4)

Inside Framework- The inside framework can be called the cap that sticks out

of the top of the pen. The part one pushes to click the ballpoint in and out of the pen cylinder. 5) Rubber Grip- The rubber grip is rapped around the outside of the bottom end of the plastic frame. It is used to give the user grip and comfort when writing. In the above picture every part of the pen mentioned in the requirements section is labeled so one could use it as visual guide while reading the requirements.

Problem Statement Design a cost efficient, light, and comfortable pen that writes smoothly. Plastic is used because It Is cheap, light, and easily manufactured. The pen must use a mechanism Inside the plastic frame In order for the ballpoint body to easily come In and out of the frame. The mechanism must include a coil that retracts the ballpoint body back into the frame when the cap is clicked. The inside framework must also have mechanism that locks the ballpoint (out of the frame) and ballpoint body in place when it is being used to write.

Functions 1) Provide Ink 3) Retract 4) Provide comfort 5) Clip Embodiment a) The pen has to always provide ink through the ballpoint in order for it to serve its purpose of writing. 2) Screw and Unscrew a) The top and bottom of the plastic frame or container must screw together and unscrew apart in order for the ballpoint body to be replaced when it runs out of ink. B) The top and bottom of the plastic frame or container must screw together and unscrew apart in case there are any malfunctions on the inside of the container and need to be repaired. Retract a) The ballpoint body must retract back into the body in order for the ink not to spill or dry. B) The coil mechanism must be used so the tension released by the coil when pushed down by the cap makes the ballpoint body retract back into the plastic

container. 4) Provide Comfort a) The rubber grip is placed around the plastic container to provide grip and comfort. A) The clip attached to the outside of the top plastic container is used to clip on to an object so it is held in place when not in use; for example: a shirt pocket.