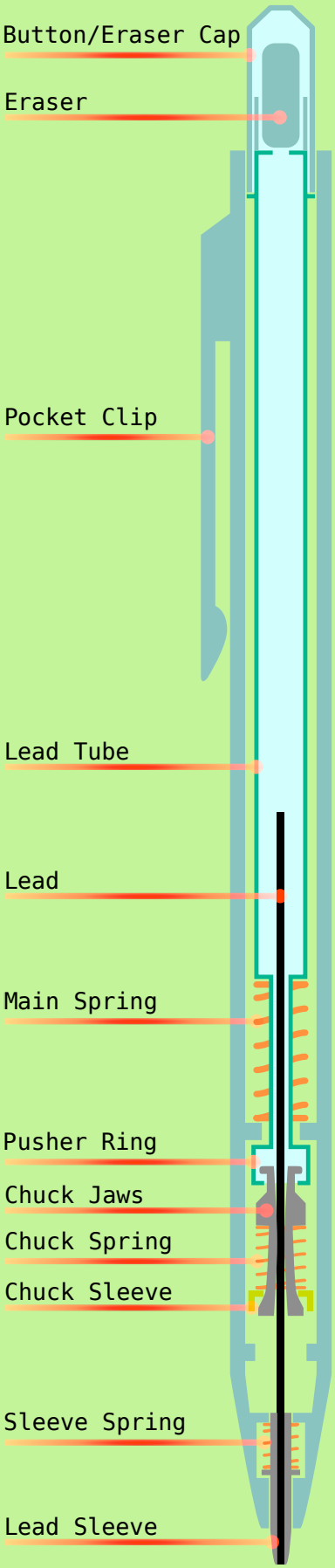
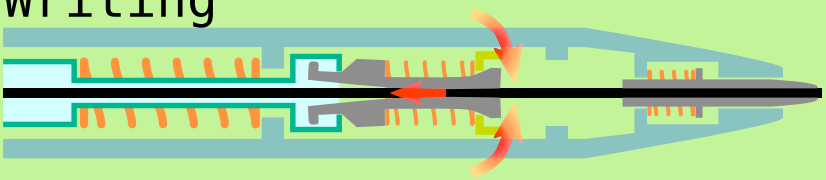
Auto-Advance Pencil



Writing

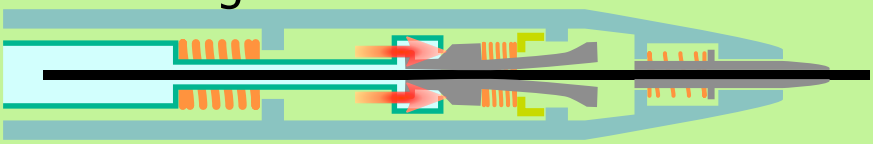


The jaws are closed by default because the chuck spring pushes the chuck sleeve forward onto them.

Friction from the lead being pushed backward makes the jaws rock forward and grip the lead more tightly, which then increases friction further, et cetera; the lead cannot slide backwards.

The paper applies an inward force on the lead and the lead sleeve. The sleeve spring contracts. The lead transmits force to the internal mechanism.

Knocking

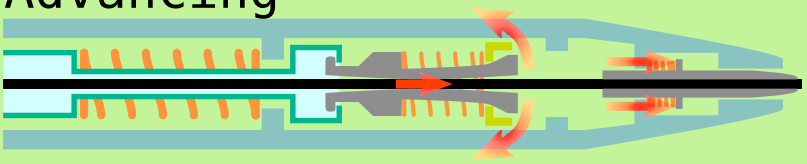


Initially, the chuck sleeve travels with the jaws. Like during writing, the lead can't slide backwards, so it gets pushed forward along with the chuck.

After the chuck sleeve catches, the chuck spring is compressed and pushes back on the jaws, pressing them into the pusher ring. This forces the jaws together at the back, keeping them open at the front. The lead now slides freely.

On the return, the jaws stay open; if they were to close, friction against the lead would rock them backward and open them.

Advancing



The pencil is ready to auto-advance when the sleeve spring has been compressed; this happens when the exposed lead is exhausted and the paper pushes on the lead sleeve directly.

When the lead is pulled forward, friction rocks the jaws backward against the chuck spring and loosens the grip; the lead slides forward easily.

When the pencil is lifted off the paper, the sleeve spring extends, pushing the lead sleeve outwards. The lead sleeve pulls the lead along by friction.