Earnshaw Chronometer Escapement
Developed by Thomas Earnshaw (1749 - 1829) in the mid 1780s. It is a spring detent type giving impulse to the balance in one direction during a short section of its arc. It has the advantage of not requiring oil on the escape wheel teeth. During the 19th century this escapement became the standard for marine chronometers and continued to be manufactured for use at sea until the advent of quartz controlled timekeepers.

Earnshaw Spring Detent Chronometer Escapement
Moment of Unlocking

∠CAD: Escaping Angle of 36°
∠EBF : Impulse Angle of 24°
$\overline{ATH}$: Quiescent ℄ of Detent

½ Ø Impulse Pallet = Ø Unlocking Pallet
point H : Flex-Point of spring = ~1.25 Ø Escape Wheel

$\overline{TJ}$ is 90° to $\overline{AH}$
$\overline{TK}$ is 10° to $\overline{TJ}$ = locking face of tooth
$\overline{TL}$ is 5° to $\overline{TJ}$ = locking face of stone

$\overline{HM}$ (1°) = limit of locking of the stone
Locking stone is 1/18th of escape wheel Ø
i.e. 9 mm Escape wheel = ½ mm locking stone
Unlocking Roller Ø is ~ 0.45 Impulse Roller Ø
Impulse Pallet ~ 0.26 mm
Unlocking Pallet ~ 0.24 mm

$\overline{AC''}$ is Impulse pallet face at moment of unlocking

∠AHP: Unlocking Angle
∠AHQ: Detent Discharge Angle

∠SAC < Tooth Space (24°)

At Drop Point:
- Impulse Pallet at $\overline{AC''}$
- Unlocking Pallet at $\overline{AP}$