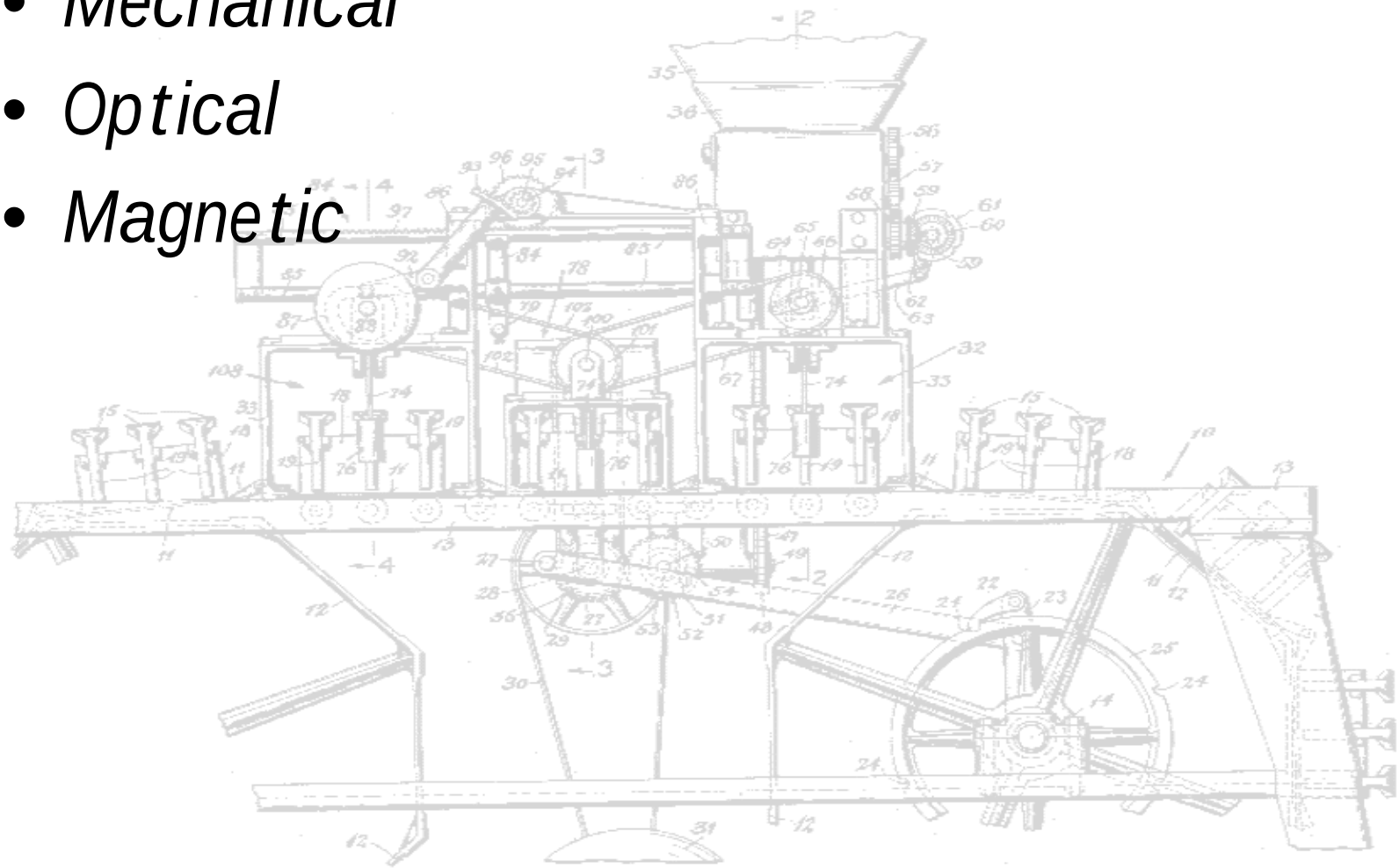
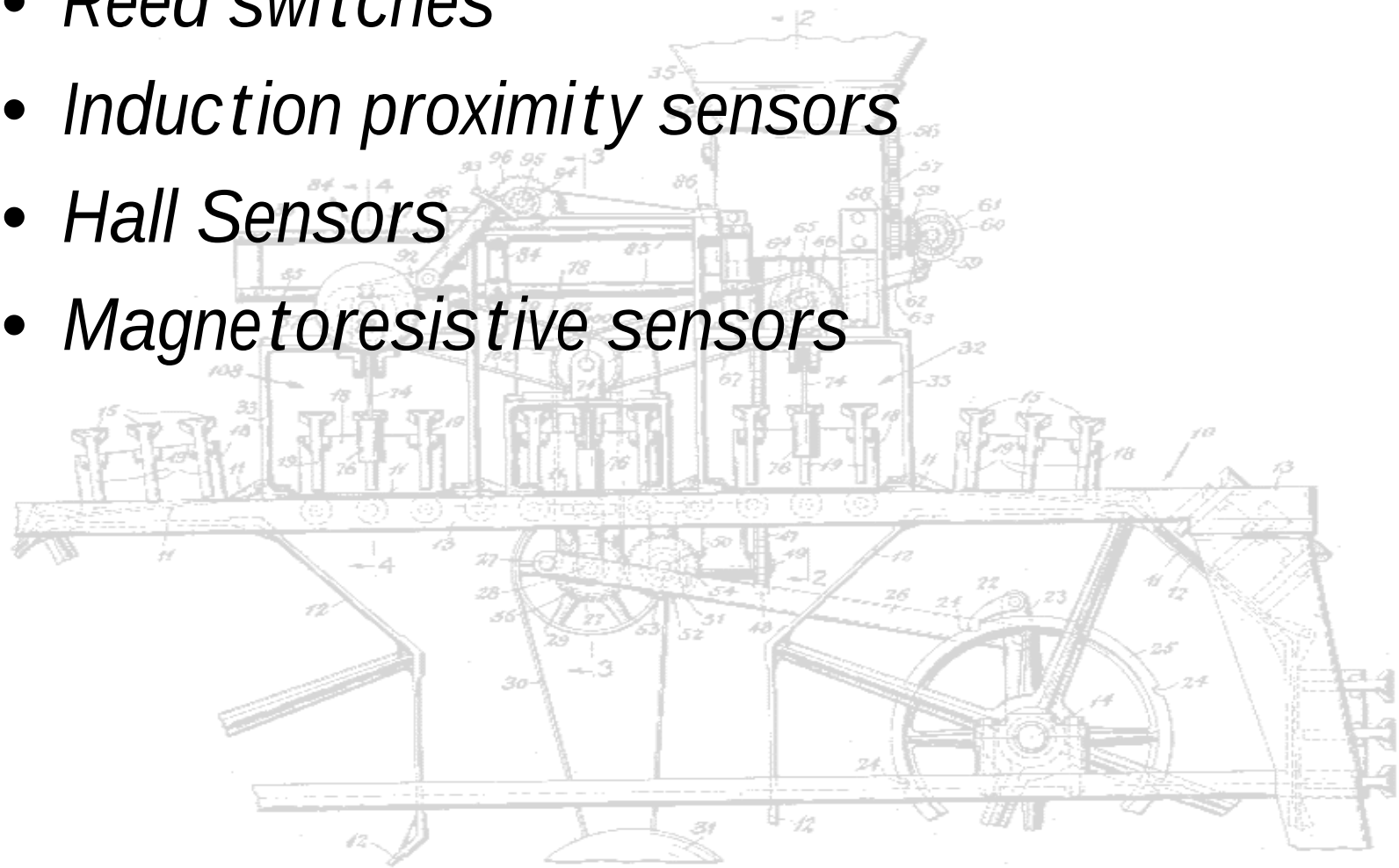
Position Sensing

- *Mechanical*
- *Optical*
- *Magnetic*

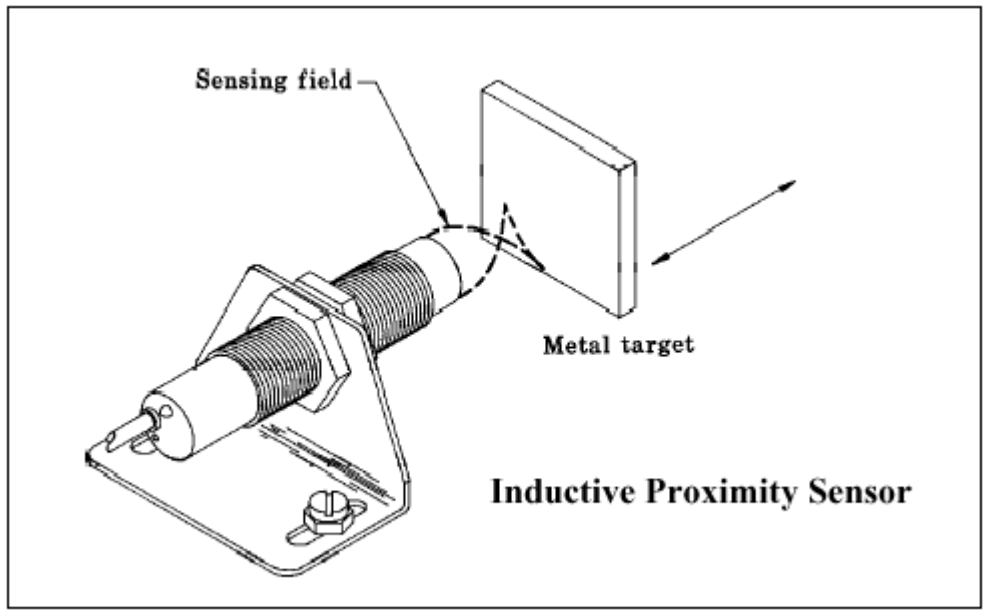


Magnetic Sensors

- *Reed switches*
- *Induction proximity sensors*
- *Hall Sensors*
- *Magnetoresistive sensors*



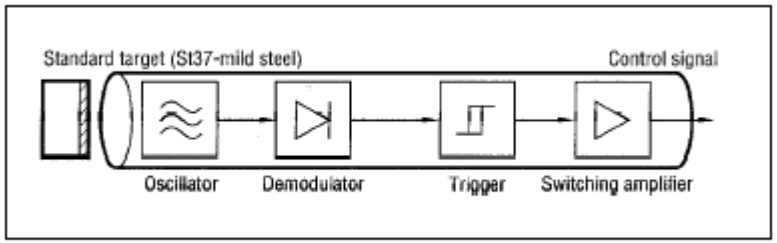
Inductive Proximity Sensor

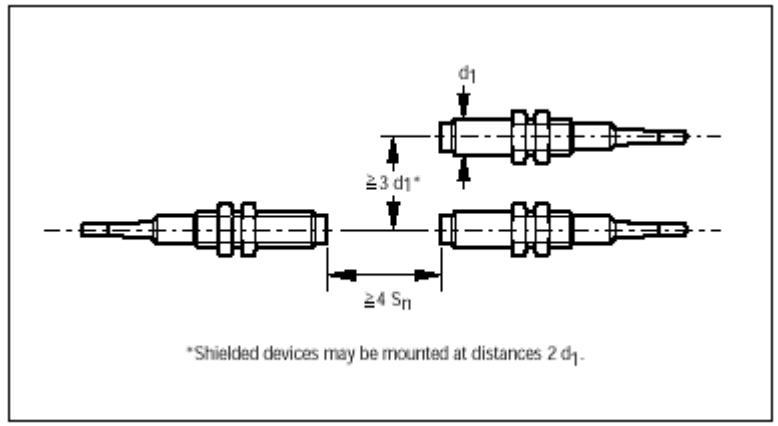


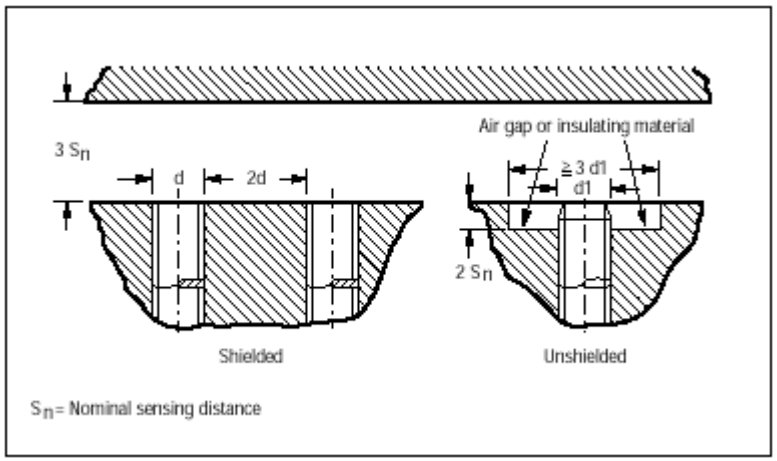
Inductive Proximity Sensors

- ~~*Eddy current sensing*~~
- *Shielded and unshielded*

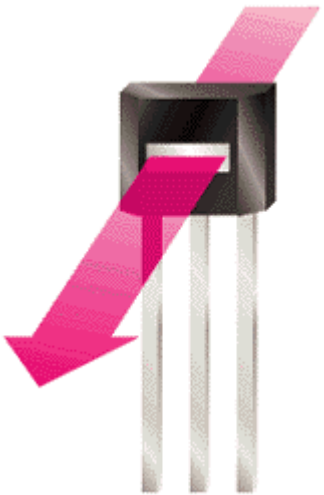
$60-$100







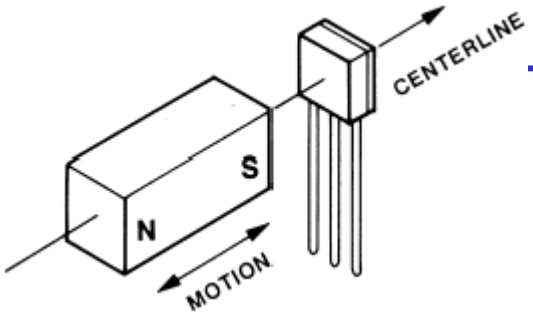
Hall Sensors

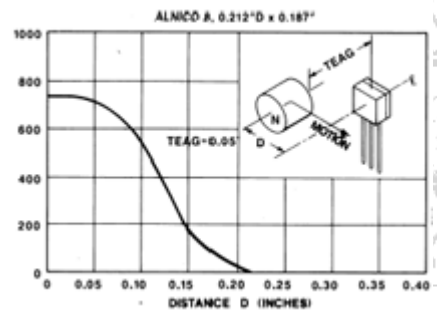


- *Hall effect:*
  - *constant voltage forces a constant current in semiconductor sheet*
  - *Magnetic field flux lines perpendicular to current cause proportional voltage across sheet.*
  - *Discovered by E.F.Hall in 1879.*
- *Linear sensor needs voltage regulator and amplifier*
- *Switch also needs threshold circuit, with hysteresis*

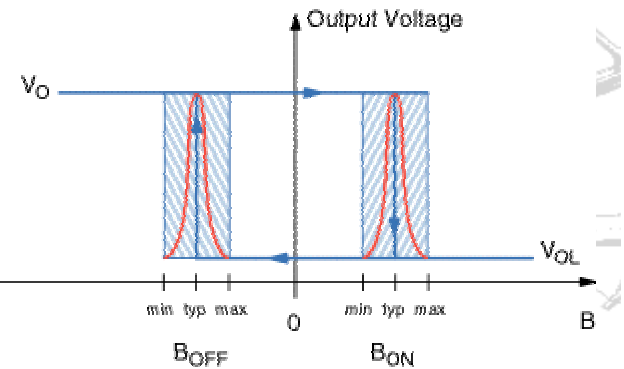
Hall Switches

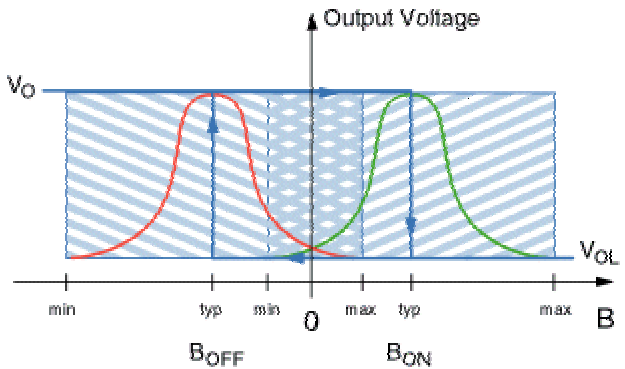
$2 - $30

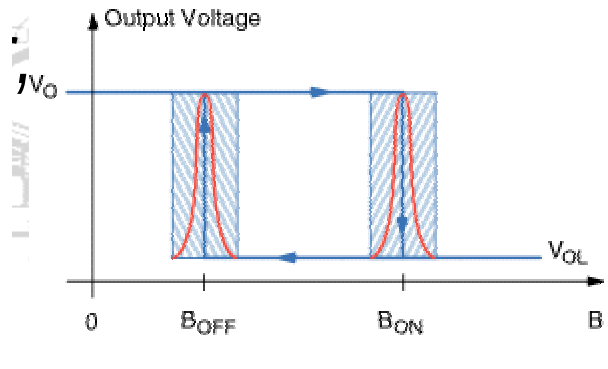




- *Magnet motion*
  - *head-on*
  - *bypass or slide-by*
- *Total effective air gap (TEAG)*
- *Sensitivity, Hysteresis, & Temperature*

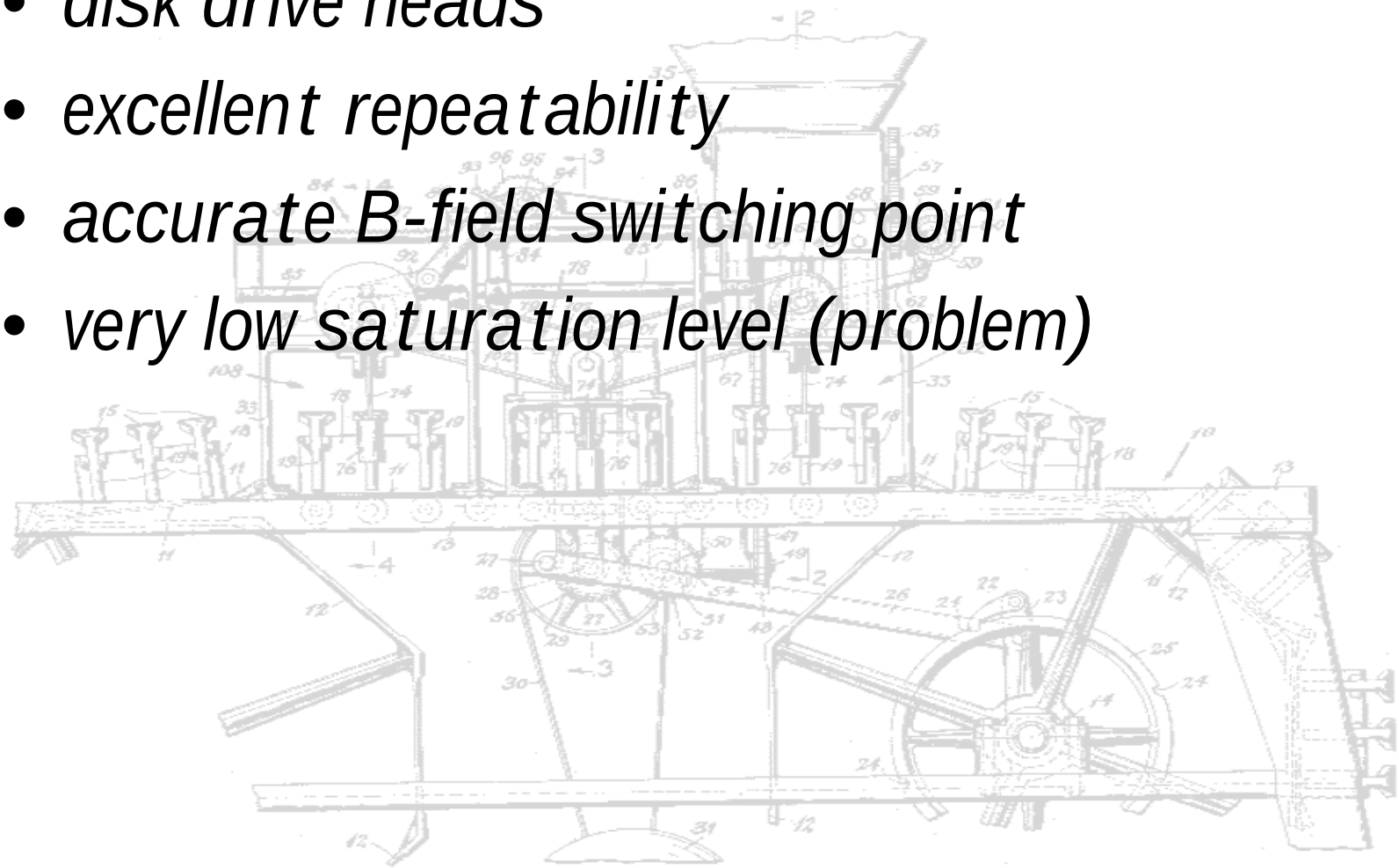






Magnetoresistive

- *disk drive heads*
- *excellent repeatability*
- *accurate B-field switching point*
- *very low saturation level (problem)*



Other position sensors

- *capacitive*
- *ultrasonic*
- *variable reluctance*

  (coil around magnet, senses moving ferrous matrl)