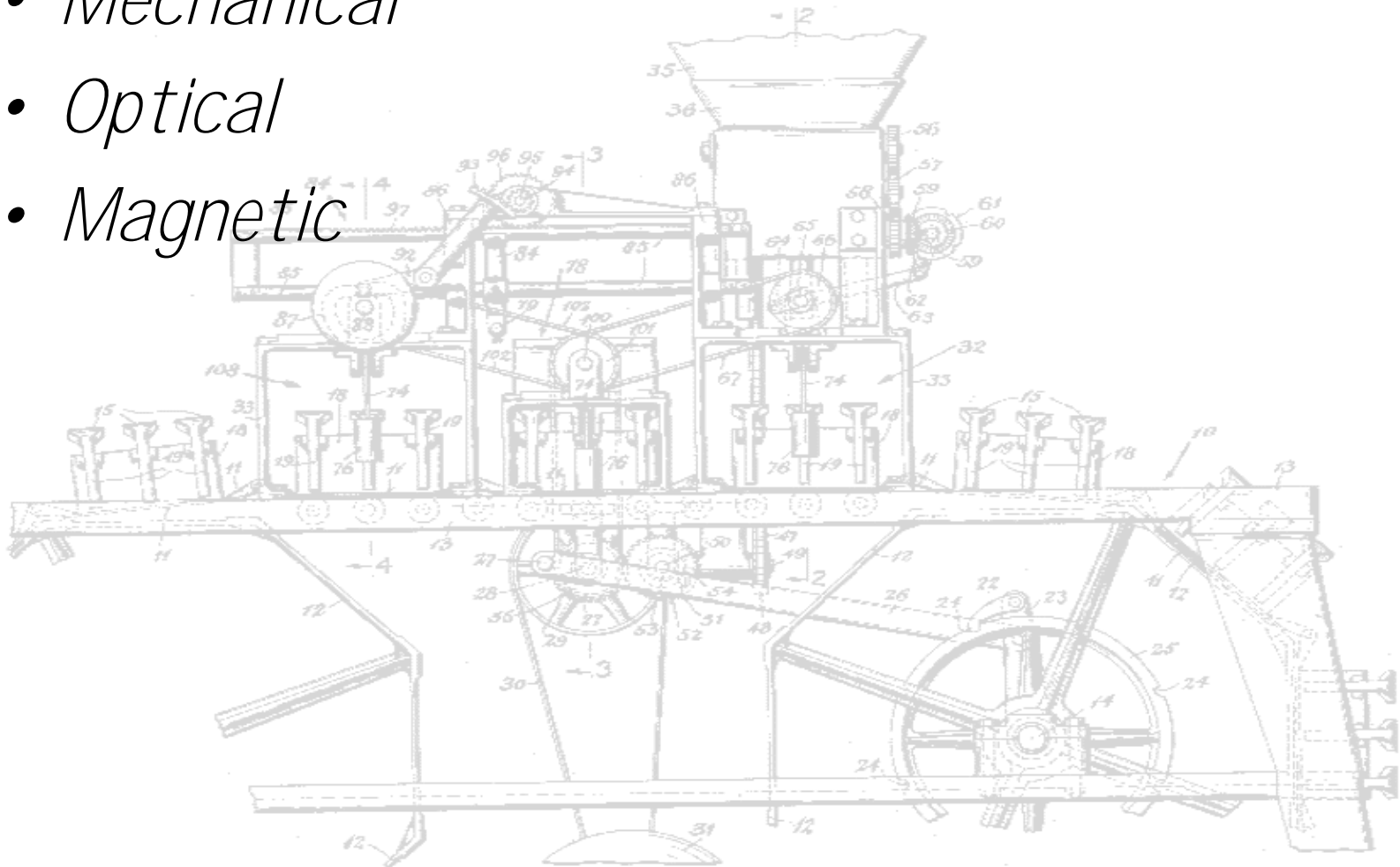


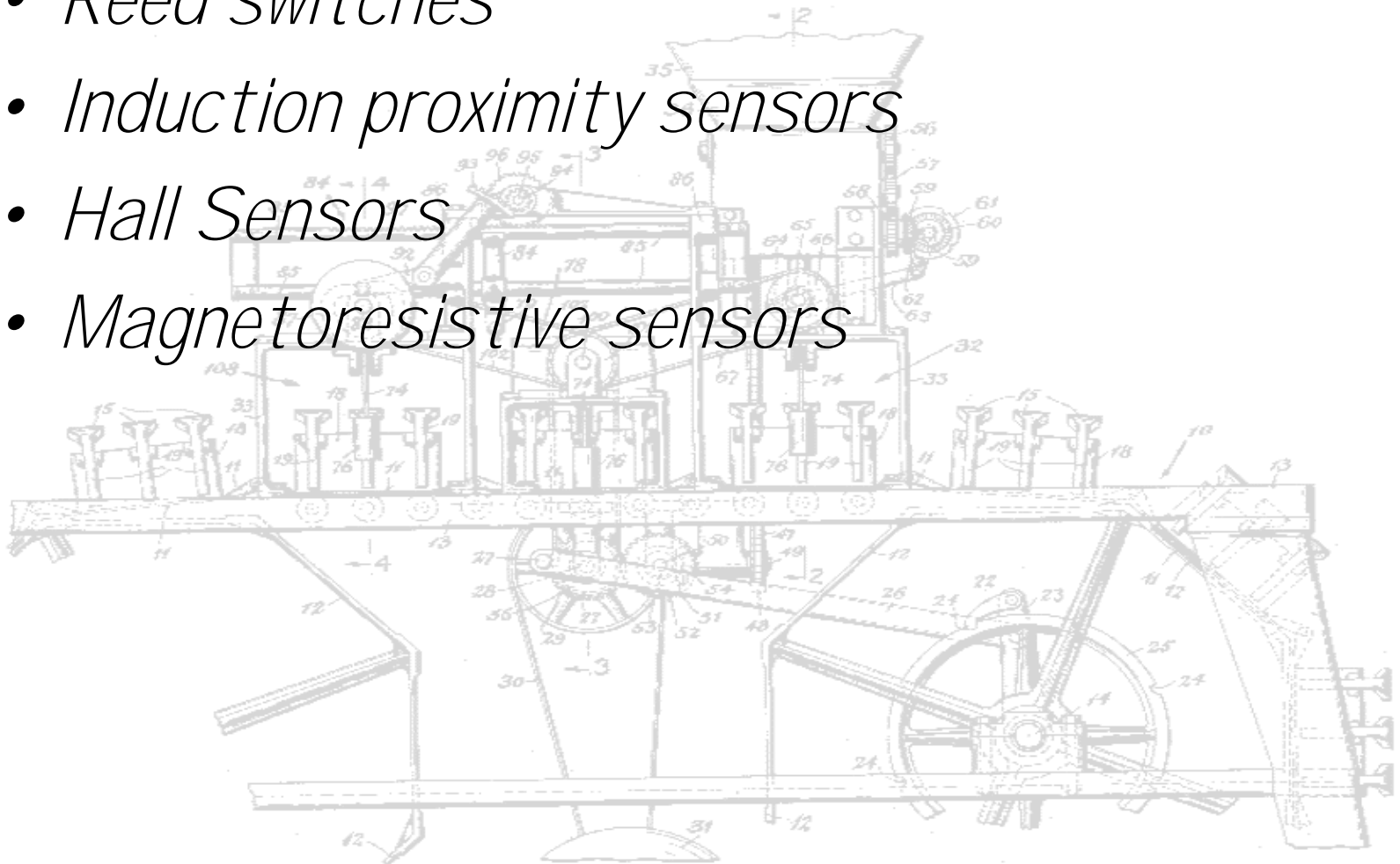
POSITION SENSING

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

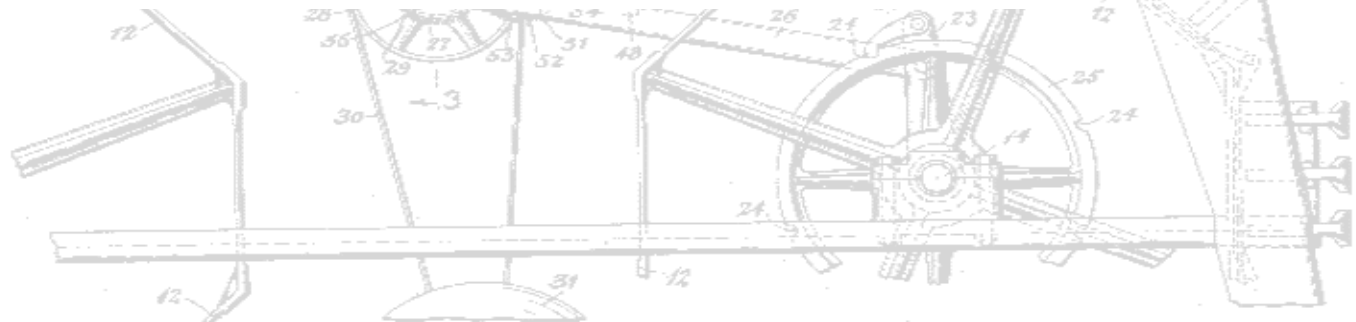
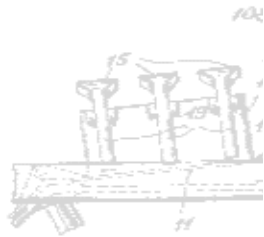
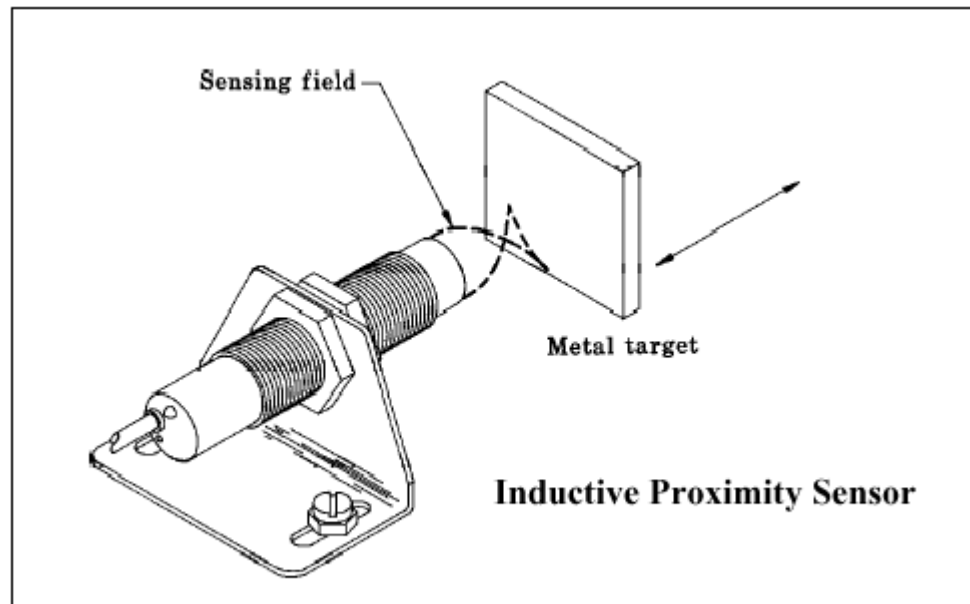


MAGNETIC SENSORS

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



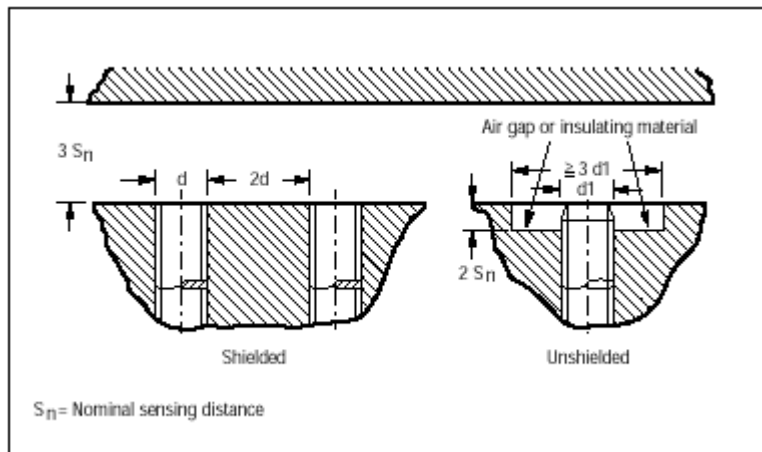
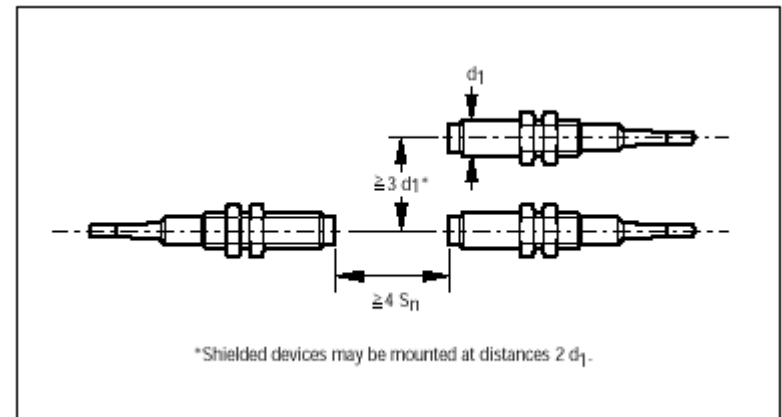
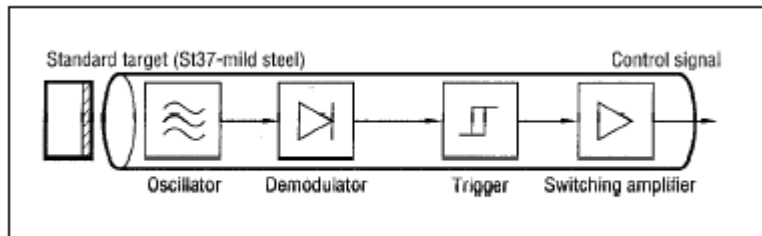
INDUCTIVE PROXIMITY SENSOR



INDUCTIVE PROXIMITY SENSORS

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

\$60-\$100



HALL SENSORS

- Hall effect:

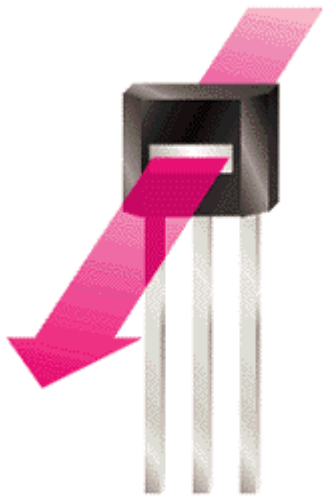
- constant voltage forces a constant current in semiconductor sheet

- Magnetic field flux lines perpendicular to current cause proportional voltage across sheet.

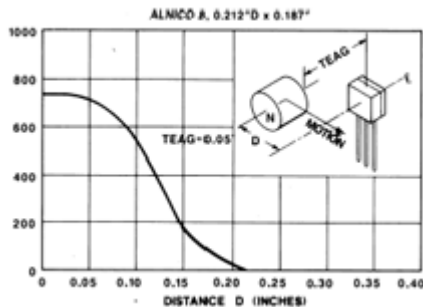
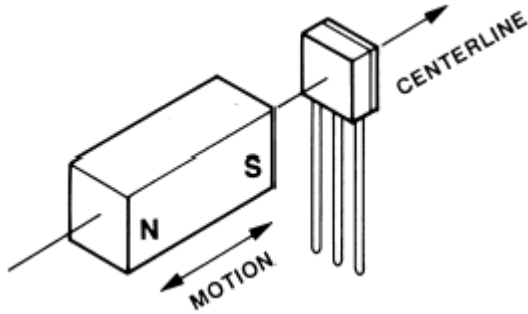
- Discovered by E.F.Hall in 1879.

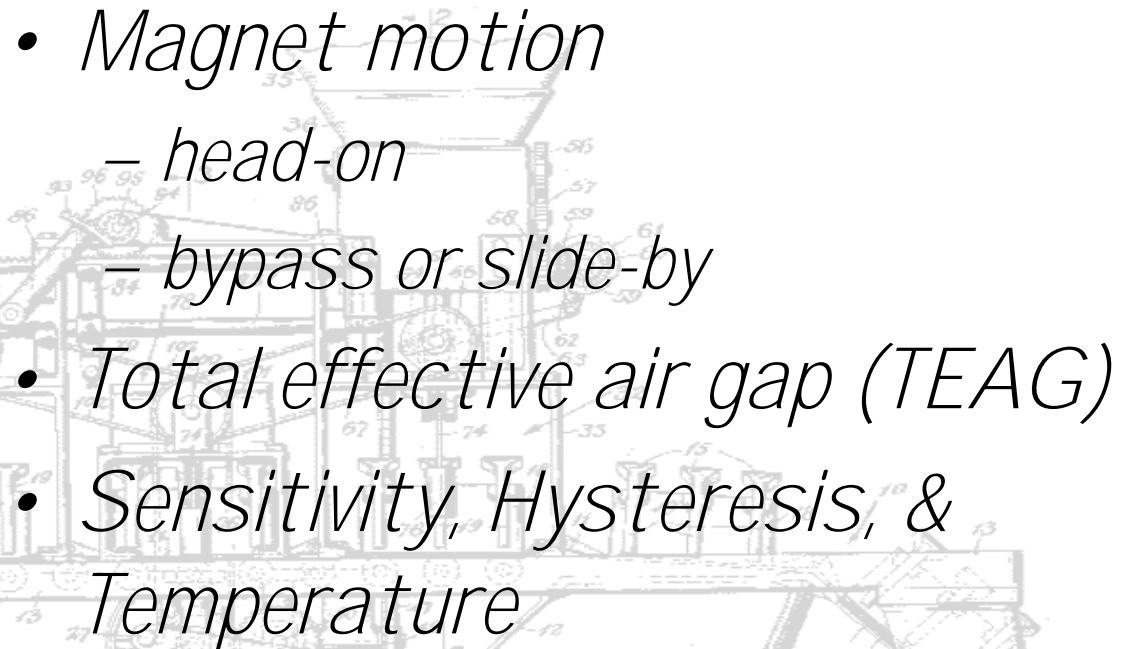
- Linear sensor needs voltage regulator and amplifier

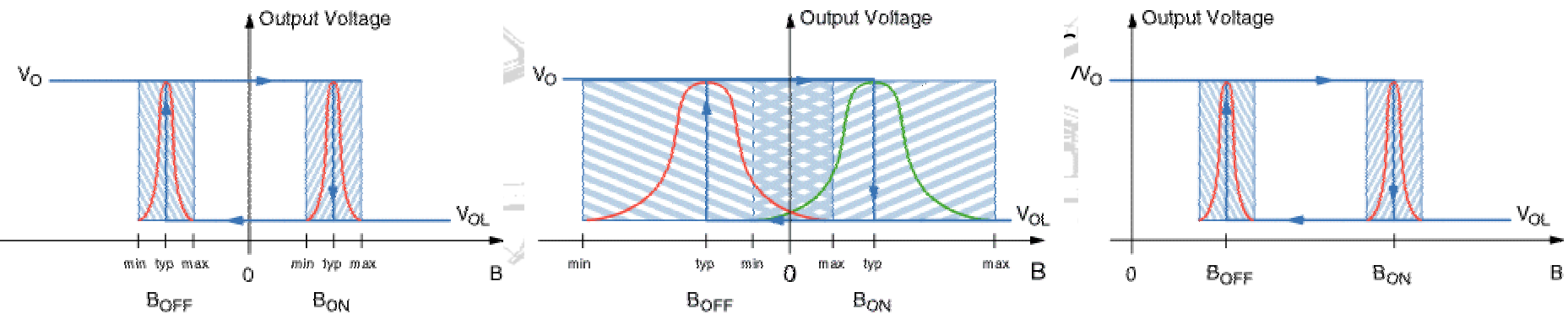
- Switch also needs threshold circuit, with hysteresis



HALL SWITCHES

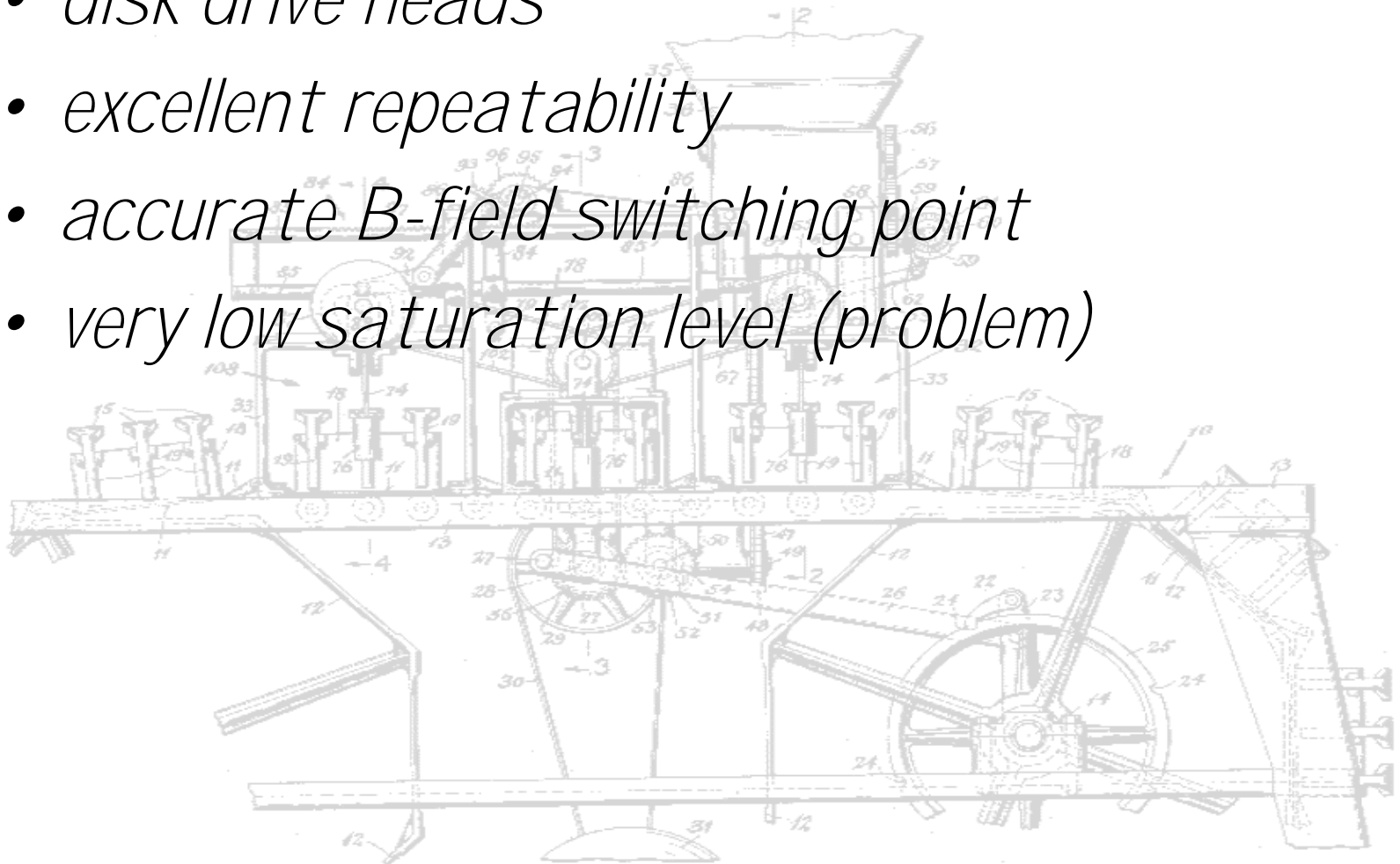
~~\$2 - \$30~~

- 
- A faint, technical drawing of a mechanical assembly, possibly a pump or engine component, serves as the background. It features various parts labeled with numbers such as 33, 96, 95, 84, 86, 56, 57, 59, 64, 68, 62, 74, 67, 33, 19, 13, 21, 12, 18, and 13. The drawing is a detailed line drawing showing the internal structure and components of the machine.
- *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 material)

