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(57) Abstract :
Abstract The present invention relates to an adjustable multi-axis gear drive mechanism for precision motion control capable of transmitting synchronized rotational motion across multiple axes within a single integrated assembly. The mechanism comprises an input drive source coupled to a central drive gear assembly that distributes torque to multiple adjustable axis transmission units. Each axis transmission unit is mounted within a pivotable housing allowing controlled angular adjustment while maintaining continuous gear engagement. Alignment and locking mechanisms secure the selected orientation during operation, ensuring mechanical stability and accuracy. Precision-machined gears reduce backlash, vibration, and power losses, resulting in smooth and efficient motion transfer. The compact and modular design reduces component count, simplifies assembly, and minimizes reliance on electronic compensation systems. The invention is suitable for use in robotics, automated manufacturing, aerospace systems, medical equipment, and other applications requiring accurate and adaptable multi-axis motion control.

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