

Mecanisms

A mechanism is a device designed to transform input forces and movement into a desired set of output forces and movement. Mechanisms generally consist of moving components such as gears and gear trains, belt and chain drives, cam and follower mechanisms, and linkages as well as friction devices such as brakes and clutches, and structural components such as the frame, fasteners, bearings, springs, lubricants and seals, as well as a variety of specialized machine elements such as splines, pins and keys.

The German scientist Reuleaux provides the definition "a machine is a combination of resistant bodies so arranged that by their means the mechanical forces of nature can be compelled to do work accompanied by certain determinate motion." In this context, his use of *machine* is generally interpreted to mean *mechanism*.

The combination of force and movement defines power, and a mechanism is designed to manage power in order to achieve a desired set of forces and movement.

A mechanism is usually a piece of a larger process or mechanical system. Sometimes an entire machine may be referred to as a mechanism. Examples are the steering mechanism in a car, or the winding mechanism of a wristwatch. Multiple mechanisms are machines.

Types of mecanisms

From the time of Archimedes through the Renaissance, mechanisms were considered to be constructed from simple machines, such as the lever, pulley, screw, wheel and axle, wedge and inclined plane. It was Reuleaux who focussed on bodies, called links, and the connections between these bodies called kinematic pairs, or joints.

In order to use geometry to study the movement a mechanism, its links are modeled as rigid bodies. This means distances between points in a link are assumed to be unchanged as the mechanism moves, that is the link does not flex. Thus, the relative movement between points in two connected links is considered to result from the kinematic pair that joins them.

Kinematic pairs, or joints, are considered to provide ideal constraints between two links, such as the constraint of a single point for pure rotation, or the constraint of a line for pure sliding, as well as pure rolling without slipping and point contact with slipping. A mechanism is modeled as an assembly of rigid links and kinematic pairs.

Cam and follower mechanisms

A cam and follower is formed by the direct contact of two specially shaped links. The driving link is called the cam (also see cam shaft) and the link that is driven through the direct contact of their surfaces is called the follower. The shape of the contacting surfaces of the cam and follower determines the movement of the mechanism.

Task 1

Запишите компоненты простейшего электродвигателя постоянного тока: electrical current, field magnet, loop of wire, commutator, brushes, armature. Найдите их переводы.

Подпишите названия компонентов к предложенной ниже схеме.

DC motor		
<i>1</i>	<i>2</i>	
	<i>3</i>	<i>Loop of wire</i>
	<i>4</i>	

Изучите описание электродвигателя.

A simple dc motor consists of a field magnet and an armature. The armature is placed between the poles of the magnet. The armature is made up of a loop of wire and a split ring known as a commutator. The loop is connected to the commutator. Current is supplied to the motor through carbon blocks called brushes.

Для описания любого механизма Вам понадобятся выполнить следующие речевые действия и использовать следующие типовые выражения:

1. Выделите основные части механизма, используя следующие выражения:

A A	consists of	X
	is made up of	X and Y
	is composed of	Y

2. Определите названия данных компонентов:

Carbon blocks	<i>called</i>	brushes.
	<i>known as</i>	

3. Укажите на месторасположение компонента:

The armature **is placed between** the poles.

4. Укажите его связь с другими компонентами:

The loop **is connected to** the commutator.

Task 2

Заполните пропуски в тексте соответствующими выражениями: **are made up, is placed, is composed, consists.**

Составьте схему трансформатора и подпишите названия его компонентов.

A transformer _____ of two coils, a primary and a secondary. The coils are wound on a former which is mounted on a core. The coils _ _____ of a number of loops of wire. The core _____ of thin pieces of soft iron. U- and T-shaped pieces are used. The former _____ on the leg of the T.

Task 3

Подготовьте описание любого механизма с названием его частей и составьте его схему, подписав названия его компонентов.