Mechanical Engineering

Links

When two parts are linked together and perform a mechanical function.

links are characterized in four ways:

1. Direct vs. Indirect
2. Rigid vs. Flexible
3. Removable vs. Non-removable
4. Complete vs. Partial

Direct	Indirect
When two parts are held together without a linking component. No glue or screw	When two parts are held together by a linking component. (Screw, glue or tape).
Rigid	**Flexible**
When the linking components have no flexibility or return movement necessary for the function of the components.	When the material or links flexibility is necessary for the function of the components. It must go back to its initial position.
Complete	**Partial**
When it prevents the linked parts from moving independently from one another.	When at least one part can move independently from the other part. **The movement must be necessary to the functioning of the link.**
Removable	**Non-removable**
When the linked parts can be separated without damaging either parts. Screws are removable.	When the linked parts cannot be separated without damaging either parts. Nails and rivets are nonremovable.

Direct or indirect Rigid or flexible Complete or partial Removable or non-r	Direct or indirect Rigid or flexible Complete or partial Removable or non-r	Direct or indirect Rigid or flexible Complete or partial Removable or non-r	Direct or indirect Rigid or flexible Complete or partial Removable or non-r
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Guiding Components

- Guides control the motion of moving parts along a given trajectory (direction) and ensures it moves in a specific way.
- There can be no guiding control in a complete link.

3 types:

Translational	Rotation	Helical
Straight motion of moving parts. Back and forth or up and down movement.	Ensures rotational motion.	Has a translational and rotational movement for apparatus to work.
Unidirectional translation = ⟶ Bidirectional translation = ⟷	Unidirectional rotation = ↷	Bidirectional helical motion: ↷↶

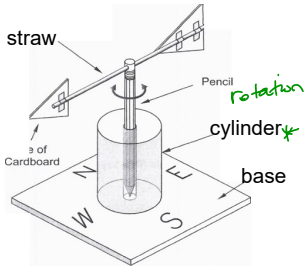
Give the type of guiding control and state what is controlling the motion.

Past exam questions

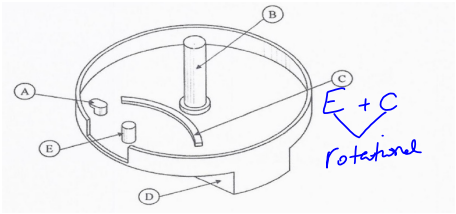
1. A weather vane is a device used to indicate the direction of the wind. You have made a weather vane like the one shown below.

a- Specify what **acts** as a guiding control for the pencil when the weather vane is in operation.

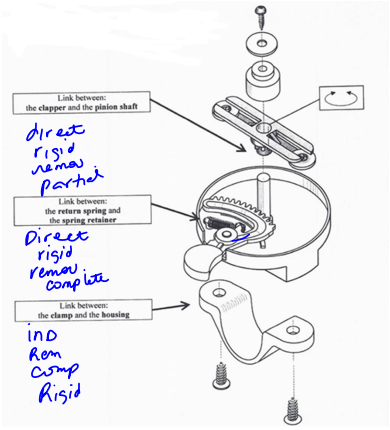
b- Indicate the **type** of guiding involved.

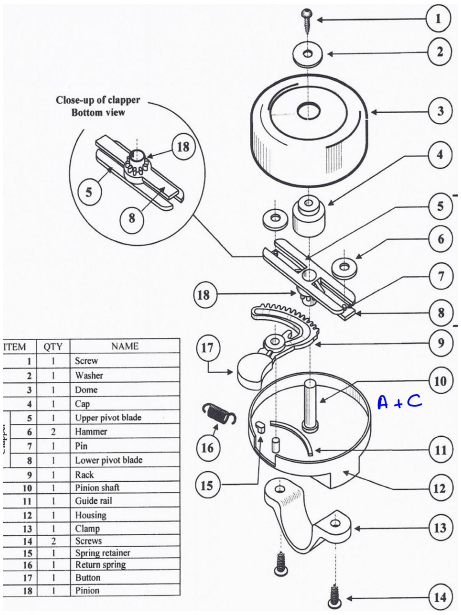


2. Using the picture below, indicate **two** components of the 5 listed needed to guide the rack and indicate the type of guiding control involved.



3. Give the links for the picture below. Write the answer below each section.





ITEM	QTY	NAME
1	1	Screw
2	1	Washer
3	1	Dome
4	1	Cap
5	1	Upper pivot blade
6	2	Hammer
7	1	Pin
8	1	Lower pivot blade
9	1	Rack
10	1	Pinion shaft
11	1	Guide rail
12	1	Housing
13	1	Clamp
14	2	Screws
15	1	Spring retainer
16	1	Return spring
17	1	Button
18	1	Pinion