Name: _____ Date: _____

Click, Click: The Ratchet in a Socket Wrench

Circle group

Try tightening a bolt with an ordinary wrench. You turn it a little. You lift it off. You put it back. You turn again. It is slow work. A socket wrench with a ratchet fixes this. You can hear it work: click, click, click.

Inside the head of the tool is a gear wheel with slanted teeth. A small catch called a pawl rests on the teeth. A spring presses it there. Turn the handle one way. The pawl locks into a tooth. The gear turns the socket, and the socket grips the bolt. The bolt gets tighter.

Now swing the handle back. This time the pawl does not lock. The slanted teeth push it aside. It clicks over each tooth as the handle moves. The socket stays put, so the bolt does not loosen. Then you swing forward and the pawl catches again. You never lift the tool off the bolt.

Many ratchets have a small switch. It flips the pawl to the other side. Then the same tool can loosen a bolt. A part that moves one way but not the other shows up in many places. Bicycle hubs and tie-down straps use it.

The click is the sound of the pawl hopping from tooth to tooth.

Questions

1. What is the part called that rests on the teeth of the gear?

_____

_____

2. What happens when you turn the handle forward?

_____

_____

3. What makes the clicking sound?

_____

_____

4. What does the small switch on many ratchets do?

_____

_____

5. Why does the bolt not loosen when you swing the handle back?

_____

_____

6. Why is a ratchet faster than an ordinary wrench?

_____

_____

Words to know

ratchet: a tool part that turns one way but not the other
pawl: a small catch that locks into a gear's teeth
socket: a hollow part that fits over a bolt
loosen: to make something less tight
tighten: to make something more tight

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Click, Click: The Ratchet in a Socket Wrench

Triangle group

Anyone who has tightened a bolt with an ordinary wrench knows the problem. You turn the wrench a little, lift it off, put it back, and turn again. It is slow work. A socket wrench with a ratchet solves the problem, and you can hear it working: click, click, click.

Inside the head of the tool is a gear wheel with slanted teeth. A small spring-loaded catch called a pawl rests against those teeth. When you turn the handle one way, the pawl locks into a tooth and the gear turns the socket, which grips the bolt. The bolt tightens.

Now swing the handle back. The pawl does not lock this time. The slanted teeth push the pawl aside, and it clicks over each tooth as the handle moves. The socket stays where it is, so the bolt does not loosen. Then you swing forward again and the pawl catches. You never have to lift the tool off the bolt.

Many ratchets have a small switch that flips the pawl to the other side. That lets the same tool loosen a bolt instead of tightening it. The idea of a part that moves one way but not the other appears in many places, from bicycle hubs to tie-down straps and some clocks.

The clicking is simply the sound of the pawl hopping from tooth to tooth.

Questions

1. What is the part called that rests against the teeth of the gear?

_____

_____

2. What happens when you turn the handle forward?

_____

_____

3. What causes the clicking sound?

_____

_____

4. What does the small switch on many ratchets do?

_____

_____

5. Why does the bolt not loosen when you swing the handle back?

_____

_____

6. Why is a ratchet faster than an ordinary wrench?

_____

_____

Words to know

ratchet: a tool part that turns one way but not the other
pawl: a small catch that locks into a gear's teeth
socket: a hollow part that fits over a bolt
loosen: to make something less tight
tighten: to make something more tight

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Click, Click: The Ratchet in a Socket Wrench

Square group

Anyone who has tried tightening a bolt with an ordinary wrench understands the frustration. You turn the wrench a little, lift it off, set it back, and turn again, which is painfully slow. A socket wrench with a ratchet eliminates the problem, and you can actually hear it working: click, click, click.

Inside the head of the tool is a gear wheel with slanted teeth. A small spring-loaded catch called a pawl rests against those teeth. When you turn the handle in one direction, the pawl locks into a tooth and the gear rotates the socket, which grips the bolt. As a result, the bolt tightens.

Now swing the handle backward. On this stroke the pawl does not lock. The slanted teeth shove it aside, and it clicks over each tooth as the handle moves. The socket remains where it is, so the bolt does not loosen. Then you swing forward again and the pawl catches once more. You never have to lift the tool off the bolt.

Many ratchets feature a small switch that flips the pawl to the opposite side, allowing the same tool to loosen a bolt instead of tightening it. The principle of a part that moves in one direction but not the other appears in numerous places, from bicycle hubs to tie-down straps and some clocks.

The clicking is simply the sound of the pawl hopping from tooth to tooth.

Questions

1. What is the part called that rests against the teeth of the gear?

_____

_____

2. What happens when you turn the handle in the forward direction?

_____

_____

3. What produces the clicking sound?

_____

_____

4. What does the small switch on many ratchets allow the tool to do?

_____

_____

5. Why does the bolt not loosen when you swing the handle backward?

_____

_____

6. Why is a ratchet quicker than an ordinary wrench?

_____

_____

Words to know

ratchet: a tool part that turns one way but not the other
pawl: a small catch that locks into a gear's teeth
socket: a hollow part that fits over a bolt
loosen: to make something less tight
tighten: to make something more tight

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Click, Click: The Ratchet in a Socket Wrench

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Click, Click: The Ratchet in a Socket Wrench

Easier · 210 words · Flesch-Kincaid grade 1.3

1. A pawl.
2. The pawl locks into a tooth and the socket turns the bolt.
3. The pawl hopping from tooth to tooth.
4. It flips the pawl so the tool can loosen a bolt.
5. The pawl slides over the teeth, so the socket stays put.
6. You never have to lift the tool off the bolt between turns.

Triangle: Click, Click: The Ratchet in a Socket Wrench

This passage · 228 words · Flesch-Kincaid grade 3.6

1. A pawl.
2. The pawl locks into a tooth and the socket turns the bolt.
3. The pawl hopping from tooth to tooth.
4. It flips the pawl to the other side so the tool can loosen a bolt.
5. The pawl slides over the teeth, so the socket stays in place.
6. You never have to lift the tool off the bolt between turns.

Square: Click, Click: The Ratchet in a Socket Wrench

Harder · 237 words · Flesch-Kincaid grade 5.7

1. A pawl.
2. The pawl locks into a tooth and the socket turns the bolt.
3. The pawl hopping from tooth to tooth.
4. Flip the pawl so the tool can loosen a bolt.
5. The pawl slides over the teeth, so the socket remains in place.
6. You never have to lift the tool off the bolt between turns.