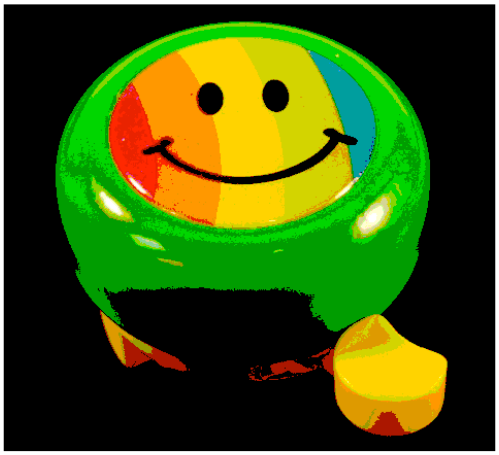
centre de développement pédagogique
pour la formation générale en science et technologie

« The sound of the bells »

Bicycle bell analysis activity



June 2011

Objectives for the activity:

- Allow the participants to discern the prescribed concepts in the training program, putting the learning progression to good use for teaching technology.
- Illustrate the usefulness of the principles and construction diagrams as a communication tool in science and technology.
- Allow the participants to develop their expertise to communicate and judge which type of diagram to advocate, depending on the context.

An everyday object, observed or heard many times since earliest childhood:
The bicycle bell...

Who among you has ever taken the time to have a look at the operation of a bicycle bell? According to which principles does it work?
Would you be able to design such an object?
Do all bicycle bells work according to the same principles?
How is one built?
How would its operating principles be appropriately illustrated?

This activity gives you some reference points about diagramming and illustrates the importance of the context in which we would use one form of representation rather than another. It will allow you to better understand this object while developing your competency in communicating using the languages associated to technology.

Your challenge:

1. Explain the operating principles of a bicycle bell using your scientific and technological knowledge.
2. Compare the operation of various bicycle bells.
3. Highlight the commonalities and particularities of the various bells.

Global function and nomenclature of the parts

(In order to alleviate the complexity of the exercise, we will concentrate only on the bell itself, not the device to affix it to the handlebars.)

Note: The *global function,* sometimes called the *service function,* is a statement which concisely describes what the object is used for.

1. What is the global function of the object?

_____

_____

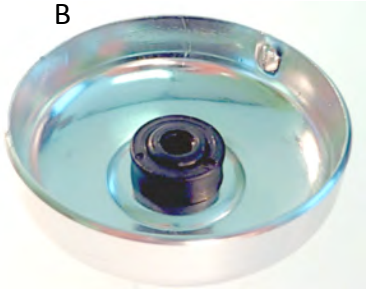
2. Associate the names of the parts to each of the photos.

Recall spring - Stepped pinions - Resonator - Housing - Geared lever - Beater

A

_____

B



_____

C

_____

D

_____

E

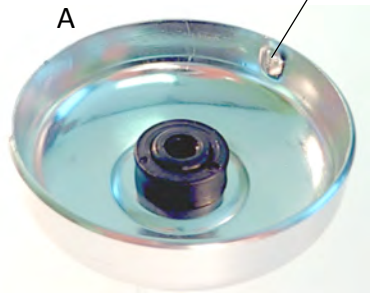
_____

F

_____

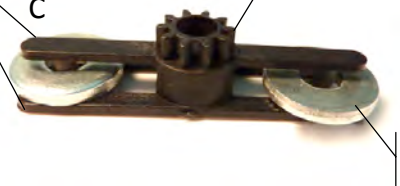
3. Certain parts also include details essential to the operation of the object. On each of the images below, name these identified parts.

A



B

C

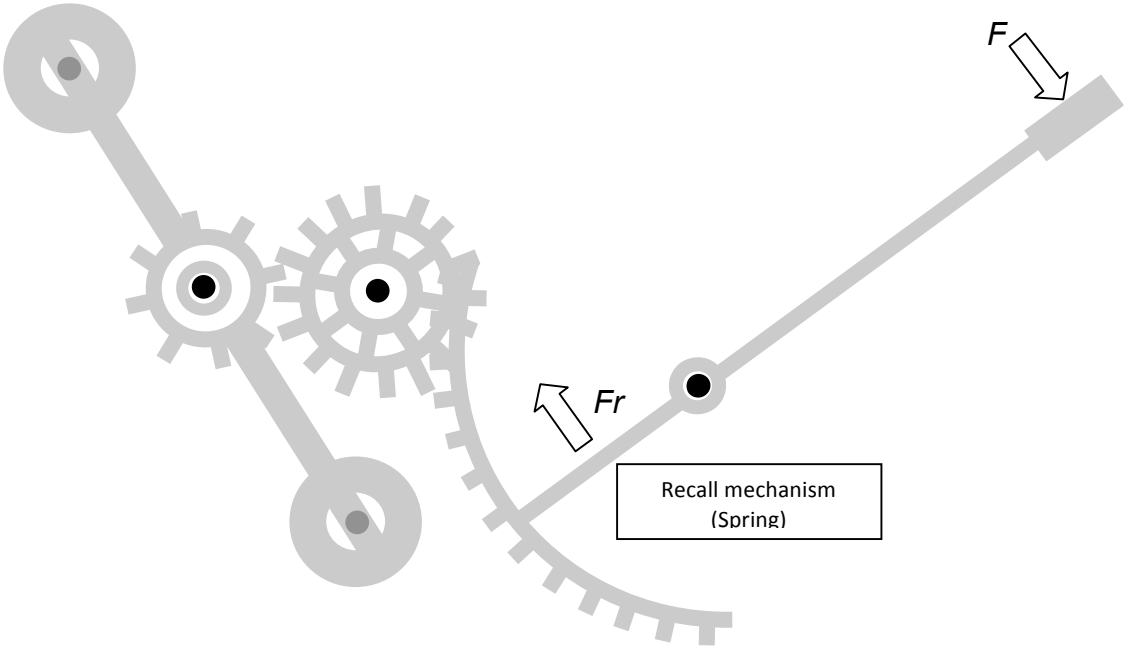


4. In order to adequately explain the operating principles of the bell, we judged that two views would be necessary. This was a conscious choice. Another expert might have made the decision to carry out a single diagram and still be able to represent the arrangement of the parts and their movements.

On the two draft diagrams below, add the information necessary to explain the operation of the bell.

Operating principles

Operating principles - continued
(Deployed mechanism)



Explanations:

5.Here are two other models of bicycle bells. Carefully observe the images and compare each of these bells to the principles diagrams that you carried out in the previous question. Answer questions 6 to 8. (See annexes 1 and 2).

6. Are the operating principles of bells 2 and 3 different from the first bell? Justify your answer in terms of the movements, the function of the parts and the force of action.

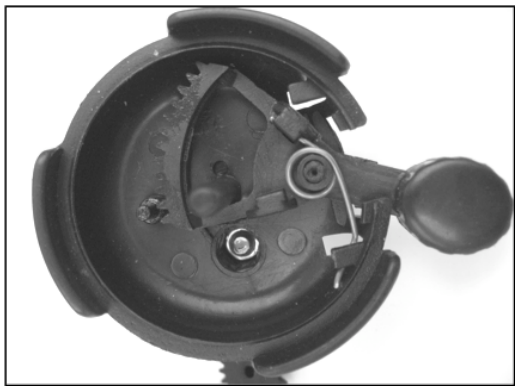
7. Would the principles diagrams carried out for the first bell suit bells 2 and 3? Justify your answer.

8. Is the recall mechanism of the geared lever the same for each of the bells? Justify your answer.

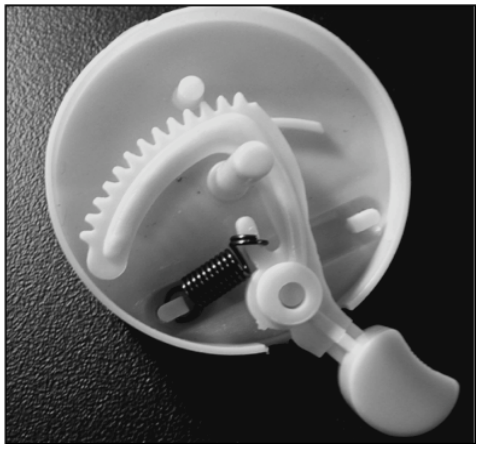
9. In your opinion, does the type of spring chosen have an impact on the shape of the geared lever? Justify your answer.

10. Carry out the construction diagram of the "geared lever and spring" set for each of the bells.

Bell 1

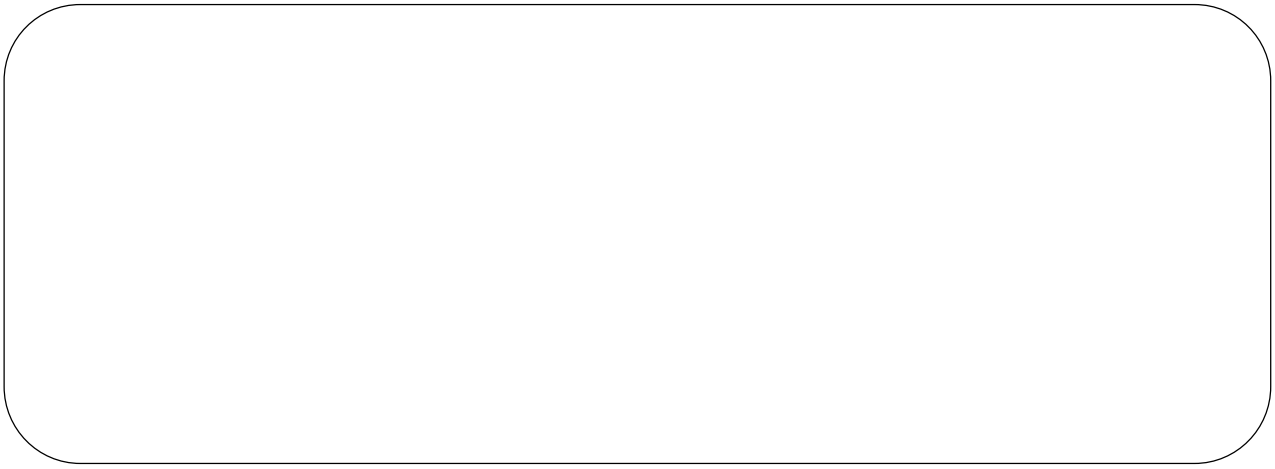


Bell 2

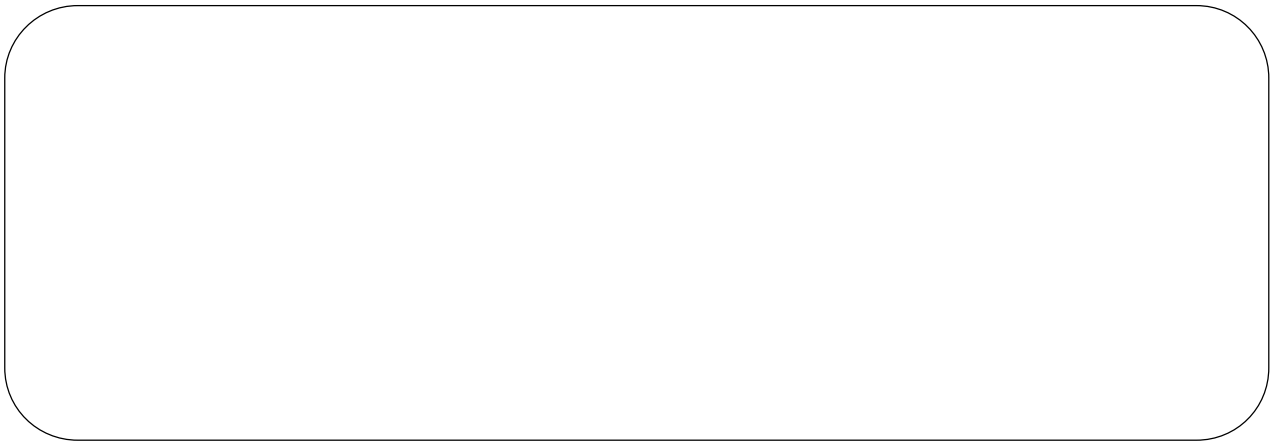


Bell 3

Construction diagram 1



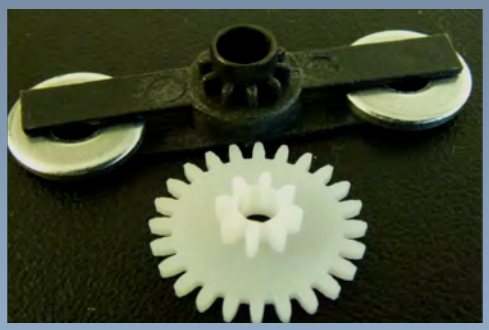
Construction diagram 2



Construction diagram 3

ANNEX 1

Bell 2



ANNEX 2

Bell 3