

## COMPARATIVE STUDY OF FIVE DIFFERENT CORKSCREWS

WING CORKSCREW



STRAIGHT-PULL  
CORKSCREW



COUNTERSCREW CORKSCREW



AUTOMATIC CORKSCREW



WAITER'S CORKSCREW



April 2005

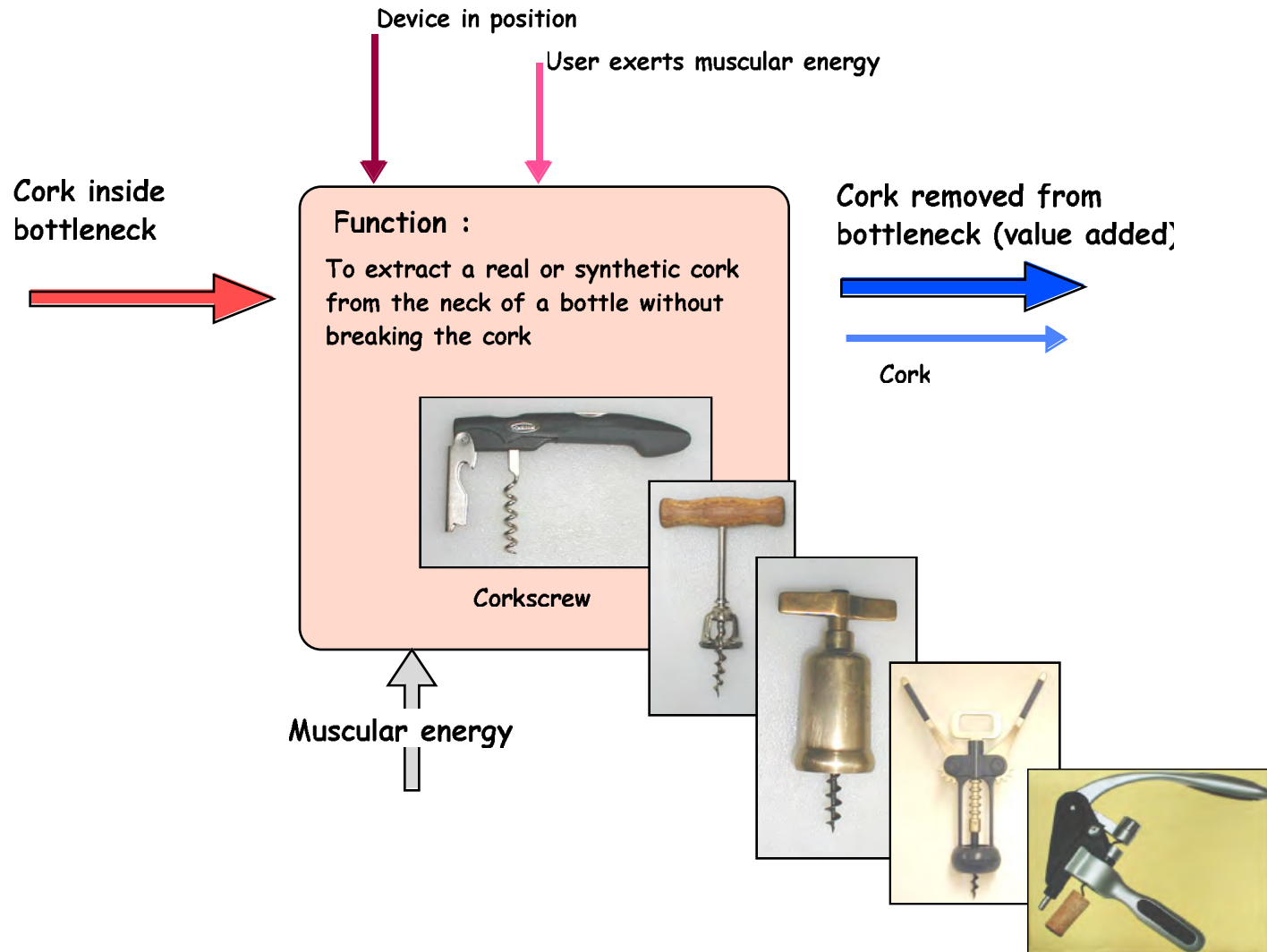
**Note:**

The purpose of this document is to help train science and technology education consultants and introduce students to the concept of technological analysis.

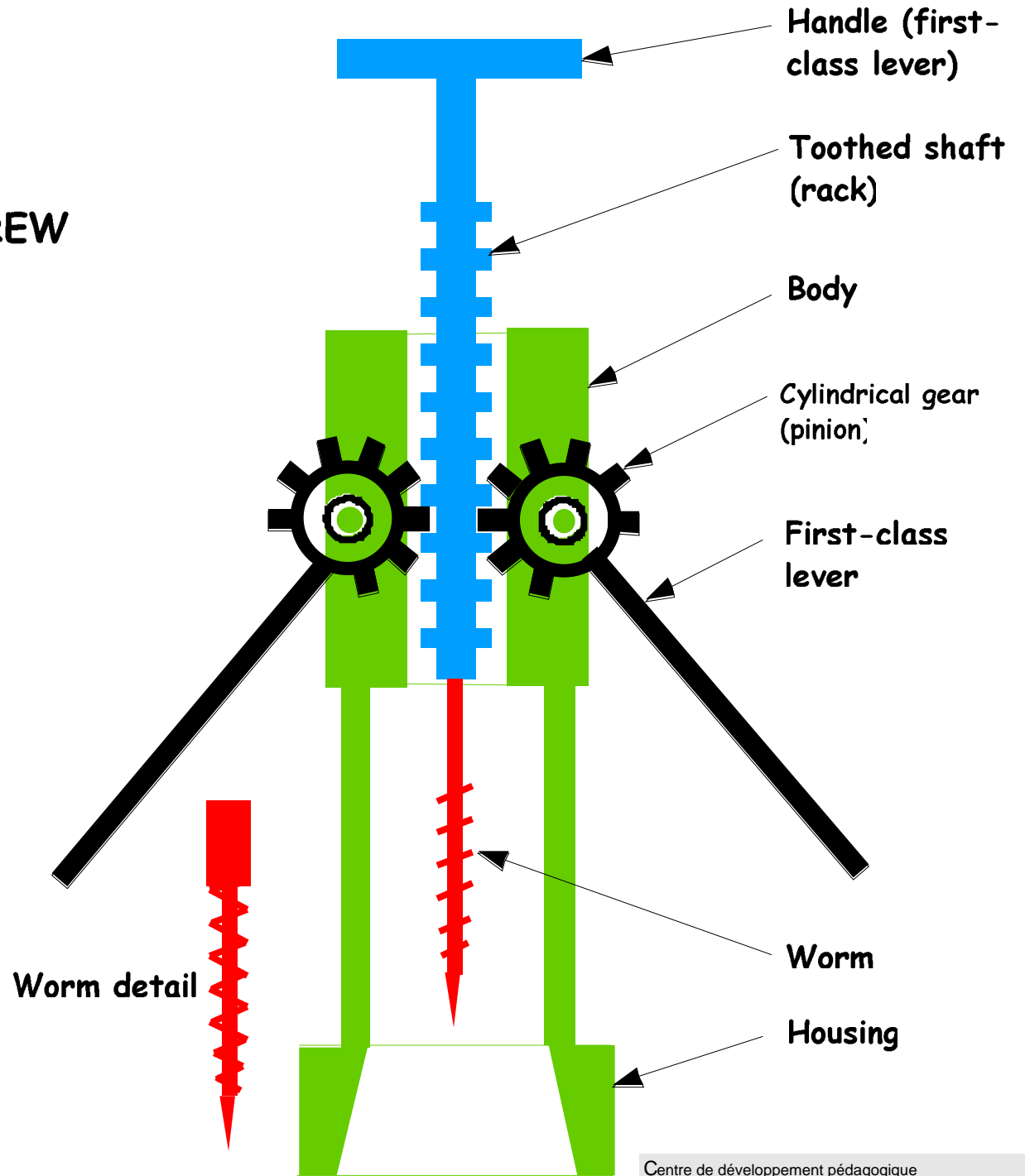
It does not contain the information delivered verbally during training and is not intended for use as a stand-alone teaching tool. Rather, it serves as an example of how to analyze a specific technical object and must be used in conjunction with the appropriate support material.

The CDP team

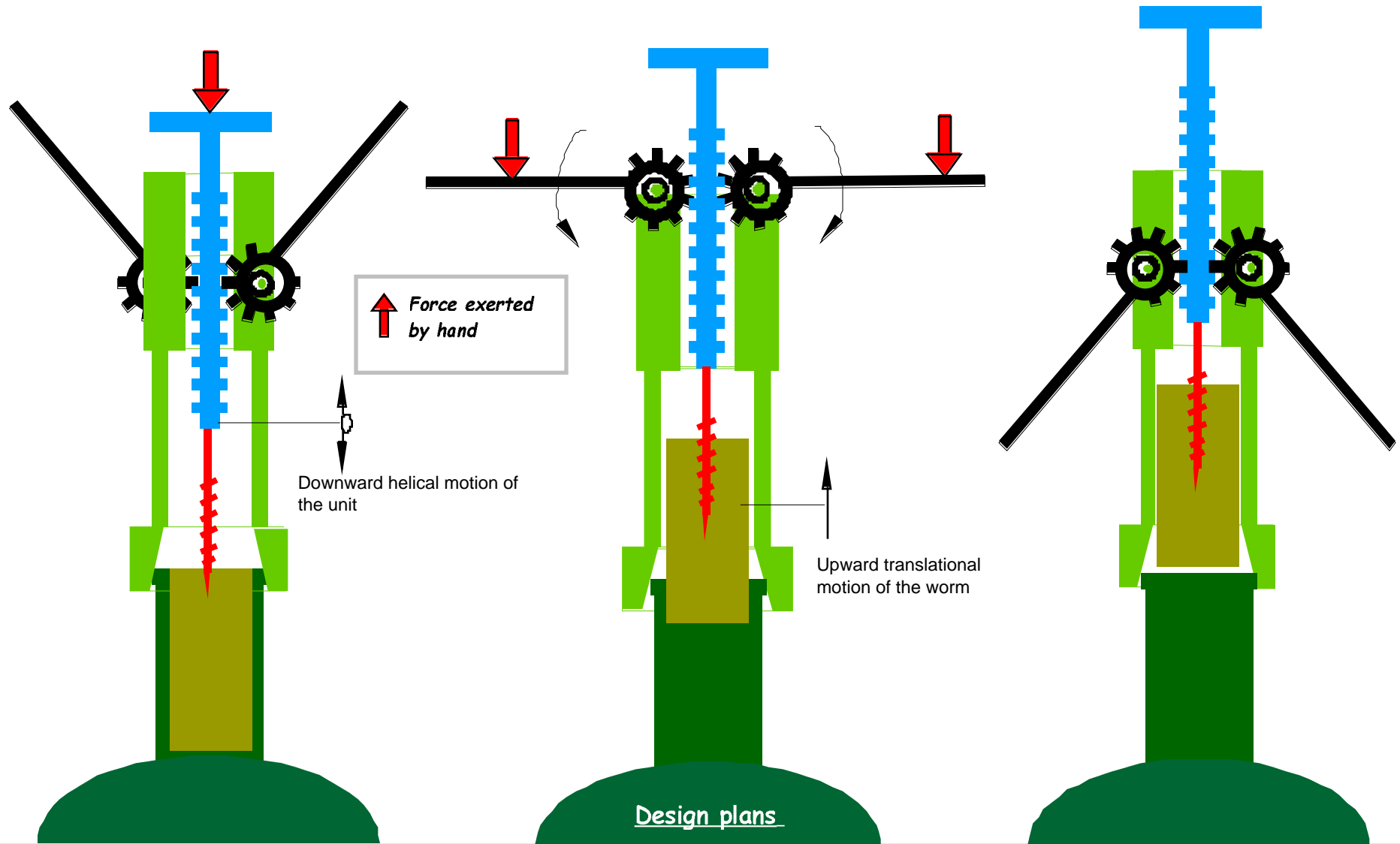
# Systemic Analysis



# WING CORKSCREW



## STUDY OF OPERATING PRINCIPLES



### Step 1: WORM INSERTION

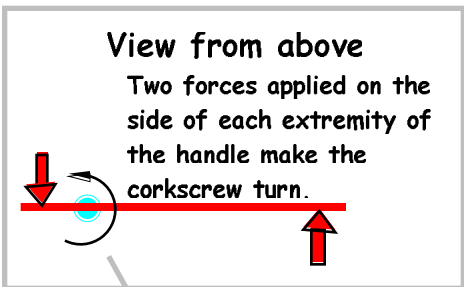
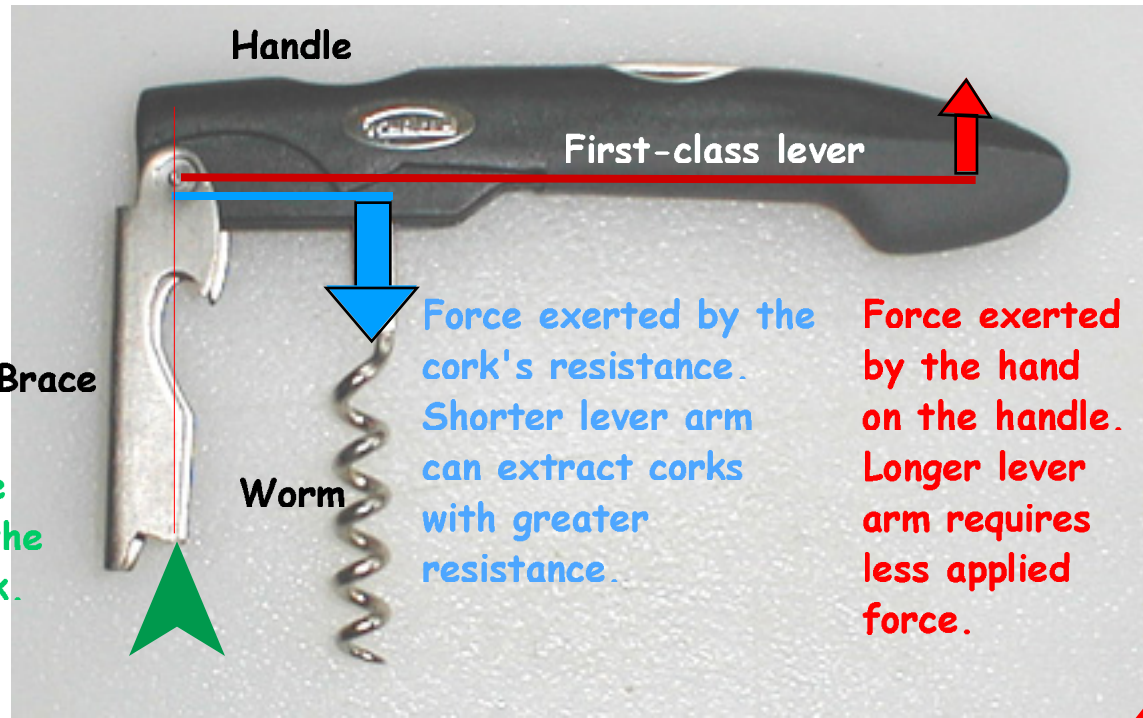
- Levers held in upright position
- Worm positioned downward, ready to screw into cork
- Handle rotated and tip inserted

### Step 2: CORK EXTRACTION

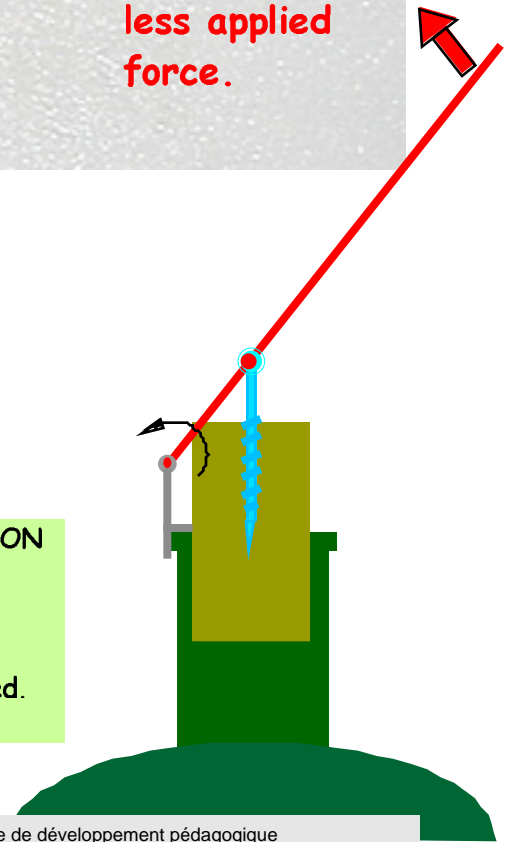
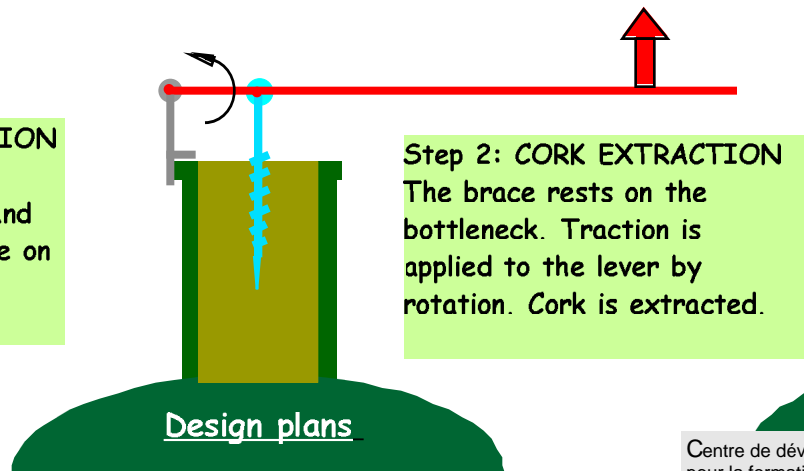
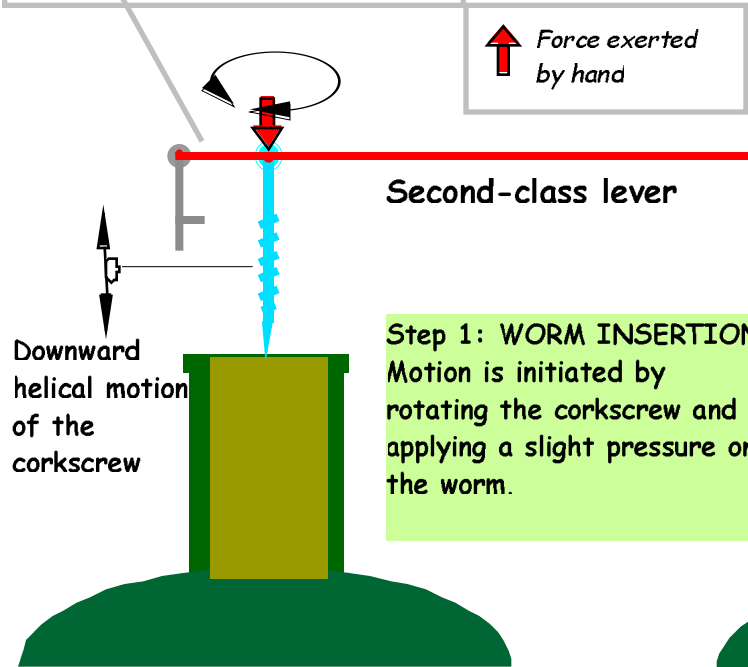
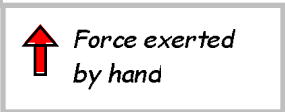
- Levers gradually lowered
- Worm in mid-position
- Cork partially removed from bottle

# WAITER'S CORKSCREW

## STUDY OF OPERATING PRINCIPLES

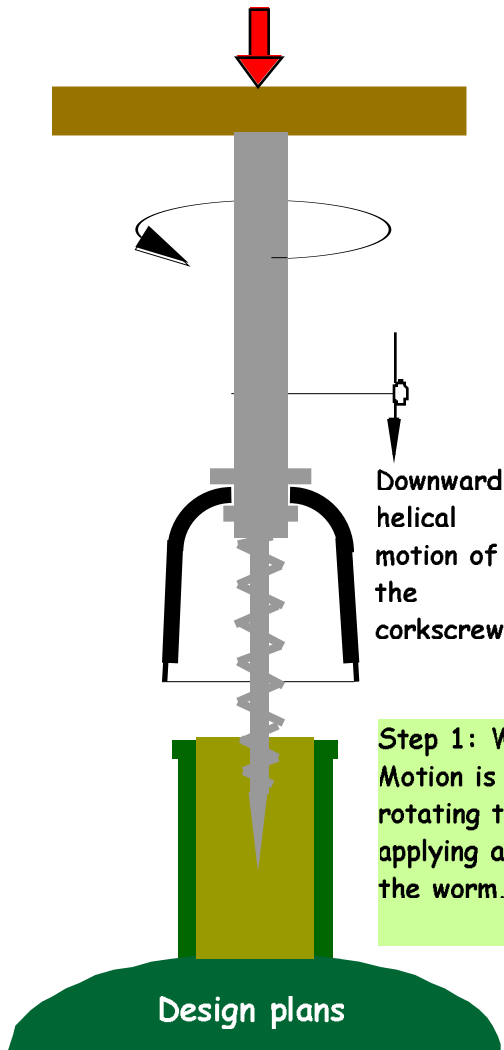


The brace rests on the bottleneck.

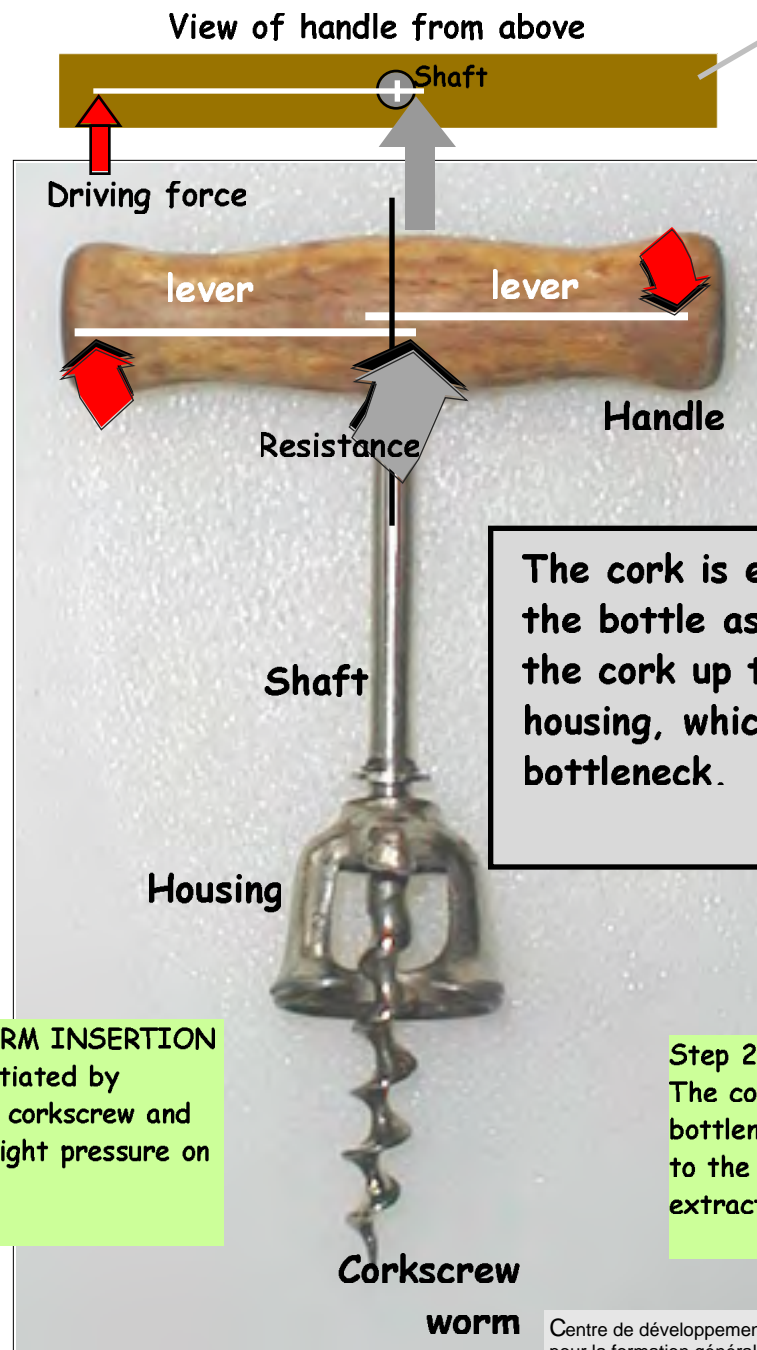


# STUDY OF OPERATING PRINCIPLES

## STRAIGHT-PULL CORKSCREW



**Step 1: WORM INSERTION**  
Motion is initiated by rotating the corkscrew and applying a slight pressure on the worm.

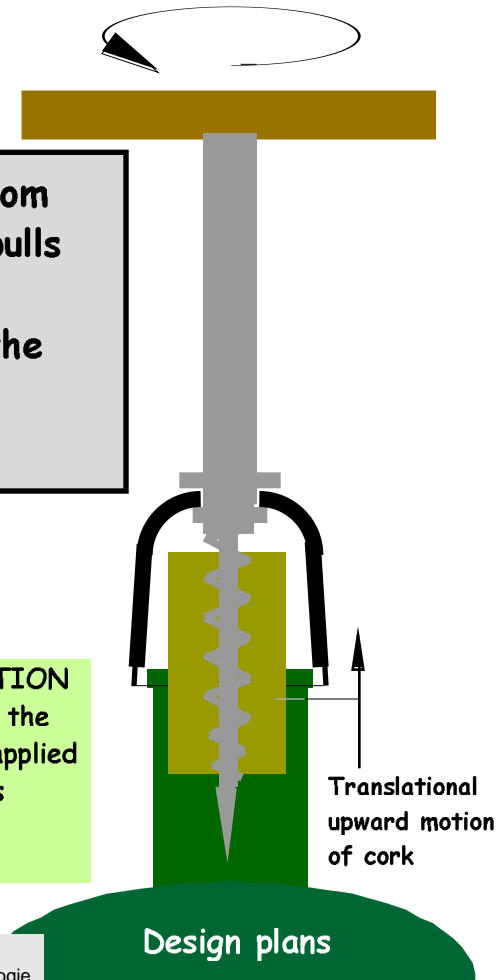


Force is exerted by the hand on the wooden handle. The handle acts as a second-class lever on each side of the metal shaft that ends in the worm.

Force exerted by hand (driving force)

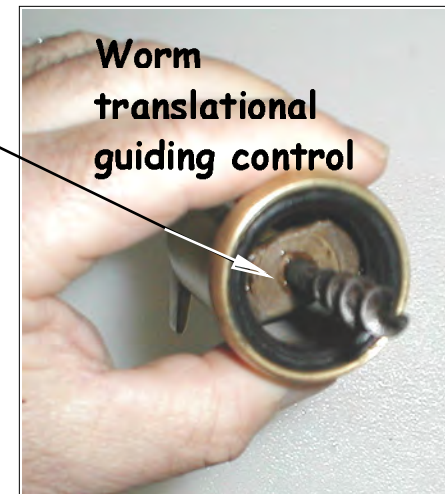
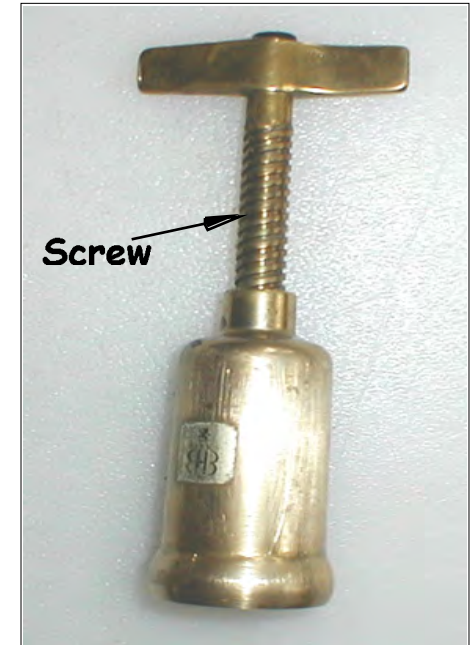
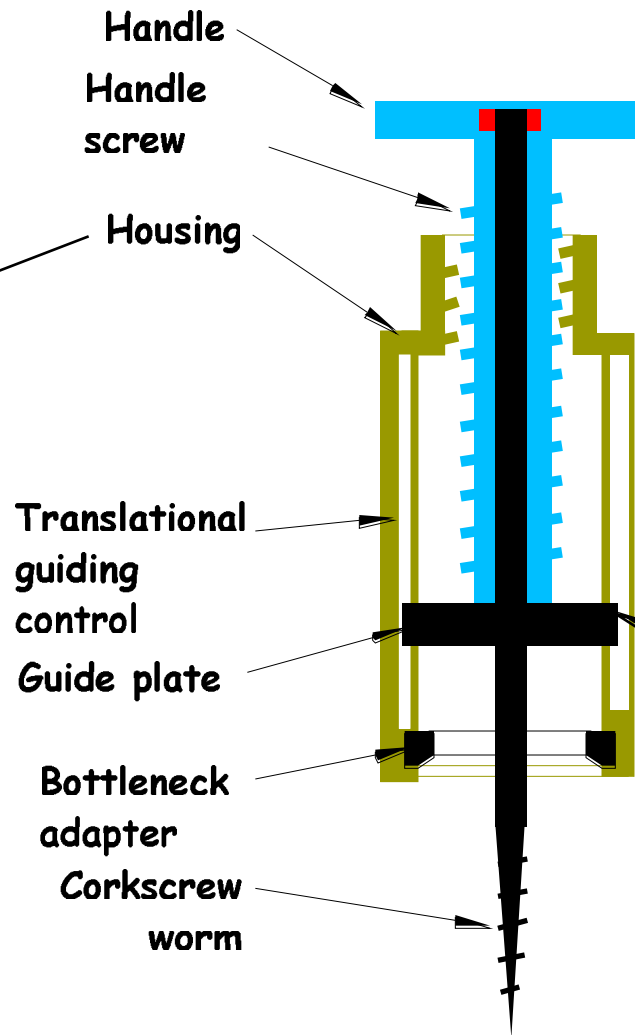
The cork is extracted from the bottle as the worm pulls the cork up through the housing, which rests on the bottleneck.

**Step 2: CORK EXTRACTION**  
The corkscrew rests on the bottleneck. Traction is applied to the lever. The cork is extracted.



# COUNTERSCREW CORKSCREW

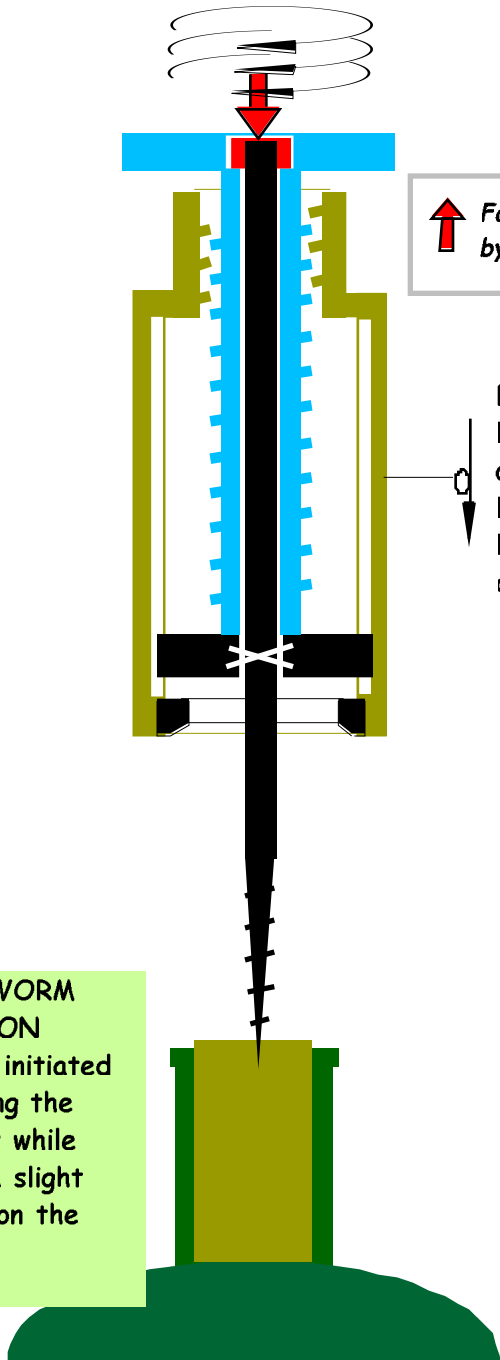
## STUDY OF OPERATING PRINCIPLES





# STUDY OF OPERATING PRINCIPLES

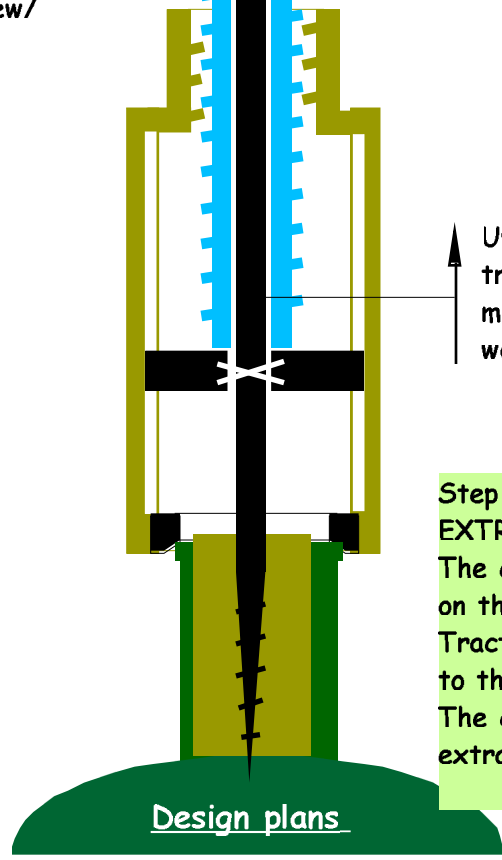
**Step 1: WORM INSERTION**  
Motion is initiated by rotating the corkscrew while applying a slight pressure on the worm



Helical motion of the handle in the opposite direction

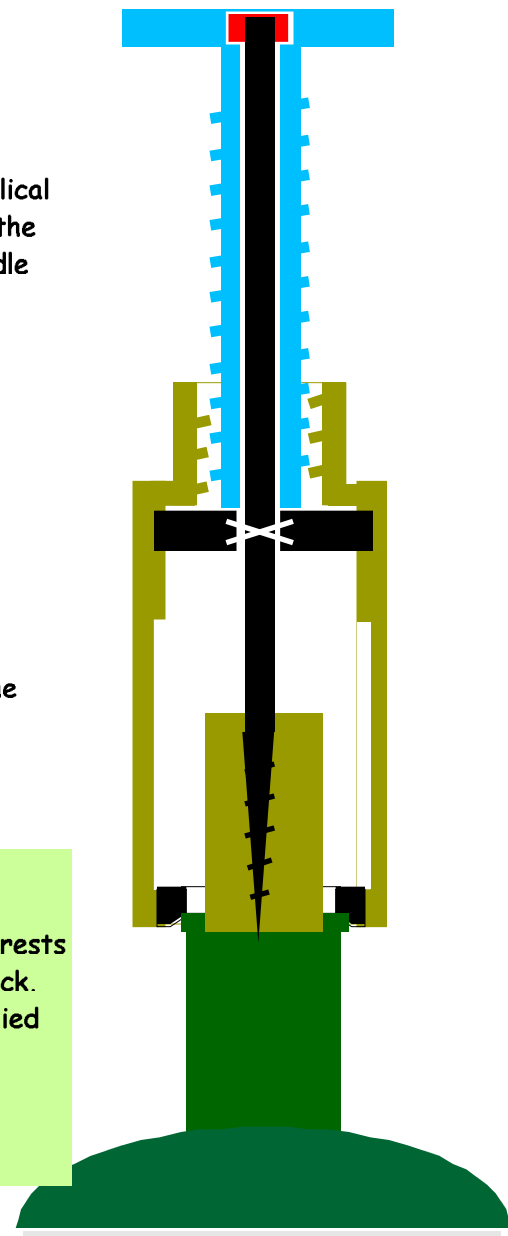


Upward helical motion of the screw/handle

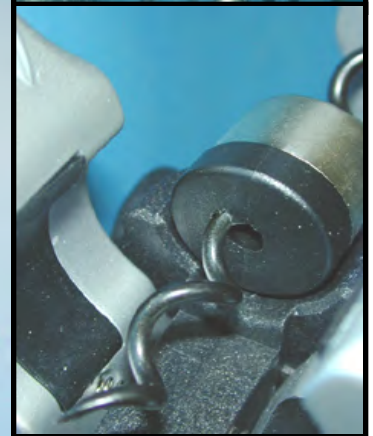


**Step 2: CORK EXTRACTION**  
The corkscrew rests on the bottleneck. Traction is applied to the lever. The cork is extracted.

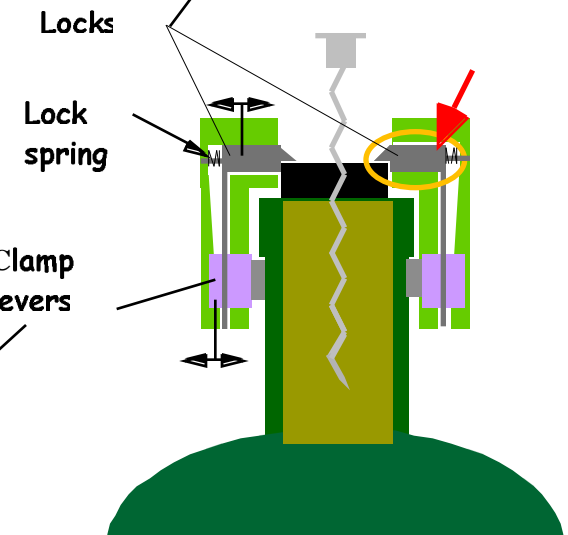
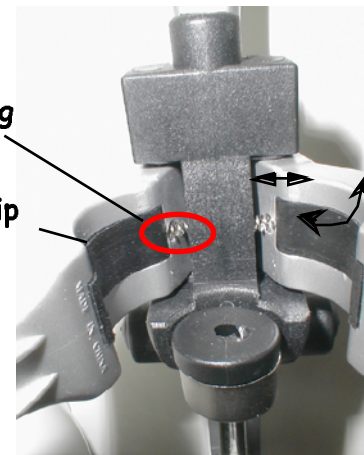
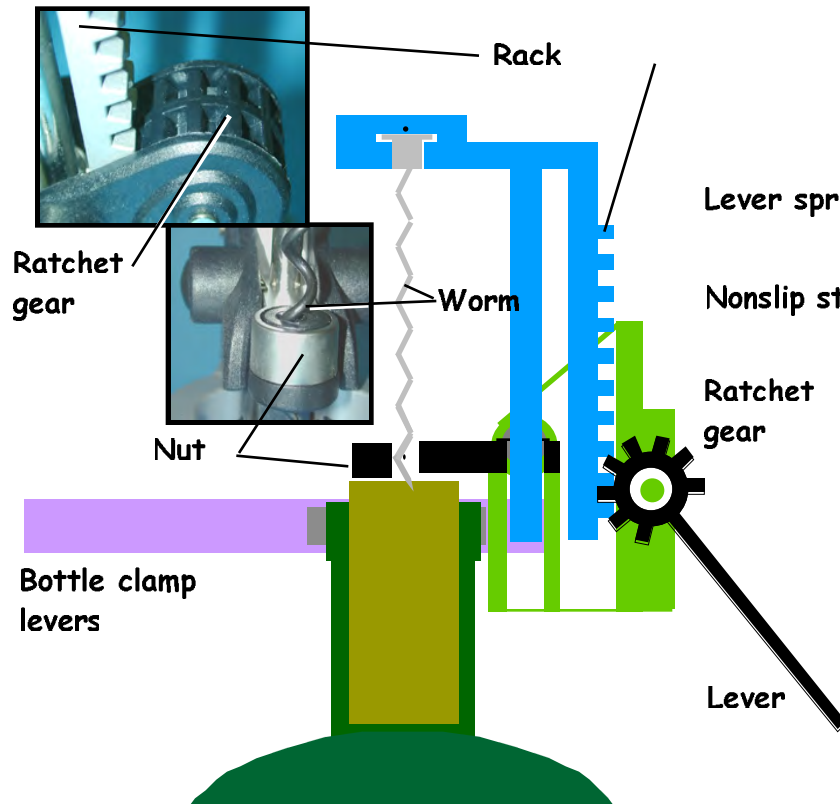
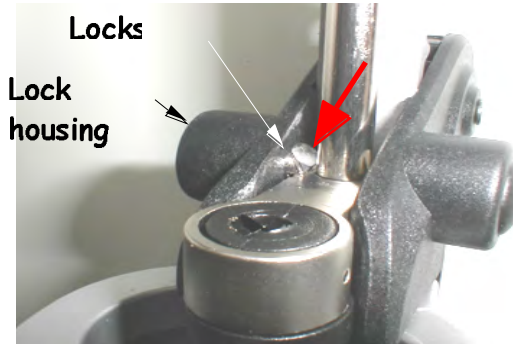
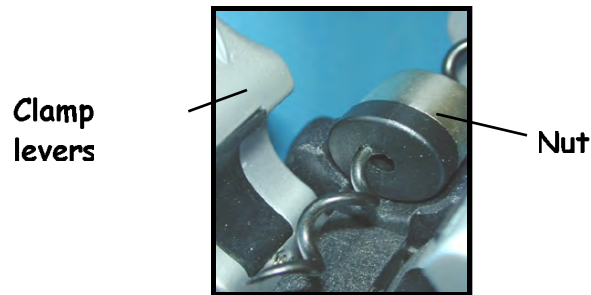
Design plans



# AUTOMATIC CORKSCREW



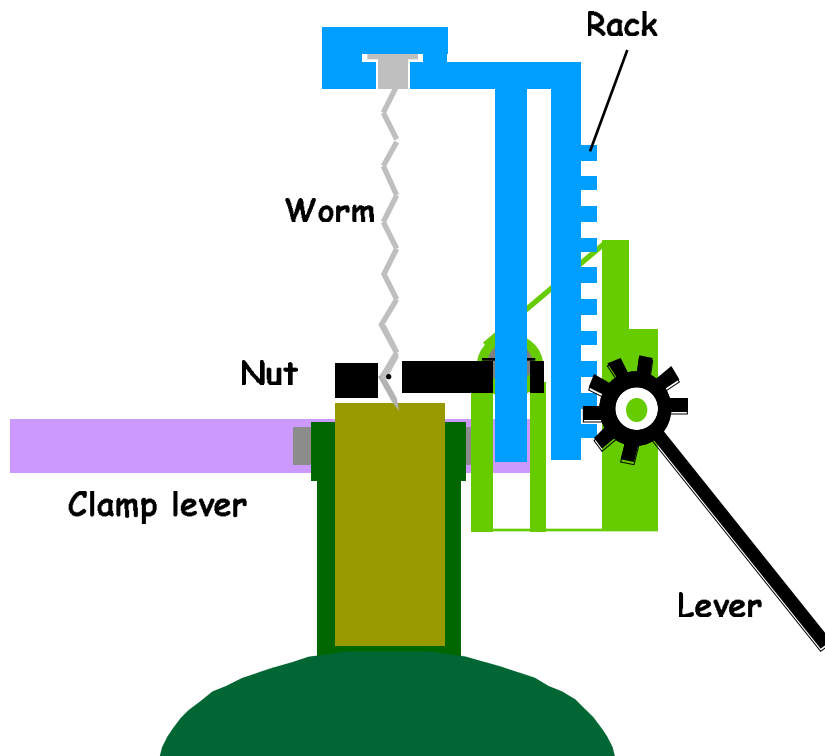
# STUDY OF OPERATING PRINCIPLES/COMPONENTS/CLAMPING AND LOCKING SYSTEM



The worm has the following features: it is narrow, pointed, and has a pitch (one complete coil) of 15 mm, which allows it to turn when pushed through a nut.

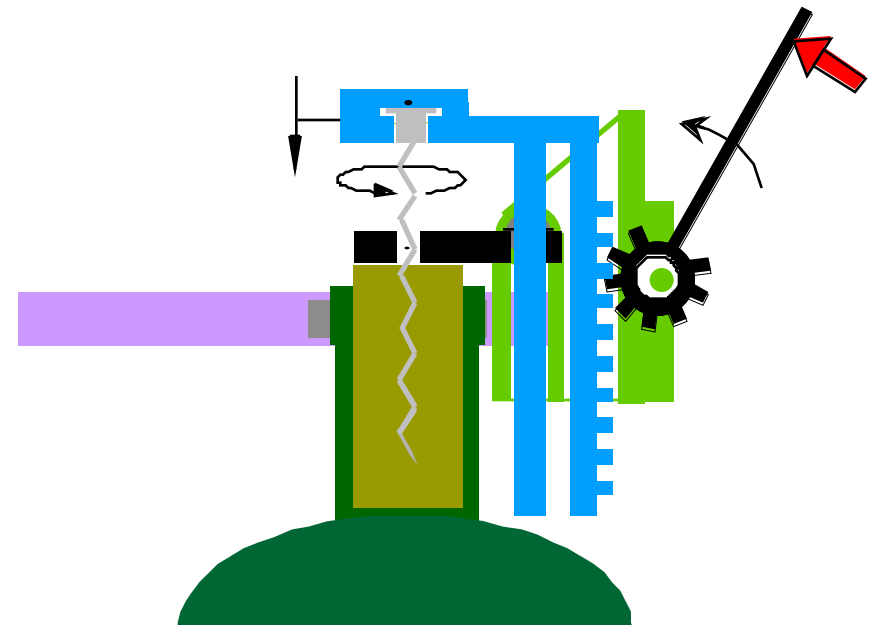
The nut is held in the down position by two locks that are released during steps 1 to 3 with the movement of the clamping levers. The flexible link between the clamping levers and the rest of the assembly is a hinge consisting of a shaft pushed by small springs. By clamping tight the bottleneck, the levers, which rest on the bottle, cause the shafts to move, pushing the locks outward to unlock them.

## STUDY OF OPERATING PRINCIPLES (Cont.)



### Step 1: POSITIONING THE CORKSCREW

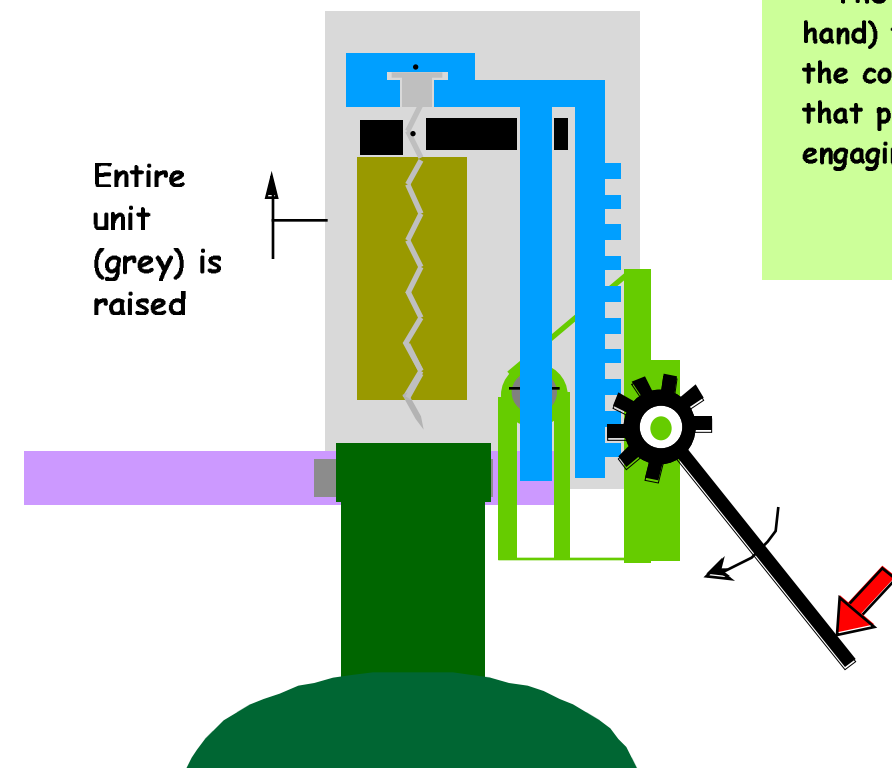
- The handle is down, the worm is in raised position.
- The clamping levers hold bottleneck firmly.



### Step 2: INSERTING THE WORM

- The lever is slowly raised (by hand).
- The rack lowers by pushing against the worm, which rotates freely. A bearing reduces friction against the head of the worm.
- The worm rotates, passing through the nut and penetrating the cork.

## STUDY OF OPERATING PRINCIPLES (Cont.)



### Step 3: EXTRACTING THE CORK

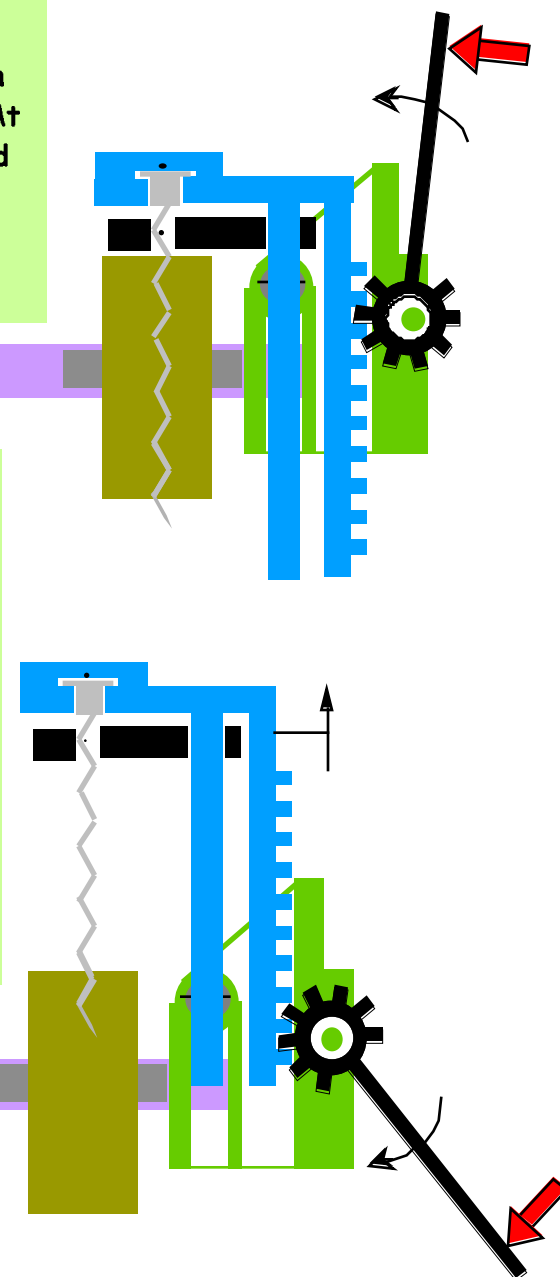
- The lever is slowly lowered (by hand).
- The rack lifts, extracting the cork. The worm is prevented from rotating by the nut, which is lifted along with the cork once the locks release.

### Step 4: REMOVING THE CORK

- The lever must be lifted (by hand) to lower the rack along with the cork into the down position. At that point, the locks can be heard engaging and blocking the nut.

### Step 4: REMOVING THE CORK (Cont.)

- The lever must be lowered again (by hand). The rack and worm move into the up position while the cork is held in place by the clamping levers.



## CONCEPTS AND TOPICS COVERED IN THIS STUDY

Concept of system

Concept of service function (overall function of technical object)

Rotation

Rectilinear translation

Transformation of motion with a rack and pinion (circular gear and toothed shaft)

Simple machines (inclined plane and lever)

Helicoidal (spiral) motion

Concept of applied force acting on an object

Symbols used in schematic diagrams

Design plans