FIM 1801 - FUNDAMENTALS OF CINEMATOGRAPHY

Film Cameras

THE CAMERA

All motion picture cameras are made up of many different components and accessories. Each camera manufacturer has its own specific design for the various parts, and these parts are usually not interchangeable from one make of camera to another. A basic camera is made up of the following components: Film Chamber, Gate, Shutter, Inching Knob, Viewing System, Motor, Lens and Magazine. There are many more specific components that are used on all motion picture cameras which you will learn as you work more and more.

Over-cranking - the process of filming at a speed higher than 24 fps and projecting at 24 fps.

Gate - When referring to the gate, we usually mean that area in the camera which contains the pull down claw, registration pin, aperture plate and pressure plate. The term "The Gate" is also used to refer to the opening which is cut into the aperture plate.

![Diagram of Panavision Gate Area Showing Loops and Various Components]
Shutter Angle - The opening in the shutter which allows the light to strike the film and create an exposure is called the shutter angle. The standard shutter angle for motion picture production is **180 degrees**. On all professional motion picture cameras you will have either a fixed shutter which cannot be changed from 180°, or a variable shutter which can be adjusted to a variety of different shutter angles. By changing the shutter angle you affect how long the film is exposed to light. By reducing the shutter angle, you reduce the amount of time that the film is being exposed to light, and by increasing the shutter angle you are increasing the amount of time that the film is being exposed to light. In most cases the shutter will be one of two types, standard solid 180° shutter or double bladed 180° shutter.

In addition to the rotating mirror shutter, Panavision cameras contain a focal plane shutter which controls the light striking the film, while the mirror shutter is only for the reflex viewing system.

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<th>STANDARD 180° SHUTTER</th>
<th>DOUBLE BLADED 180° SHUTTER</th>
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Inching Knob - Most professional motion picture cameras contain an inching knob. This is a small knob, located either inside the camera body or on the outside of the camera. By turning this knob you are able to slowly advance or "inch" the film through the camera movement to check that it is moving smoothly. Whenever you first thread the film into the camera, you should turn the inching knob a few turns to check that the film is traveling smoothly and not binding or catching anywhere. If you were to turn the camera on immediately after threading, without checking by turning the inching knob, you could rip or tear the film.

Viewing System - The viewing system or viewfinder allows the camera operator to view the scene. There are three basic types of viewing systems which have been used on motion picture cameras throughout the years. The rack over viewing system and direct viewfinder are older viewing systems which are not used today for most professional motion picture productions.

Diopter Adjustment - Because of the differences in each person's eyesight, the viewfinder of most cameras have an adjustable diopter. By setting the diopter according to your particular vision, the image will appear in focus when you look through the eyepiece, provided the lens focus is set correctly.

To Adjust the Diopter - It is usually best to remove the lens and point the camera at a bright light or white surface. While looking through the eyepiece, turn the diopter adjustment ring until the cross hair of the ground glass in the viewfinder is sharpest. If you cannot remove the lens, open the f-stop to its widest setting and put the lens out of focus. Point camera at bright light or white surface and while looking through the eyepiece, turn the diopter adjustment ring until the cross hair is sharp.
Motor - The three main types of camera motors are Variable, Constant and Crystal. Almost all professional motion picture cameras today use a crystal motor. The camera motor contains a crystal similar to the crystal found in a quartz watch. The sound recorder also contains a similar crystal. This crystal vibrates at a precise frequency, ensuring that during shooting, the camera and sound recorder are running in sync so that the picture and sound will match. Most crystal motors have the ability to run at variable speeds for slow motion or high speed filming. They may also be set to various speeds other than sync speed of 24 fps. by using some type of optional speed control device.

Lens - The lens is a device containing one or more pieces of optically transparent material such as glass, which bends the rays of light passing through it, causing them to focus at a point. This point is called the film plane or focal plane and the light causes an exposure on the film's emulsion at this point. Lenses will be discussed in a future class in greater detail. For now it is enough to know that it is an integral part of the motion picture camera.

KEY CAMERA TERMS FROM VOICE & VISION

Intermittent Movement
Sync speed
Slow Motion
Under-cranking
Synching Dailies
Body
Gate
Aperture Plate
Pressure Plate
Film Plane (Focal Plane)
Sprocket Holes
Claw
Shutter
Registration Pin
Constant Speed Motor
Variable Speed Motor
Feed Spindle
Take-up Spindle
Drive Sprockets
Guide Rollers

Reflex Viewing System
Ground Glass
Fiber Optic Viewing Screen
Mirrored Shutter
Beam Splitter System
Cross Hairs
Dioptr
Threading Pattern
Magazine
Displacement Magazine
Coaxial Magazine
Guide Rollers
Core Adapters
Changing Bag