INSTRUMENTATION

Lighting instruments - different configurations of lens, lamp and reflector, depending on purposed use.

All our instruments:
designed for temporary installation (OSHA notes here)
intended to be hung on 1 1/2 " pipe. as opposed to something like unistrut.
have a "C" clamp, yoke, safety cable and pigtail in common.

"C"clamp:
c clamp is a cast iron clamp with a number of adjustments which allow the instrument to be hung on pipe securely, and also allows pan adjustments for the instrument to rotate about the point of attachment. Most important, a "c"clamp allows for quick re-positioning of the lighting instrument and allows for maximum flexibility. Most commonly adjustments are made with an open-ended adjustable wrench ("C"wrench) or with industry specialized multi-wrenches. The first adjustment is made by tightening the clamp bolt. Once the c-clamp is attached to the bar, the pan adjustment screw and the spigot bolts should be lightly tightened.

Yoke: A metal piece which attaches the c-clamp to the instrument - the yoke can pan on the c-clamp, while the instrument can tilt at the connection to the yoke. Usually, there is a bolt on one side of this connection and some sort of thumbscrew on the other side.

Safety cable.
Is designed to protect audience and performers in the event of a c-clamp failure and are required on every instrument in use.

Pigtail:the wires that connect the lamp, inside the instrument to the power supply.
there are three wires, white, green and black. covering the wires is an abrasion sheild.
Note older wires may be insulated with asbestos! on the end of the pigtail is the connector- this allows for no-permanent connections to power supply. In our case, we use 2 pin and ground stage connectors. some other facilities (like the Music recital hall) use edision plugs. this makes cabling easier, but in order to to be code all extensions AND plugs must be rated for 20 amps.

INSTRUMENTATION

we have a number of different types of instruments - here we are only talking about "standard " stage instruments, later we will highlight specialty instruments like LEDs and VariLights.

FRESNELS
We have 3 sizes of fresnels: 3",6" and 8". This refers primarily to the size of the lens and all else scales up.

The 3” size uses a 250W lamp-which we no longer stock and is generally a wimpy instrument.
the 6” size is what we have the most of - uses a 500 or 750w lamp and is generally a good source of pretty soft or wash light.
the 8” size uses a 1000w retrofit lamp. These instruments are so old that they end up being pretty inefficient.

the case. - metal housing with attachments for yoke, pigtail on the “front” is a slot for barndoors and/or gel frames, the lens. -Underneath is a knob and a slot. Loosen this knob and it can move forward (flood) or back (spot). on top is another knob. Loosen this to gain entrance to the innards of the instrument.

To get inside, the lens holder/ ge;frame holder hinges down.
Inside, we see the lamp, socket and reflector - all arranged into a fixed position on a device I call the sled.
The sled moves forward and back (flood or spot) while maintaining the relationship of the filament location and the focal center of the reflector - which is spherical. The lamp is typically a mono-plane filament and in the case of our instruments are all retro-fits. These Fresnels hail from the 60’s.
Because of the fresnel lens and the treatment on the back, the light, while focused is soft edged. The beam of light can be partly shaped by the used of a snoot or barndoors.

ELLIPSOIDALS
Termed ERS for Ellipsoidal Reflector Spot. Slang term is LEKO thought this technically only refers to lights made by Kleigle Brothers.
we have a bunch of different sizes and various ages..
Altman 3 1/2X6
Altman 3/12X8
Altman 6X9
Altman 6X12
Altman 6X16
Century 6X9
Century 6X12
ETC source 4-50,36, 19 degrees

The Century instruments are old. The lamp (750w retrofit) comes out the side of the reflector making this a “T”mount. The reflector on these instruments is smooth-stamped aluminum. Not too super efficient. They have 4 shutters in 2 planes.The case or metal housing is cast aluminum. Shaping the beam via shutters is easy. Also because of the elliptical reflector, there is a new area inside the instrument where the light is very focused- the gate. Putting a gobo into the gate allows this instrument to project shaped shadows (like leaves). there is a gel holder slot at the front of the instrument and above it id a knob. loosen this knob to move the lens assembly (lens train) in and out focusing or unfocusing the image. ellipsoidals are capable of very sharp or very soft

edges. (the rainbow on the edge of sharp focused light is a product of chromatic aberration.
The cap or base which contains the lamp comes out of the instrument without needing to move the instrument focus. This contains the lamp and socket - the pigtail and adjustments to move the lamp within the focal axis of the instrument - allowing for a “tune-up” of the light output.
The Altman Ellipsoidals are pretty much the same as the Century one - except:
the lamp is now in the optical axis, the reflector is faceted and the body is lighter, the socket is designed for a tungsten-halogen lamp. - All this contributes to a much more efficient instrument while being easy to maintain and relatively inexpensive.
The source 4 instrument is the major re-design. the lamp is new, higher output using less power (1000w worth for 575w of power) the reflector is a glass, diachroic mirror which allows heat to pass though it (keeping the beam cool) the glass mirror is a huge improvement. The shutter plane is able to rotate in either direction for easier matching of shutter cuts - and since the beam is cooler, the shutters don’t warp. the gate has room for 2 gobos or a gobo rotator. the lens train is what determines the degree(beam size) of the instrument - so just changing the lens tubes changes the instrument. There are two gel slots in front with a locking tab to keep them in place. All adjustments including tuning the lamp are tool free.

PAR cans
PARS (parabolic aluminized reflectors) are the old meat and potatoes of rock and roll concert lighting. They are easy to maintain, simple to focus and provide a good, soft edged smoothing or wash quality of light. The lamp is the instrument. I contains the filament, reflector and lens all in a “sealed beam” sort of like a old car headlight. To change the beam spread, change the lamp - they come in 12 sizes from wide flood to very narrow spot. Don’t confuse these lamps with “R” lamps which don’t have a lens on the front. Besides just aiming the can, there is one other focus adjustment - the beam is slightly elliptical, by rotating the lamp you can change the orientation of this ellipse. Our PAR cans are PAR 64’s which means they are 64- 1/8th’s wide or 8 inches.

Beam Projectors
Beam projectors are technically, a soft light because they don’t have a lens. What they do have is a parabolic reflector which is very good at focusing the light from the lamp into a nearly parallel beam of light. This makes beam projectors really good at simulating things like sunlight though windows.

SCOOPS
Also known as ERF’s or Elliptical reflector floods, are softlights. They have no lens and the reflector is softened to scatter light more smoothly. Traditional use is for lighting softgoods like cycs scrims or drops. The light is very soft and practically edgeless. We also use them as work lights to fill the space with pretty cheap light.

STRIP LIGHTS
Strip lights are soft lights arranged in line. in a 3X4 fixture, there would be 12 lights (“R” lamps) arrange in 3 circuits of 4 lights each. These fixtures are designed to daisy chain

together - so have a male plug for each circuit at one end and a female plug for each circuit at the other end. Typically these are colored using rondels (permanent glass gels) with each circuit being a different color. These fixtures are used to light soft goods- top and bottom, or to provide a very soft overhead wash (X-ray wash).

FAR CYCS

A more modern, usually more powerful version of the strip light is a FAR CYC unit. These typically are a pebbled elliptical reflector and no lens used to light softgoods or provide a soft wash. These units may be bought in multiple units to function more like a strip light.

VARI LIGHTS

Our varilights represent a different type of light altogether. Begining with the c-clamp it is a completely different fixture. Because it needs to be really steady, and is very heavy, this instrument uses two c-clamps. It also is powered quite differently: there is a DMX in a DMX out a lamp power in and a fixture power in. The lamp power should be dimmable while the fixture power should not.

Our specific fixture is a VL-1000T which means it has a 1000w tungsten lamp. Our version also comes with 4 moveable shutters. Altogether, this fixture uses 29 control channels. It is able to pan, tilt, change focal length, focus, spot/flood, change color, use 1 of 5 different gobos, rotate the gobos and using the shutters, frame the light. This is all accomplished using a control console. While much improved over earlier models, it is still noisy and requires judicious use.

LED Spots.

These little gems are able to create any color of light by blending the 7 colors of LEDs in the fixture. The color is permanent and dimmable. The light has incredibly fast response time and makes a dandy lighting effect.the instument has a DMX in, a DMX out and a power in (straight 120v) - it uses 7 control channels on the console - but no dimmers.