THE MUSEUM OF WESTERN FILM HISTORY

Brenkert Theater Projector

Organized in 1907, Brenkert (BLPC) was incorporated in 1941. The company, based out of Detroit, made spot lights, lantern slide projectors, stereopticons, effects projectors, etc. for live opera, vaudeville, and movie theatres expanding into making film projector lamphouses in 1929, then entire streamline modern projectors in 1939.

BX-80- Circa 1939

Brenkert's projector heads were considered by some to be the BEST 35mm projector heads ever made in the U.S.A.

The first BLPC projector arc lamp for movie use was introduced in 1929. And their arc lamp (the Enarc) was introduced in 1935. The first projector mechanism (the BX-80) introduced in 1939; the Second projector mechanism (the BX-40) introduced in 1940.

The Brenkert BX-80 head with RCA 9050 soundhead. Note the soaked paper towel under the oil sight glass and the lower sprocket. These machines are notorious for oil leaks.

Brenkert designed the BX40/80 series starting just before WW-2. The BX-80 had counter-rotating double disolving rear shutters and the BX-40 had a single rear shutter.

Some collectors feel that the greatest American projector was the Brenkert BX-60. (The Museum Brenkert is a BX-60). It was an "economy version" that came out in 1951. It was a little more light weight with the main casting in aluminum, but it was still a rock solid machine. Unfortunately movie theatres were closing in record numbers because of television, and these were the end years for Brenkert. The BX-60 proved to be more durable and reliable than the more deluxe BX-80 and BX-100 models! Third and Fourth projector mechanisms (the BX-60 and BX-62) were introduced in 1948.

BLPC was purchased by RCA on July 1, 1945 50's to complement their (RCA photophone) soundhead business but in 1954 RCA dissolved the BLPC division. After BLPC was out of business, RCA had the following companies "make" "RCA-badged" products as noted below. RCA didn't put much investment into the motion picture business causing it to go out in the mid-50's.

RCA-200 projector mechanism (c. 1953) made by Century.

RCA projection arc lamps (Brite-Arc, Line-Arc, Hy-Arc, and Dyn-Arc, c.1953-54) made by Ashcraft.

RCA "Standard Line" projector head and sound head (c.1954-55) made by Wenzel for export.

RCA "ALL-American" combo picture and soundhead (c. 1955-56) made by Settles fr export.

Of note, ***Gone With the Wind***, or as the film buffs say: ***GWTW*** premiered in Atlanta on Brenkert projectors. Brenkert also made an excellent motion picture projection arc lamp, there are operating formats of both their projectors and lamps still in use in theaters today.

Other notable dates:

Telecine (film chain) mechanism (the BX-90) introduced around 1947.

Last projector mechanism (the BX-100/RCA-100) introduced in 1950.

Largest BLPC arc lamp (Model A-4 Super Intensity: 13.6mm trim, 180 amps) introduced in 1949.

RCA continued making theatre sound heads & sound systems in their Indianapolis, Indiana plant for several years after Brenkert closed. For example, a typical circa 1953-54 "RCA" installation would include an RCA-200 projector head (made by Century), an RCA arc lamp (made by Ashcraft), and an RCA soundhead (This was still made by RCA!).

Brenkert "thought about" but never made their own soundheads, and after 1938, Brenkert equipment was sold ONLY thru RCA Theatre Supply dealers.

Brenkert heads cost more than others, but many leading theatres, (Especially theaters in Detroit and Chicago) had them: The two largest theatres in Chicago had Brenkerts: the *Chicago* (4100 seats), and the *Uptown* (4500 seats). The big Detroit theatres that had Brenkert equipment included the *Michigan* (4200 seats), the *Broadway-Capitol* (3000+ seats), *The Fisher* (2800 seats) the *Madison*, etc.

Odd Brenkert related information:

Some Century-built model VV horizontal VistaVision projectors (8-perf frame pull-across) were retrofitted to use Brenkert intermittents in place of the official Century intermittents.

In the mid-1930's, Motiograph of Chicago was in a "deal" to manufacture projector mechanisms for distribution or sale by Brenkert & RCA dealers, but the deal "fell apart" around 1936/37, so Brenkert "rush-designed" their own design, and thus was born the BX-80, introduced in May of 1939.

The very successful "oil-spray" lubrication system of the Simplex XL was basically a copy of the Brenkert system of 1939 (The XL was introduced in 1949/50).

The very successful "double rear counter-rotating" shutters of many Century models (CC, HH, DA, etc.) was basically an idea "borrowed" from Brenkert.

Contribution to article by - Robert Sprague/Film Tech
http://www.film-tech.com/ubb/f1/t002625.html

Links:
List of carbon-arc theaters
http://www.screeningroomservices.com/Carbon_Arc_Theatres.htm
http://www.graumanschinese.org/projection-1.html

The Museum's Brenkert Projector

Donated by Nevadan, S. Arlitz. The model BX60, manufactured around in the early 1950's was rescued by Arlitz from the Sage Crest Drive-In which was a one screen, 250 car Drive–In located on Highway US 95 in Yerington, NV.

Brenkert BX 60

There were originally, two Brenkerts on the premises. One was donated to Pinewood studios in the U.K., the other to Lone Pine. The BX60 has a RCA base, RCA Lamphouse, the original RCA sound box, and reels. One of the most popular Projectors of the era, the museum is please to have added it to it's collection. We imagine millions of Western Fans benefitted from its service over the years.

Arc Rods in Lamphouse

Three excellent short films on the Way Film Projectors Work are listed below:

John Gilbert, The Old Fashioned Way: Demonstrates how projector works and a changeover. - www.youtube.com/watch?v=ywmNppYJbeo

The Mechanics of a Film Projector - www.youtube.com/watch?v=En VooEJsU
35MM Film Projector – How it works - www.youtube.com/watch?v=ywmNppYJbeo

Notes:

Brenkert F-7 Master "Brenograph" Effects Projector - Actually, the full name of the piece of equipment was: The Deluxe Brenkert F-7 Master "Brenograph" Combined Effect, Slide and Flood Light Projector. This formidable rig became the standard for effects projectors during the 20s and 30s — it seems as though almost any theatre worth its salt had one, and many projection technicians of today have stories to tell of finding a dust-covered Brenograph someplace; of being able to cautiously fire them up, with them still working.

The Brenkert Effects Projector allowed for untold creative uses, from the projection of slides containing scenery or lettering, to solid colors created by the gel holders way out in front. This unit has two smaller carbon-arc lamphouses, again running DC current to the arcs.

For similar research – see info on the Museum's Simplex Projector.

Arc Lamp

Almost 60 years before Edison Invented the Incandescent Bulb – There was Electric Light!

An arc lamp or arc light is a lamp that produces light by an electric arc (also called a voltaic arc). The carbon arc light, which consists of an arc between carbon electrodes in air, invented by **Humphry Davy** (December, 17, 1778 – May 28, 1829) in the first decade of the 1800s, was the first practical electric light. It was widely used starting in the 1870s for street and large building lighting until it was superseded by the incandescent light in the early 20th century. It continued in use in more specialized applications where a high intensity point light source was needed, such as searchlights and movie projectors until after World War II. The carbon arc lamp is now obsolete for all of these purposes and is only still made for very specialized purposes where a high intensity UV source is needed.

The term is now used for gas discharge lamps, which produce light by an arc between metal electrodes through an inert gas in a glass bulb. The common fluorescent lamp is a low-pressure mercury arc lamp. The xenon arc lamp, which produces a high intensity white light, is now used in many of the applications which formerly used the carbon arc, such as movie projectors and searchlights.

Operation

An arc is the discharge that occurs when a gas is ionized. A high voltage is pulsed across the lamp to "ignite" or "strike" the arc, after which the discharge can be maintained at a lower voltage. The "strike" requires an electrical circuit with an igniter and a ballast. The ballast is wired in series with the lamp and performs two functions.

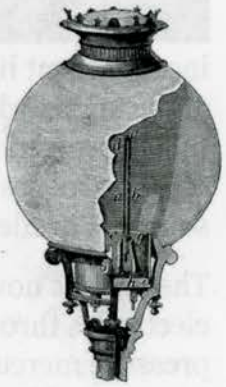
First, when the power is first switched on, the igniter/starter (which is wired in parallel across the lamp) sets up a small current through the ballast and starter. This creates a small magnetic field within the ballast windings. A moment later the starter interrupts the current flow from the ballast, which has a high inductance and therefore tries to maintain the current flow (the ballast opposes any change in current through it); it cannot, as there is no longer a 'circuit'. As a result, a high voltage appears across the ballast momentarily - to which the lamp is connected, therefore the lamp receives this high voltage across it which 'strikes' the arc within the tube/lamp. The circuit will repeat this action until the lamp is ionized enough to sustain the arc.

When the lamp sustains the arc, the ballast performs its second function, to limit the current to that needed to operate the lamp. The lamp, ballast and igniter are rated matched to each other; these parts must be replaced with the same rating as the failed component or the lamp will not work.

The color of the light emitted by the lamp changes as its electrical characteristics change with temperature and time. Lightning is a similar principle where the atmosphere is ionized by the high potential difference (voltage) between earth and storm clouds.

Carbon Arc Lamp

In popular use, the term arc lamp means carbon arc lamp only. In a carbon arc lamp, the electrodes are carbon rods in free air. To ignite the lamp, the rods are touched together, thus allowing a relatively low voltage to strike the arc. The rods are then slowly drawn apart, and electric current heats and maintains an arc across the gap. The tips of the carbon rods are heated and the carbon vaporizes. The carbon vapor in the arc is highly luminous, which is what produces the bright light. The rods are slowly burnt away in use, and the distance between them needs to be regularly adjusted in order to maintain the arc. Many ingenious mechanisms were invented to effect this automatically, mostly based on solenoids. In one of the simplest mechanically-regulated forms (which was soon superseded by more smoothly acting devices) the electrodes are mounted vertically. The current supplying the arc is passed in series through a solenoid attached to the top electrode. If the points of the electrodes are touching (as in start-up) the resistance falls, the current increases and the increased pull from the solenoid draws the points apart. If the arc starts to fail the current drops and the points close up again. **The Yablochkov Candle** is a simple arc lamp without a regulator, but it has the drawbacks that the arc cannot be restarted (single use) and a limited lifetime of only a few hours.



History

In 1802, Humphry Davy had what was then, the most powerful electrical battery in the world at the Royal Institution. Using charcoal sticks and a two thousand cell battery to create an arc across a 4-inch (100 mm) gap. He mounted his electrodes horizontally and noted that, because of the strong convection flow of air, the arc formed the shape of an arch. He coined the term "arch lamp", which was contracted to "arc lamp" when the devices came into common usage.

With it, Davy created the first incandescent light by passing electric current through a thin strip of platinum, chosen because the metal had an extremely high melting point. It was neither sufficiently bright nor long lasting enough to be of practical use, but demonstrated the principle. By 1806 he was able to demonstrate a much more powerful form of electric lighting to the Royal Society in London. It was an early form of arc light which produced its illumination from an electric arc created between two charcoal rods.

The arc lamp provided one of the first commercial uses for electricity, a phenomenon previously confined to experiment, the telegraph, and entertainment.

In the United States, there were attempts to produce arc lamps commercially after 1850 but the lack of a constant electricity supply thwarted efforts. Thus electrical engineers began focusing on the problem of improving Faraday's dynamo. The concept was improved upon by a number of people including William Staite and **Charles F. Brush.** It was not until the 1870s that lamps such as the Yablochkov candle were more commonly seen. In 1877, the Franklin Institute conducted a comparative test of dynamo systems. The one developed by Brush performed best, and Brush immediately applied his improved dynamo to arc-lighting an early application being Public Square in Cleveland, Ohio, on April 29, 1879. In 1880,

Brush established the Brush Electric Company. The harsh and brilliant light was found most suitable for public areas, such as Cleveland's Public Square, being around 200 times more powerful than contemporary filament lamps.

The usage of Brush electric arc lights spread quickly. Scientific American reported in 1881 that the system was being used in 800 lights in rolling mills, steel works, shops, 1,240 lights in woolen, cotton, linen, silk, and other factories, 425 lights in large stores, hotels, churches, 250 lights in parks, docks, and summer resorts, 275 lights in railroad depots and shops, 130 lights in mines, smelting works, 380 lights in factories and establishments of various kinds, 1,500 lights in lighting stations, for city lighting, 1,200 lights in England and other foreign countries. A total of over 6,000 lights which are actually sold.

There were three major advances in the 1880s: František Křižík invented in 1880 a mechanism to allow the automatic adjustment of the electrodes. The arcs were enclosed in a small tube to slow the carbon consumption (increasing the life span to around 100 hours). Flame arc lamps were introduced where the carbon rods had metal salts (usually magnesium, strontium, barium, or calcium fluorides) added to increase light output and produce different colors.

In the U.S., patent protection of arc-lighting systems and improved dynamos proved difficult and as a result the arc-lighting industry became highly competitive. Brush's principal competition was from the team of Elihu Thomson and Edwin J. Houston. These two had formed the American Electric Corporation in 1880, but it was soon bought up by Charles A. Coffin, moved to Lynn, Massachusetts, and renamed the Thomson-Houston Electric Company. Thomson remained, though, the principal inventive genius behind the company patenting improvements to the lighting system. Under the leadership of Thomson-Houston's patent attorney, Frederick P. Fish, the company protected its new patent rights. Coffin's management also led the company towards an aggressive policy of buy-outs and mergers with competitors. Both strategies reduced competition in the electrical lighting manufacturing industry. By 1890, the Thomson-Houston company was the dominant electrical manufacturing company in the U.S. Nikola Tesla received U.S. Patent 447920, "Method of Operating Arc-Lamps" (March 10, 1891), that describes a 10,000 cycles per second alternator to suppress the disagreeable sound of power-frequency harmonics produced by arc lamps operating on frequencies within the range of human hearing.

Around the turn of the century arc-lighting systems were in decline, but Thomson-Houston controlled key patents to urban lighting systems. This control slowed the expansion of incandescent lighting systems being developed by Thomas Edison's Edison General Electric Company. Conversely, Edison's control of direct current distribution and generating machinery patents blocked further expansion of Thomson-Houston. The roadblock to expansion was removed when the two companies merged in 1892 to form the General Electric Company.

Arc lamps were used in some early motion-picture studios to illuminate interior shots. One problem was that they produce such a high level of ultra-violet light that many actors needed to wear sunglasses when off camera to relieve sore eyes resulting from the ultra-violet light.

The problem was solved by adding a sheet of ordinary window glass in front of the lamp, blocking the ultra-violet. By the dawn of the "talkies", arc lamps had been replaced in film studios with other types of lights. In 1915, Elmer Ambrose Sperry began manufacturing his invention of a high-intensity carbon arc searchlight. These were used aboard warships of all navies during the 20th century for signaling and illuminating enemies. In the 1920s, carbon arc lamps were sold as family health products, a substitute for natural sunlight.

Arc lamps were superseded by filament lamps in most roles, remaining in only certain niche applications such as cinema projection, follow spots, and searchlights. Even in these applications conventional carbon arc lamps are being pushed into obsolescence by xenon arc lamps, but were still being manufactured as spotlights at least as late as 1982 and are still manufactured for at least one purpose – simulating sunlight in "accelerated aging" machines intended to estimate how fast a material is likely to be degraded by environmental exposure.

https://en.wikipedia.org/wiki/Arc_lamp