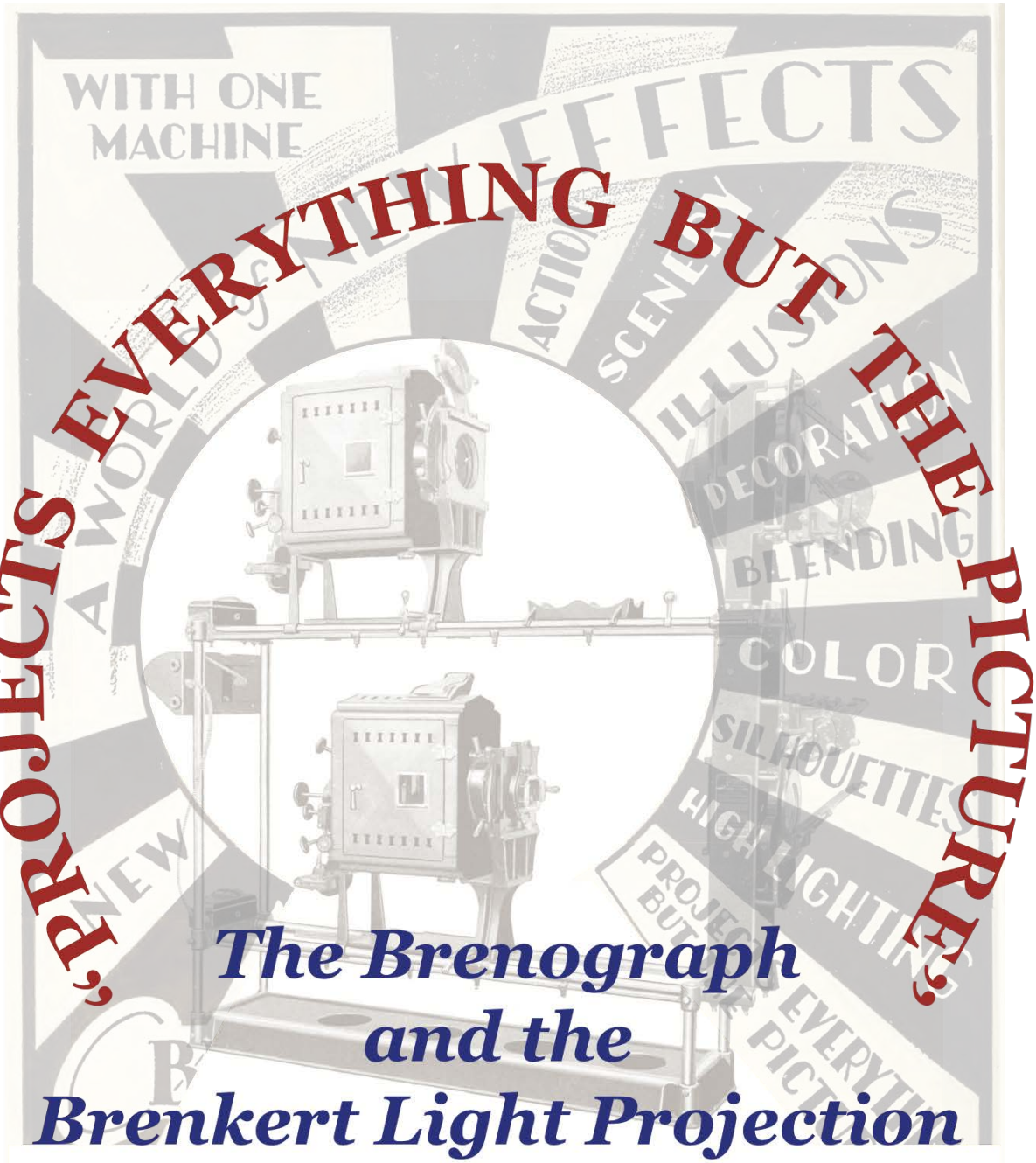

‘PROJECTS EVERYTHING BUT THE PICTURE’

The Brenograph and the Brenkert Light Projection Company

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"Projects Everything but the Picture"
The Brenograph and the Brenkert Light Projection Company

IN THE LATE 1920s, every deluxe movie palace had as part of its requisite equipment at least one "Master Brenograph F7," a massive double magic lantern advertised by its manufacturer as projecting "Everything but the Picture." From the projection booth, these complex machines could project airplanes flying through moving clouds, running water, fire, song lyrics dissolving from one verse to the next for sing-alongs, changing colors of patterned light, strobe effects, spot lights, and hundreds of special effect scenes manufactured by the Maurice Workstel Studios and a few others. With the coming of sound films, the depression, and major changes in theatrical exposition after 1930, most of the Brenographs were pushed aside, forgotten, and eventually sold for scrap. Today, only a few Brenographs survive at all, with a mere handful of them still operable and in their original locations.

Despite—or perhaps because of—its general disappearance, the machine has remained an object of fascination among aficionados and historians of theatres and theatrical exhibition, theatre lighting and projection equipment, magic lanterns, theatre organs, and popular culture and its sociology. The Brenograph is regularly mentioned in publications (print and online) in all of these areas, but generally without much technical or historical detail. Ben Hall's popular and oft-quoted *The Best Remaining Seats: The Story of the Golden Age of the Movie Palace*,* for example, includes a brief description (p. 94) of the Brenograph Junior, which was used to project clouds on the ceilings of atmospheric theatres and for other similar effects, and a picture of a Master Brenograph F7 accompanied by a one-paragraph description (pp. 201–2) beginning: "The projection booth was also equipped with a Brenograph, a super magic lantern that not only projected song slides for the organ interludes, but an endless variety of scenic effects by means of multiple lenses and moving slides and intricate fades and dissolves." Hall lists some of the animated effects available for the projector (but without any description of how they might work) and concludes: "So equipped, the operator had at his finger tips the power to conjure up disaster, holocaust, and a plague of butterflies, to say nothing of the capacity to launch everything from a steamship to an aeroplane to Little Eva (complete with angel escort)."

Most of the many other very brief references that appear in general histories of theatres and theatrical exhibition are credited to Hall, and a number of them repeat the amusing anecdote from his description of the Paradise Theatre in Faribault, Minnesota (p. 102): "Posted by the switchboard was this notice that established, in language that was simple yet worthy of a passage from Genesis, the little theatre's kinship with the greater Paradises in Chicago and New York: Please do not turn on the clouds until the show

*Full bibliographic references for all works cited (except for catalogues) appear on pp. 59–60.

starts. Be sure the stars are turned off when leaving." Some examples include Richard Koszarski's *An Evening's Entertainment: The Age of the Silent Feature Picture, 1915–1928* (p. 159), Maggie Valentine's *The Show Starts on the Sidewalk: An Architectural History of the Movie Theatre* (p. 75), Robert Craig's *Atlanta Architecture: Art Deco to Modern Classic, 1929–1959* (p. 74), Constance Rosenblum's *Boulevard of Dreams: Heady Times, Heartbreak, and Hope along the Grand Concourse in the Bronx* (pp. 130 and 134), and the various booklets on individual theatres and cities published by Arcadia in its Images of America series.

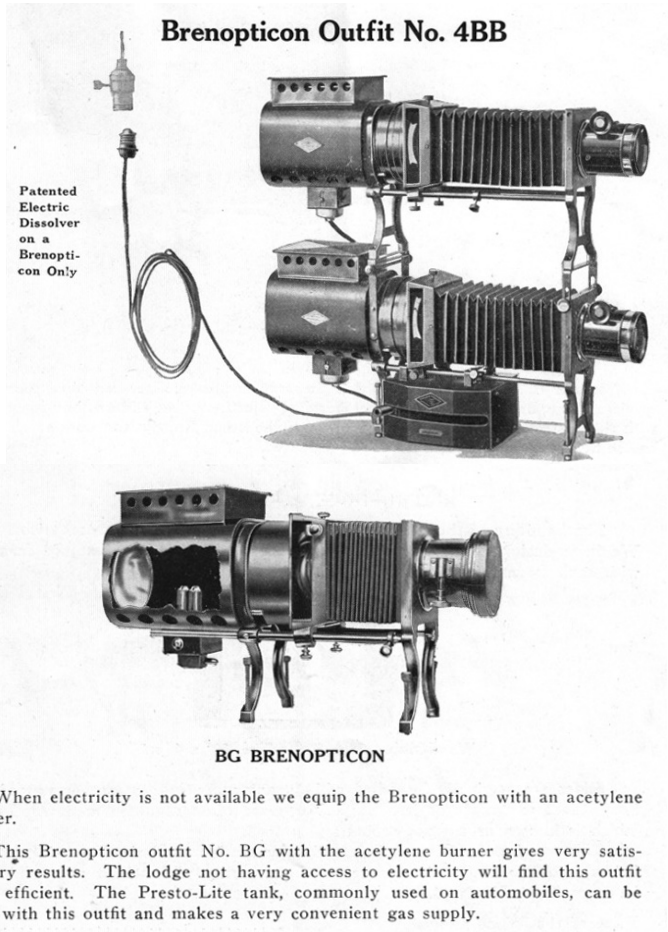
A few specialized publications and online resources such as Film-Tech (a Google search of "brenograph site:www.film-tech.com" will produce a complete list of all the postings) provide a somewhat fuller picture of the Brenograph. In the course of cataloguing the large collection of slides for the Brenograph at the Fox Theatre in Atlanta, GA, Lila King documented her work in a booklet *Framing the Cinema: Brenograph Slide Images from the Fox Theatre Collection*, devoting six pages (pp. 20–25) to a general description of the machine based on the operator's manual published in 1928 by its manufacturer, the Brenkert Light Projection Company of Detroit, MI. Jack Judson's short chapter "The Wondrous Brenkert Master Brenograph" in the Magic Lantern Society's *Realms of Light: Uses and Perceptions of the Magic Lantern from the 17th to the 21st Century* (pp. 211–13) provides a few historical details on the Brenkert company and includes three illustrations from its catalogue. But the fullest treatment by far was provided by Mark Butterworth in his invaluable article "The Brenograph in Action" published in the Magic Lantern Society's *The New Magic Lantern Journal* 10, no. 2 (2006), which describes his work on the Brenograph in the Majestic Theatre in Pomona, Queensland, Australia. It is the only publication that provides anything close to a detailed description of the machine and its operation. Nevertheless, these three treatments reveal only a small part of the history, design, and use of this fascinating machine, as if seen through its nearly closed iris. Opening the iris will enable us to view the fuller picture.

Forerunners: The Balopticon, Brenopticon, Sciopticon, and Stereopticon

The projection of images to create magical effects, enhance and illuminate theatrical scenes, accompany lectures, and so on extends at least as far back as the seventeenth century, and much of that history is effectively surveyed by the various articles that comprise the Magic Lantern Society's *Realms of Light: Uses and Perceptions of the Magic Lantern from the 17th to the 21st Century*. The Brenograph's immediate ancestors, however, are the projection and lighting devices employed in theatrical presentations. These were manufactured by a number of different companies, including Bausch & Lomb Optical Company (Rochester, NY), Kliegl Bros. Universal Stage Lighting Company (originally at 321 West 50th Street, New York), Display Stage Lighting Company (originally at 334 West 44th Street, New York), Chicago Cinema Equipment Company (originally at Kildare and Arlington Streets, later at 820 South Tripp Avenue, then at 1736–1754 No. Springfield Avenue, Chicago), Major Equipment Company (originally at 4603 Fullerton Avenue, Chicago), and Brenkert Light Projection Company (originally at 49 Cortland Avenue, later at 7348 St. Aubin Street at East Grand Boulevard, Detroit), manufacturer of various models leading eventually to the Brenograph. All of these companies—and no doubt others as well—offered a variety of ways to project lantern slides (glass slides of

3.25" x 4"), large slides depicting a stable scenic effect, or motorized devices producing effects in motion.

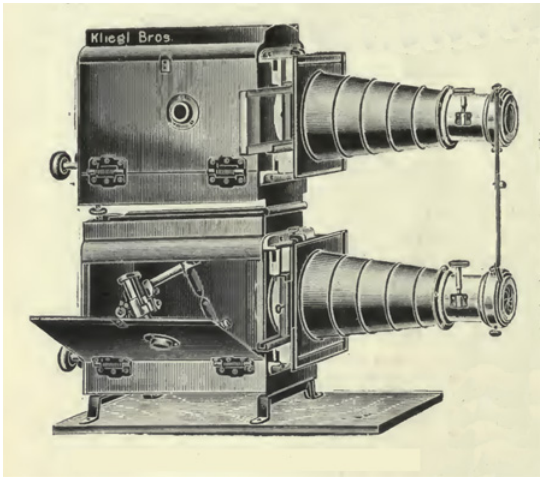
Lantern slides exhibiting text—e.g., announcements, exhortations, song lyrics, scenes, backgrounds, and so on—were projected by single, double, or even triple projectors, commonly known at the time as stereopticons (see p. 37 below). These were fitted with lenses of various focal lengths depending on the distance from the projector to the point where the image was to be projected, whether a screen or some other surface. Light was provided by incandescent bulbs, carbon arc, or even gas (typically acetylene). Bausch & Lomb's 1917 catalogue *Balopticons and Accessories* featured two stereopticons, the Balopticon B and C, both of which were available with any of these sources of light and with various devices allowing slides to fade from one to the next. Likewise, Catalogue No. 9 of the Ihling Bros.–Everard Co. features several versions of Brenkert's stereopticon, the Brenopticon (perhaps modeled on the Balopticon): a single projector (model 4B); a double projector (4BB) and a double projector mounted on a stand with cabinets for the slides and projectors (4BB-400), both provided with an electric dissolver; and a projector fitted with an acetylene burner (BG), capable of providing illumination for seven hours on a single tank. Catalogue No. 9 is undated but was almost certainly issued around 1918: the electric dissolver was patented by Joseph and Karl Brenkert in 1918 (US 1,282,743), and acetylene lamps on automobiles, to which the catalogue refers, were largely superseded by electricity after 1915.

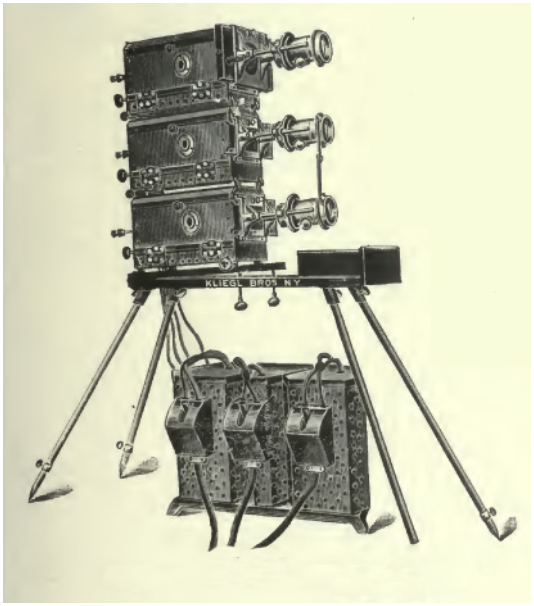


Gas light was hardly ideal for projectors in theatres or large lodge rooms, and incandescent or arc light was the norm. In the case of the Brenopticon, incandescent bulbs were available at 400, 600, and 1000 watts, and dissolving effects were created between the projectors by electrical cross-fading, as described in Catalogue No. 9 (p. 4):

> This Electric Dissolver marks the greatest step of progress ever given to a stereopticon. It is another of the exclusive developments of our Brenopticon. The dissolving produced by the Electric Dissolver surpasses that of any mechanical dissolver that can be devised. Where you change from one view to the other you raise or lower an easily operated lever on the Electric Dissolver

> [actually, the lever is moved horizontally], and as the brilliancy of one lamp gradually increases, the other as gradually decreases and vice versa. This function upon the lamps creates that smooth, velvety dissolving and blending of one view to the other. This dissolving makes the work very effective and wonderfully impressive, bringing out the real beauty of the views that cannot be accomplished with any other form of dissolver or single unit outfit. The fact that the dissolving is created by this control of the lamps means a saving on the life of the lamps for one lamp is being alternately darkened—thus this Brenopticon with Electric Dissolver produces the most beautiful dissolving effect with the burning of only one lamp.





Other companies offered similar types of projectors but with mechanical dissolvers between the projectors. The Kliegl Brothers (famous for the Klieglight) distinguished between their “Sciopticons,” single-unit projectors designed to create special effects with motor-driven or stable units, and “Stereopticons,” single- or multiple-unit projectors designed to project primarily lantern slides. Their double Stereopticon was available with arc lamps (as shown) or with 1000 watt nitrogen incandescent bulbs. Dissolving effects were created by interlocked mechanical irises: as the rod shown between the two lenses moved up or down, one iris would close while the other opened. The triple Stereopticon was used for “pose plastique” presentations in which a performer dressed in white tights would pose in front of a screen on which the various scenes and effects were projected: the upper lantern projected motorized effects such as falling snow, fire, flying birds or butterflies, and so on while the two lower lanterns cross-faded between scenes. Thirteen motorized effects for these “poses plastiques” were offered on p. 60 of the Kliegl Bros. Catalogue K (1922), and each of the projectors in the double or triple units could be equipped with slide carriers designed for standard lantern slides (3.25" x 4") or larger slides (4.75" x 5.375" or 6.25" x 5.875").

Like the Stereopticon, the Kliegls’ single-unit Sciopticon was available with an arc lamp (as shown on the following page) or a 1000 watt nitrogen incandescent bulb. Catalogue K lists more than 125 motorized effects (pp. 48–50) for the Sciopticon, which could also project normal lantern slides when fitted with a special adapter (p. 61) or be used as a spotlight by removing the effects holder.

The catalogue observes (p. 46) that Kliegl’s “mechanical stage effects have been in practically universal use for the past 25 years, during which time we have achieved a

reputation for truly realistic presentation of the effects desired, perfectly working mechanism, and have become practically standard." A few years later, Catalogue M (1926) boasts (p. 64):

> Kliegl scenic and stage effects are reproductions of natural phenomena and countless other forms of stage illusions. They embody mechanical, electrical, and optical contrivances, and are produced with sciopticons, stereopticons, open-box lights, spotlights, and other types of stage apparatus. Kliegl Brothers, pioneer designers and manufacturers of electrical effects for the American Stage, have a reputation for producing truly realistic effects with perfectly working mechanisms. Many Kliegl effects have been in continuous use for more than a decade and are still giving satisfactory service which speaks well for their workmanship, quality, and durability.

The motorized effects were made of mica—or sometimes glass—discs enclosed in large sheet-metal canisters (18" in diameter or somewhat smaller for color wheels and ca. 1.5" thick) that also housed double-spring clockwork motors with adjustable governors to rotate the discs. A flanged attachment to fit the grooves of the condensing lens holder on the Sciopticon was mounted on the casing as a swivel joint, enabling the effect to be turned to any desired angle: thus, the water effect flows across, the rain effect descends, the fire effect ascends, and so on. In addition, adjustable framing shutters were inserted in the condensing lens holder in order to fit the effect to any desired space. Motorized effects would run from thirty minutes to an hour or more on a single winding of the two springs, and the motors could be re-wound while the effect was running. More than one Sciopticon could be used to project a combination of effects such as moving clouds and running water, boats moving through water, and so on. A few double-disc effects were also available, as described on p. 47 of Catalogue K (1922):

> Double disc Effects are used in scenic and panoramic illusions, such as were used, for example, in "The Vanderbilt Cup," "County Fair" where the clouds, distant hills and country in the background move very slowly, while the foreground moves rapidly with the automobiles (or horses) running at high speed on the treadmills. This Effect gives a very realistic representation of the automobiles actually travelling through the country at any speed desired. Double disc Sciopticon panorama effects eliminate the costly apparatus previously used, such as the moving scenery in "Ben Hur" [i.e., the stage production, not the 1925 film version] and other similar productions.

Four years later, the reference to *Ben Hur* was replaced in Catalogue M (p. 65) by an indication that these effects could also be used in motion picture prologues: "Phantom illusions are produced with combination effects, and 'Mazda' type Sciopticons with dimmers, as in the prologue to the motion picture 'Down to the Sea in Ships' [1922, starring Clara Bow], a phantom ship appeared and disappeared on the rolling sea—the ship being faded in and out by the dimmers."

Kliegl Bros. was not the only company manufacturing these types of motorized effects. Display Stage Lighting Company's *Catalogue of Theatrical Lighting Equipment and Effects* (1927) includes a section on "Projective Effects," in which the descriptions of single- and double-disc effects are very similar to the Kliegl descriptions but emphasize

the advantages of electric motors over clockwork motors because the speed and direction of the effect can be regulated while the effect is running. Display Stage Lighting offered twelve versions of canisters, six with electric motors and six with clockwork motors, each available with single or double discs running at slow (10–20 minutes/revolution), medium (1.5–2.5 minutes/rev.), and fast (10–20 seconds/rev.) speeds. One of Display Stage Lighting’s fire effects (probably catalogue no. 1434) is in the collection of the Embassy Theatre, Fort Wayne, IN, as are a motorized color wheel manufactured by the Chicago Cinema Equipment Company, yet another company offering a variety of projectors and effects, and five others manufactured by Brenkert: Clouds with Rising Moon (catalogue no. CE6), Snowflakes (CE33[?]), Waterfalls (CE35), Twinkling Stars (CE45), and a color wheel (CE37).

Display Stage Lighting, Fire Effect

Chicago Cinema Equipment, color wheel

Brenkert, Waterfalls

Brenkert, Clouds with Rising Moon

The motorized effects were quite expensive for theatres of the 1920s. For example, the more elaborate of Display Stage Lighting’s effects ranged from $85 to $135 (the Fire effect was $72.50) and Kliegl’s ran as high as $245 for its Volcano effect, which required three Sciopticons (ranging in price from $70 to $106 each) to project its eruption, lava, and rain of ashes. In 2016 dollars, these amounts would equal $1,166, $1,851, and $3,360 for the motorized effects; and $960 to $1,454 for each Sciopticon! Brenkert’s effects were more reasonably priced but still expensive: in Catalogue No. 26 (January 1929), they range from $42.50 for the Snowflakes to $70 for the Cyclone effect and several

others. The Waterfalls and Twinkling Stars effects were $50 each. In 2016 dollars, these amounts would be $583, $686, and $960 for the motorized effects. A report issued by the National Industrial Conference Board of New York City (*The Cost of Living among Wage-Earners, Detroit, Michigan, September, 1921*) places these prices in context: the average cost of living for a family of four was $1,527 per year.

Until the 1920s, all of the companies manufacturing stereopticons and effects projectors envisioned their use primarily in lodges, lecture halls, and "legitimate theatres" featuring plays and other dramatic presentations. The Ihling Bros.–Everard Catalogue No. 9 featuring the Brenopticon model 4 is explicitly aimed at lodges with its title *Brenkert Brenopticon and Brenkert Spot-Flood Lamps for All Lodges*. The order form on page 13 includes a place for the seal of the lodge and addresses the competition:

> When you decide to equip your lodge with a stereopticon and the degree slides be sure that your selection is going to prove a benefit to the lodge and not a source of disappointment. There are many stereopticons on the market to choose from, but there is but one that has been especially designed for use in the lodge room, and that one is the Brenopticon. With this Brenopticon everything goes along smoothly and the results are the very best that can be produced. You have read over the operating principle of the Brenopticon and can see for yourself that it appeals to the requirements of the lodge. You will be sorely disappointed in any outfit other than a Brenopticon. Its price is reasonable. When you buy your slides be sure to get the first class kind. There are many cheap grades on the market which you would not consider when they are compared to the regular set. The first grade cost no more than the second class grade; it is simply a question of knowing where to buy them.
>
> When you want to buy a spot and flood lamp for your lodge do not let the price govern you. A cheap article is expensive. Our spot and flood lamps are not expensive and have the material in them to stand up and give service.

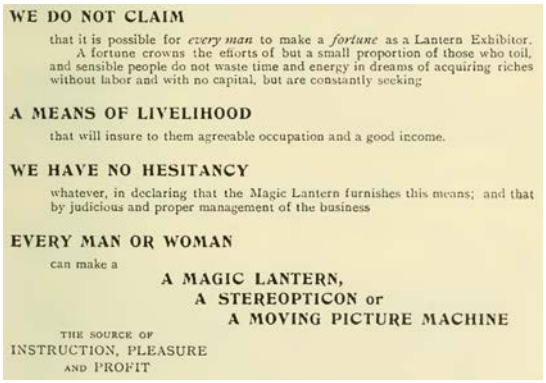
Likewise, Kliegl's Catalogue K (p. 58) describes their double Stereopticon as "especially well adapted for theatre, school and institute entertainment. It is a high grade apparatus, steady, and used for Plastique slides in professional acts." As late as 1926, Kliegl's Catalogue M barely mentions motion picture exhibition and still emphasizes the use of its Stereopticons and Sciopticons in lodges and legitimate theatres. On p. 64, for example, the catalogue states: "A number of Kliegl effects have become standard, and are carried in stock, as listed on the following pages. New effects are constantly being designed. Special effects and illusionary devices, and effects for degree work are made to order." And on p. 71, the catalogue adds: "Kliegl's illusionary effects and special illuminated designs for degree work for all Fraternal Orders, can be furnished, and are made to order. Theatrical experience enables Kliegl Brothers to devise ingenious Effects which operate smoothly—and combine beauty, novelty, and impressionable qualities."

Stereopticons and stage effects projectors were normally set up where and as needed, with a projection distance of not much more than 100 feet for a stereopticon and no more than 50 feet for an effects projector. Kliegl's Catalogue M (p. 78) lists lenses for the Sciopticon in six focal lengths for projection at a distance of 15 or 50 feet and for the stereopticon in six focal lengths at distances ranging from 10 to 120 feet. Five more "long-distance" lenses were also advertised for projection up to 150 feet, but slides projected at a distance greater than 100 feet required at least a 1000 watt bulb and were much less bright. Stereopticons would typically be set up towards the back of a hall or in the gallery of a theatre; stage effects projectors would be placed in the wings, behind a scrim, or near

the front of the stage. None of this presented any particular problem when the projectors were used in lodges or traditional theatres, and with one exception, their manufacturers seem to have had little interest in developing them because the various machines were perfectly well suited to their tasks.

The Brenkert Light Projection Company: The Early Years

The exception was the Brenkert Light Projection Company, perhaps because the principals of this company had always been interested in motion picture projection. In fact, the Brenkerts patented their first "picture projecting machine" in 1922 (US 1,427,575) as a device intended to be mounted on the front of a stereopticon. They recognized that a new type of theatre devoted to motion pictures would require a new type of projector. Robert Sprague provides some background on the company in his article "The Brenkert Story" (published in *Sixteen Frames: The Journal of the Movie Machine Society*), which was based in large part on reminiscences by Karl and Wayne Brenkert made many years later, after the company was acquired by RCA. As it turns out, their reminiscences are not entirely reliable and need to be clarified or corrected by United States Census records, various articles and advertisements in trade journals of the 1910s and 20s, patents, and early catalogues issued by the company.


WE DO NOT CLAIM

that it is possible for *every man* to make a *fortune* as a Lantern Exhibitor. A fortune crowns the efforts of but a small proportion of those who toil, and sensible people do not waste time and energy in dreams of acquiring riches without labor and with no capital, but are constantly seeking

A MEANS OF LIVELIHOOD

that will insure to them agreeable occupation and a good income.

WE HAVE NO HESITANCY

whatever, in declaring that the Magic Lantern furnishes this means; and that by judicious and proper management of the business

EVERY MAN OR WOMAN

can make a

A MAGIC LANTERN,
A STEREOPTICON or
A MOVING PICTURE MACHINE

THE SOURCE OF
INSTRUCTION, PLEASURE
AND PROFIT

In 1899, both Montgomery Ward and Sears were promoting and selling projection equipment with advertising aimed at the budding entrepreneur, as in this example from Ward's *Catalogue of Magic Lanterns, Stereopticons, and Moving Picture Machines*. Whether or not Joseph William Brenkert and his wife Elizabeth of Highland Park (a section of Detroit), Michigan, saw this advertisement, they certainly felt its spirit. In 1903, they journeyed to Chicago and purchased a variety of motion picture equipment from Sears and Roebuck—from Mr. Roebuck himself.

By 1905, the Brenkerts had acquired an Edison projector and a print of *The Great Train Robbery* (1903), and Joseph and his sons began projecting it and other films for neighbors, schools, and churches. Soon, their customers wanted equipment of their own, and the Brenkerts supplied it as Detroit agents for Roebuck. By 1907 the Brenkerts had their own stereopticon ready for sale through a fledgling company listed on p. 673 of the *Michigan State Gazetteer and Business Directory … 1907–1908* as The Detroit Stereopticon Supplies Concern, Joseph W. Brenkert, manager, with a small advertisement on p.

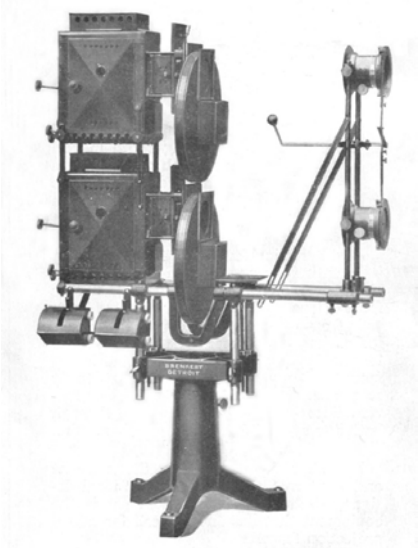
2196. As orders for the machine began to arrive, they expanded into an old barn on the Brenkert homestead at 49 Cortland Avenue. Following incorporation in August of 1911 (with a capital stock of $20,000, according to *Iron Age* 88 [1911]: 438), J. Wm. Brenkert retired at the age of

54, moved to California, and left the operation of the firm to two of his sons, Karl (18) and Joseph Jr. (22): the three stockholders were J. Wm. (President), Karl (Treasurer), and Joseph Jr. (Secretary). The four other children, Bertha, Grace, Neal, and Wayne (respectively 24, 20, 15, and 13 in 1911), do not seem to have played any role in the business at this time. Sprague confuses Wayne with Joseph in his early history of the company, but in fact it was Karl and Joseph who developed the company over the next twenty years. In the 1930 census, both Karl and Joseph (whose surname is mis-transcribed as Brinkert) are listed as employers, while Neal and Wayne are listed as salaried employees (respectively as "Production Manager" and "Theatre Engineer"). Likewise, all of the company's patents from 1918 through 1932 are credited to Karl and Joseph as inventors; Wayne is never credited on any of them. Joseph died in the early 1930s (later newspaper accounts provide conflicting dates): a patent for an automatic arc regulator (US 2,040,596 filed in 1933; granted in 1936) credits only Karl as inventor, and in the 1940 census, Joseph's wife, Stella, is listed as a widow. At some point after 1930, probably following Joseph's death, Wayne moved up in the business: in the 1940 census, he (now 41) is listed as an employer and "Sales Manager," while Neal (now 44) is still listed as a "Production Manager" in the company with a salary of $3500. When the firm was purchased by RCA in 1945, the *Showmen's Trade Review* for 7 July 1945 (p. 8) reported that "Karl and Wayne Brenkert will remain active in its management."

Between 1911 and 1921, the Brenkerts had a very steady business and constantly developed their three basic products: the stereopticon, the spot and flood lamp model C, and arc lamp rheostats. All of these appear in their Catalogue No. 15 (undated but almost certainly not later than 1922).

The Model F

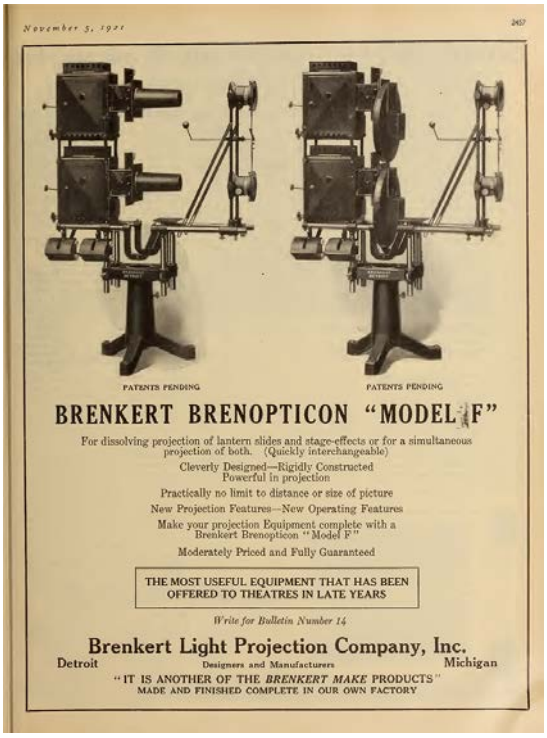
Beginning in the late teens, the Brenkert Light Projection Company began to develop a new series of machines, the model F, that combined the features of lantern slide projectors with those of effects projectors, while constantly adding improvements to a design that had remained more or less constant for more than a decade. These included modifications to the arc burner, framing shutters, cross-faders, and the arrangement of the projection apparatus, as well as the addition of automatic arc controls that improved their reliability and ease of use. Several of these innovations led to important patents, such as US 1,613,078 for improvements to the arc burner (filed in 1924 and granted in 1927) and US 1,738,945 for a precision framing shutter (filed in 1928 and granted in 1929). Nevertheless, the company did not abandon its earlier machines and continued to offer the Brenopticon (with the exception of the acetylene version), now called the model 4D, throughout the decade. It is still listed in Catalogue No. 26 (1929) but finally disappears in Catalogue No. 28 (1930).



The model F was featured on the cover of Catalogue No. 15 and described on the inside front cover. The description makes it clear that this is a new type of projector intended to be installed in a permanent location, invisible to the audience, and used to enhance motion picture projection:

> Brenkert Model “F” Stage Effect and Lantern Slide Projector … affords the most unique and novel means of added projection features since the advent of motion picture entertainment. Stage effects can be projected from the operating booth in real professional fashion. Lantern slides can be alternated with stage effects or stage effects and lantern slides simultaneously projected. An interesting feature of this equipment is the entirely new system of Brenkert lenses. Each lens mount is fitted with two different focus of lens. Mounted in a swinging holder in front of each lens mount is the proper focus lens to fit picture screen and a similar lens holder is mounted in rear of each lens mount with lenses of proper focus to fit stage opening. Either stage effects or lantern slides can be perfectly projected through both sets of lenses as occasion may require. The Brenkert Model “F” Stage Effect and Lantern Slide Projector is of ideal design and durable construction. It is the equipment that answers the call for added projection features.

The model F was given a full-page advertisement and an extended review on pp. 2456–57 in *Motion Picture News* for 5 November 1921, where it was viewed as a new model of the Brenopticon:


November 5, 1921 2457

PATENTS PENDING PATENTS PENDING

BRENKERT BRENOPTICON “MODEL F”

For dissolving projection of lantern slides and stage-effects or for a simultaneous projection of both. (Quickly interchangeable)

Cleverly Designed—Rigidly Constructed
Powerful in projection

Practically no limit to distance or size of picture

New Projection Features—New Operating Features

Make your projection Equipment complete with a Brenkert Brenopticon “Model F”

Moderately Priced and Fully Guaranteed

THE MOST USEFUL EQUIPMENT THAT HAS BEEN OFFERED TO THEATRES IN LATE YEARS

Write for Bulletin Number 14

Brenkert Light Projection Company, Inc.
Detroit Designers and Manufacturers Michigan

“IT IS ANOTHER OF THE *BRENKERT MAKE* PRODUCTS”
MADE AND FINISHED COMPLETE IN OUR OWN FACTORY

> Abreast with the progress of the motion picture projection machines is the new Brenkert Brenopticon “Model F.” With this new machine can be obtained the combination projection of lantern slides and stage effects. Lantern slides and stage effects can be shown in perfect dissolving projection, or one lantern slide and one stage effect can be simultaneously projected.
>
> The outstanding feature of the Brenkert Brenopticon “Model F” is its excellent projection of stage effects. The large working aperature lenses take in the full opening of any standard make of stage effect—and the projected images are clearly defined and brilliantly illuminated.
>
> Direct from the operating booth the stage effects can be projected singly or to operate in pairs. The Iris Dissolving Shutters are quickly controlled at the will of the operator and the Framing Shutters instantly set to frame the screen or stage opening.
>
> One effect operating in upper unit can show Moving Clouds on upper half of screen or stage setting and a Moonlight Water Ripple effect operating in lower unit to show on the lower half of screen or stage setting. There are many of the stage effects that operate in pairs for producing a most novel and beautiful effect for Overtures, Holiday features, Program Introductions, etc. The Framing Shutters permit the operator to control the area covered by the stage effects, therefore projection onto the screen or drop curtain can be accomplished with wonderful effect, or where some special stage setting is used the projection of stage effects in single or pairs can be worked in, and the results add greatly to the value of the program.
>
> Beautiful projection features are had by combining the projection of one lantern slide with one stage effect—namely—A lantern slide portraying a Winter Scene can be shown with the stage effect, Falling Snow—A Mountain Scene by lantern slide with stage effect of a Volcano, etc.

Many of these combinations can be had and worked out to give the audience something new, beautiful and attractive.

The Brenkert Brenopticon Model F is the advanced type double dissolver for theatre service. Its design and construction embrace entirely new developments and features—a distinct and marked departure from the old type double dissolvers.

The projection lenses are 4 inch diameter of full working aperature—they register clearly defined images with a perfect flatness of field. These large working aperature lenses (the largest ever offered) increase the illumination with less attention of operator in maintaining exact centering of light source.

The Iris Shutters furnished are positive in operation and close light tight. The adjustment permits setting shutters for alternate opening and closing, or, for simultaneous opening and closing.

The condensers are 5-inch diameter, which increase the illumination in lantern slide projection and cover the full opening of any standard make stage effect. They are mounted in a self-centering cell with quick access for cleaning or changing.

The framing shutters are built in and produce a curtain closing shutter effect. They operate as a dowser on lantern slide projection and are used for framing the stage opening when stage effect projection is desired.

The arc lamps are built for rugged service with vertical-longitudinal and lateral adjustments of new design.

The mazda lamp equipment consists of a quickly removable socket—the base holding socket being provided with all adjustments for exact centering of light source.

The lamp-houses are double lined with right and left doors.—Perfectly ventilated and light tight with vision glasses.

The base is a one piece pedestal with rotating top. The uprights and bed are heavy steel tubes. The stand is provided with adjustments for setting at any angle of projection required and locks tight. It is rigid and free of vibration.

The Brenkert Brenopticon Model F is furnished in an equipment having 40-60-80 ampere rheostats and dual focus lenses. These dual focus lenses provide for two different sizes of projection, namely, the projection of lantern slides to fit a given size screen and for projection of stage effects to cover an area larger than the curtain or entire size of stage opening.

The combination 40-60-80 ampere rheostat is instantly controlled, which permits the operator to increase the illumination as may be required for projection of the stage effects over a large area—and the decrease in illumination on the projection of lantern slides where the greater illumination is not required.

The dual focus lenses are quickly thrown in and out.

The Brenkert Brenopticon "Model F" projector renders a high class projection service in Schools, Colleges, Studios, for Professional and Advertising purposes.

The Mazda lamp equipment renders perfect projection of lantern slides at any distance up to 120 feet and at distances of 100 feet or less with stage effects. It is the ideal equipment for Schools, Colleges, Advertising and Professional requirements.

The arc lamp equipment has practically no limit in its distance of projection as it can be equipped with the 40-60-80 ampere rheostats and long focus lenses.

The company certainly did not want theatre owners looking elsewhere for motorized stage effects for the model F and therefore offered a wide range of them on p. 30 of Catalogue No. 15. These could of course still be used on stage spot-flood lights (such as their own models C3, 4, 5, and 6 or the Kliegl's Sciopticon), but the catalogue emphasizes their suitability for the model F:

Stage effects are furnished by us for use on spot-flood lamps or for use on the Model "F" Brenkert Lantern Slide and Stage Effect Projector. Effects listed below include projection lens of

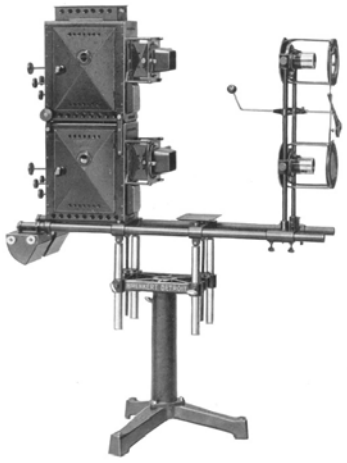
short focus for use from behind the stage or a long focus lens for use from the balcony. When effects are used on the Model “F” Brenkert Lantern Slide and Stage Effect Projector the projection lens of the effect is not necessary [because the projection lenses are already part of the projector], therefor [*sic*], where effects as listed below are desired without the effect lens deduct $5.00 from the price of effects as listed.

In later catalogues, the motorized effects are always sold without the projection lens, and their use on spot-flood lamps is considered the exception.

List of Effects

Cat. No.			
CE1	Aurora Borealis		$50.00
CE2	Babbling Brook		50.00
CE3	Blizzard Effect		50.00
CE4	Burning Forests, panorama		70.00
CE5	Clouds Passing Moon, moon stationary		60.00
CE6	Clouds with Rising Moon		70.00
CE7	Country Scene, panorama		90.00
CE8	Cyclone Effect		50.00
CE9	Cyclone with Flying Objects		60.00
CE10	Descending Clouds, for imaginary ascension trip		50.00
CE11	Falling Flowers		90.00
CE12	Flying Angels		50.00
CE13	Flying Birds		50.00
CE14	Flying Butterflies		90.00
CE15	Fog Effect		50.00
CE16	Flood with Floating Objects		60.00
CE17	Falling Flags		90.00
CE18	Fire and Smoke Effect		50.00
CE19	Flames		50.00
CE20	Inferno Spectacular Effect		60.00
CE21	Lightning Effect, forked or zig-zag, three brass slides, with lightning shutter and objective		50.00
CE22	Moon Picture Slides, with appearing and disappearing clouds		80.00
CE23	Moonlight Water Ripple		50.00
CE24	Moving Storm Clouds		50.00
CE25	Moving Fleecy Clouds		50.00
CE26	Moving Evening and Sunset Clouds		60.00
CE27	Moving River		50.00
CE28	Midnight Sun		50.00
CE29	Ocean Waves		50.00
CE30	Rain Effect		50.00
CE31	Rainbow Prism Effect		95.00
CE32	Sand Storm Effect		50.00
CE33	Snow Storm Effect		50.00
CE34	Volcano Effect, used on three machines	Eruption	50.00
		Flowing Lava	50.00
		Rain of Fire and Ashes	50.00
CE35	Water Falls		50.00

The Model F2



Somewhat different models, called the F2, are shown and described on pp. 19–21 of Catalogue 15. These are basically the same projector but without the U-shaped brackets that allow the base rods to accommodate the canister of the lower motorized effect and without the extra angle braces on the vertical lens supports. The model F2 could be purchased with the same sort of adjustable base that came with the model F or with four short legs so that it could sit on a table. It was also available as a triple projector. According to the catalogue (p. 20):

> Every Theatre Owner and Manager, as well as public institution officials, desire to project lantern slides at various times to properly complete the program of entertainment. When projected clear in detail, with a pleasing change from one to the other, lantern slides offer possibilities of endless variety of entertainment and their use becomes an important factor. As these results cannot be obtained from the ordinary lantern slide projector, or with the same equipment which projects film, we have drawn on our 14 years of experience in the design and manufacture of projection apparatus to produce a superior equipment for projection of lantern slides in clearness of detail and perfect blending change of picture with an ease of operation, heretofore unknown.

The Model F2 with the base sold for $259.50 or $216 without the base. The version with three projectors was available for an additional $80, and it was also available with 1000 watt mazda lamps for the same prices. None of these versions, however, included the two (or three) rheostats necessary for their operation. These were available in various

amperages, depending on the type of lamp and current (120 or 220 volts), and cost an additional $40–84. No price was given for the model F, but it probably did not cost a great deal more than the F2. In any case, Brenkert's new models would have been fairly expensive: a complete F2 with base and two rheostats running on 220 volts would have cost $427.50, or $5,863.00 in 2016.

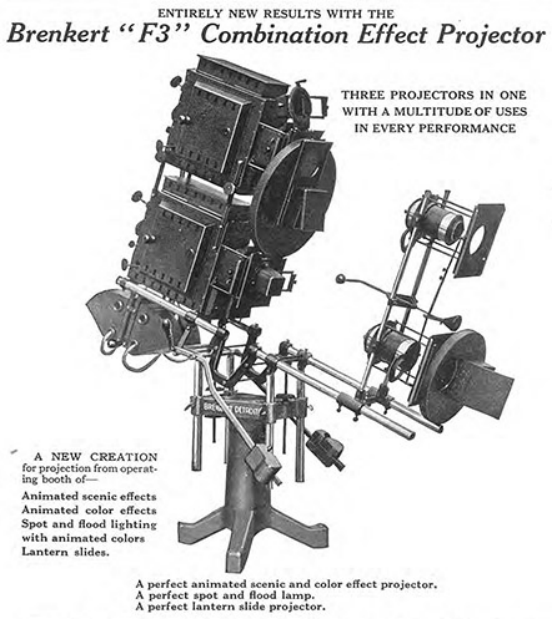
The Brenkert Light Projection Company: 1925–1930s

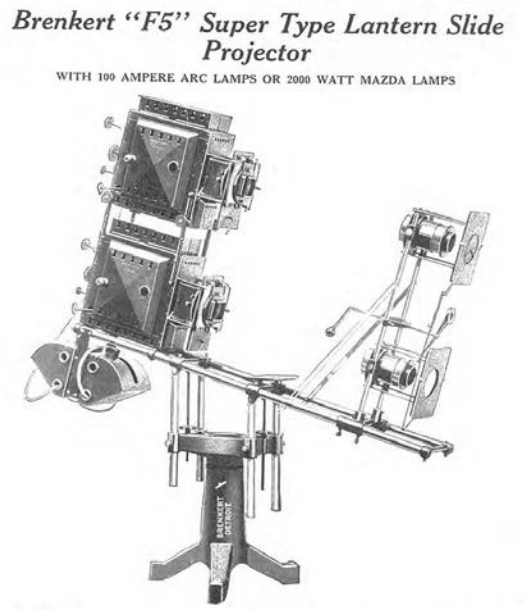
In 1925, the Brenkert Light Projection Company moved to a new and much larger location at the corner of St. Aubin Street and East Grand Boulevard. Boasting 18,000 square feet, the new factory enabled the company to keep up with orders from its ever-expanding network of dealers and to continue the development of new models.

The Brenkert Plant

The Model F3 and F5

The apparent success of the model F and F2 led to an expansion of the series with the F3 and F5; these were essentially respective modifications of the F and F2 but with a number of additional innovations. The most obvious modification was the introduction of a tilting mechanism so that the projectors' bases could sit level on the floor of a projection booth located above and behind a balcony with the projector itself set at the proper angle (13° was assumed) to direct its beam downward towards the proscenium. This could be done on the F and F2 by adjusting the four rods that attached the projector to its base, but the earlier models were clearly not intended to project at an angle, and once set, the angle could not be adjusted while the machine was in use. The F3 was designed to tilt and swivel on its base while the machine was in use so that its light could be projected anywhere in the auditorium subject only to the limits imposed by the opening in the



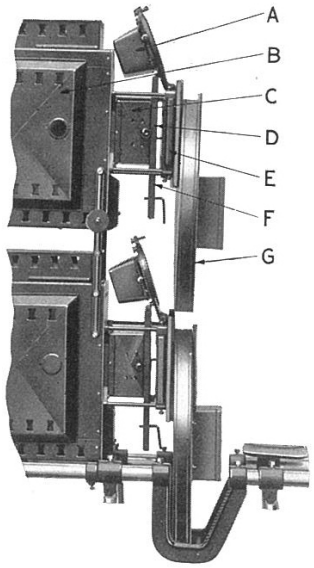


projection booth, enabling it to function as a spotlight as well as a lantern slide and effects projector. Like the F2 (which remained available at least through Catalogue No. 24, issued in 1927), the F5 had its tilt fixed by the adjustment of the rods. Both models were available with arc lamps or incandescent 900, 1500, or 2000 watt mazda lamps (mazda lamps were adequate only if the projection distance was less than 120 feet). The amount of light emitted by the projectors had been improved by increasing the diameter of the projection lens from 2.375" to 3" (for use with arc lamps) or 4" (for use with mazda lamps); the catalogue does not give the specific size of the condenser lens, but it was probably the same 5"-diameter lens used in their attachments for projecting stage effects from spot lamps.

The versatility of the model F3 was emphasized at length in Catalogue No. 24 (p. 3):

> With the Brenkert F3 combination effect projector moving color effects or combination color effects are projected over the entire stage opening or orchestra pit and by means of the iris aperture controlling shutters and vertical and horizontal framing shutters the area and shape of projected light is controlled as desired. The vertical counterbalance and ball bearing horizontal swivel allows the operator to quickly and easily direct the path of light to any part of the stage or orchestra pit or follow performers. By use of the gelatine color slides or color wheel single colors or combination-colors are projected.
>
> Moving scenic effects are projected onto a scrim or drop covering the entire stage opening or onto the motion picture screen. One moving scenic effect can be projected in combination with a lantern slide to which it conforms or two moving scenic effects, such as moving river with moving clouds above, can be projected simultaneously.
>
> Moving scenic effects are used for prologues while the orchestra or organist is playing or are used to animate certain parts of the stage scenery for vaudeville sketches.
>
> We manufacture a large variety of scenic effects as listed on page 7 for use with the Brenkert F3 projector. These may be purchased or rented from theatre supply dealers at nominal cost.
>
> The Brenkert F3 combination effect projector is being rapidly installed in theatres of all sizes in all sections of this country. It’s [*sic*] use adds prestige and patronage to your theatre. Make this installation now and receive these benefits.

The following two pages of the catalogue offered a much more detailed description of the mechanism than had previously appeared for any of the Brenkert products:



PATENTS PENDING

FRONT VIEW OF LAMPHOUSES

Showing combination projection of slide and "moving effect."

"A" Slide carrier compartment swung into position ready to project lantern slides.

"B" Moving scenic or color effect slipped into position on the lower unit ready to be projected on to the motion picture screen, over the entire stage or on to a drop covering the entire stage opening.

Note: Slide carrier in this unit is swung out of position.

For projecting dissolving lantern slides, effect in lower unit is quickly removed, and slide carriers in both lower and upper unit are swung into position as at "A."

SIDE VIEW OF LAMPHOUSES

Showing simultaneous projection of two moving effects such as "moonlight water ripple" with "moving fleecy clouds."

"A" Slide carriers swung out of position on both the lower and upper unit.

"B" Lamphouse.

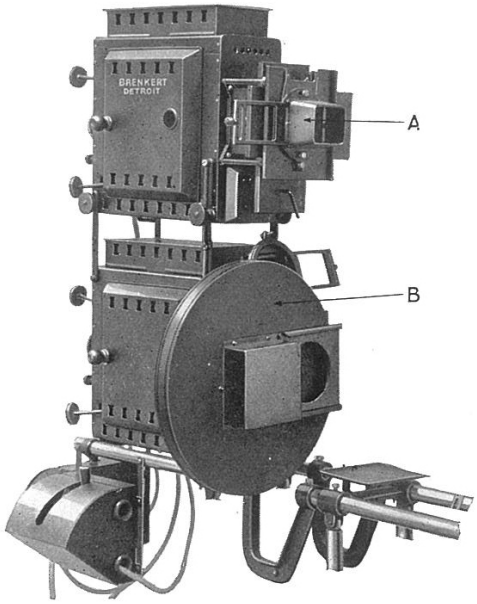
"C" Condenser cell with large diameter condensers to completely cover opening of standard size stage effects.

"D" Mask compartment for holding irregularly shaped effect masks and border devices.

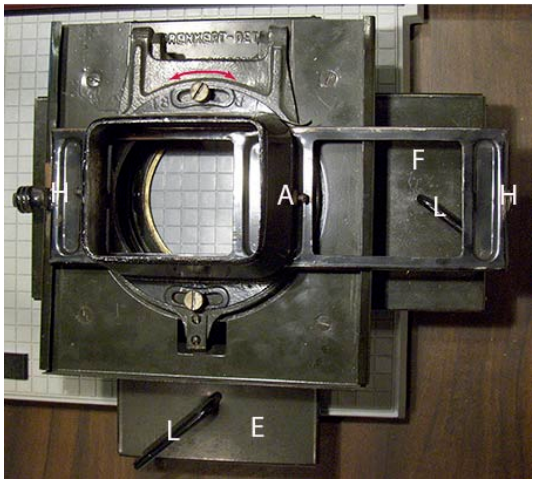
"E" Horizontal adjustable framing shutter for framing or masking off the sides of the projected light area.

"F" Vertical adjustable framing shutter for framing or masking off the top and bottom of the projected light area.

"G" Moving scenic or color lighting effect enclosed in metal casing with spring motor driving mechanism. (See page 7 for list of "effects").



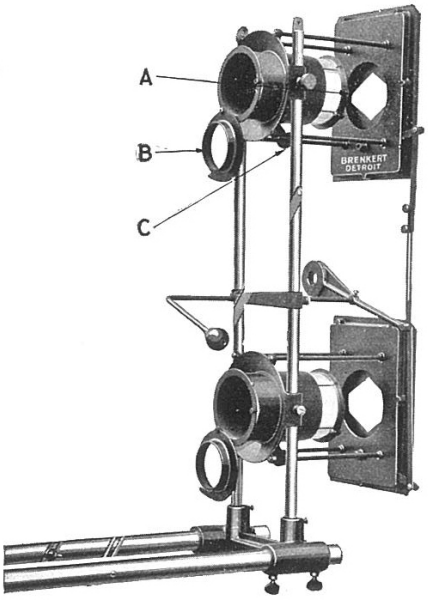
PATENTS PENDING



The slide carriers (A in the diagram above and this photograph) were one of the innovations featured on the models F3 and F5. Each carrier had a vertical shutter and a second horizontal shutter (E and F) independently adjustable by a lever (L) so that light coming from the lamp house could be precisely masked to fit a lantern slide or fully opened to allow all the light from the lamp house to pass through a motorized stage effect or function as a spotlight. When a motorized effect was to be used, the slide carrier and light tube (A) would swing up out of the way and the motorized effect would be supported by the bottom and side grooves of the carrier. In addition, the slide carrier itself could rotate a

few degrees left or right of center so that the slides could be precisely aligned on the screen as they followed one after another without a break, alternating by means of the back-and-forth slide holder (H). Or, the slides could be cross-faded by using the slide carriers on both lamp houses and the dissolving shutters positioned in front of the projection lenses.

The front part of the apparatus was illustrated and more fully explained on p. 5 of the catalogue:



PATENTS PENDING

FRONT VIEW OF DUAL FOCUS PROJECTION LENSES

“A” Rear or short focus lenses in position ready to project moving stage effects or moving color effects over the entire stage opening.

“B” Dissolving shutters for dissolving from one effect or slide to the other. These shutters are adjustable to gradually close one while opening the other or both open at the same time.

“C” Front effect holder for effects which must be operated in front of the projection lens.

“D” Rainbow Prism effect in place.

“E” Front, or long focus lenses, swung out of position.

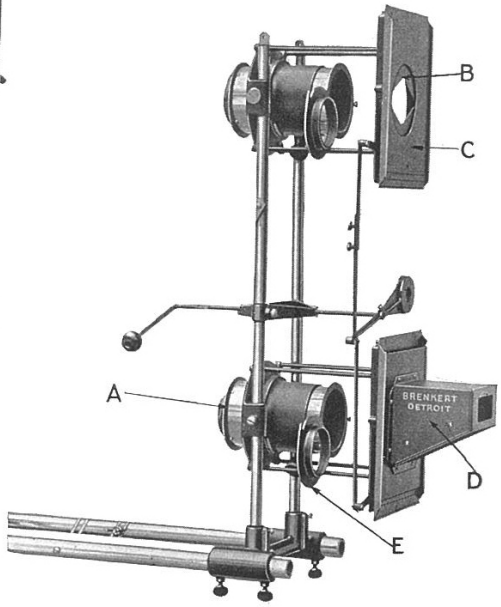
REAR VIEW OF DUAL FOCUS PROJECTION LENSES

“A” Front or long focus projection lenses in position ready to project moving stage effects, moving color effects, or slides on to the motion picture screen.

“B” Rear or short focus lenses swung out of position.

“C” Fine focussing adjustment for either the long or short focus lenses. (In changing from long to short focus lenses it is not necessary to change the position of the main upright tubes).

Note: Both dissolving shutters are now open for projecting from both lower and upper unit simultaneously with either two moving effects or one moving effect and one lantern slide.



PATENTS PENDING

As this diagram illustrates, the projectors came with short- and long-focus lenses for the different types of projection. Because the projectors were intended for permanent installation in the theatre’s booth, the distance from the projector to the screen and the size of the image desired had to be determined in order to specify the proper focal lengths of the two lenses at the time the projector was ordered. More than two lenses could be purchased at extra cost, but most theatres probably did not do this. The company provided two detailed charts to assist the projectionist in deciding on the lenses appropriate for his theatre:

TABLE No. 1
For projection of lantern slides and effects on Brenkert F3 projector and lantern slides only on F5, F2 and D2 projectors.
With slide mat opening 2¾" high x 3¼" wide.
DISTANCE IN FEET FROM LENS OF PROJECTOR TO SCREEN

SIZE IN FEET OF PICTURE OR EFFECT ON MOTION PICTURE SCREEN

Focus of Lens	30 Ft.	40 Ft.	50 Ft.	60 Ft.	70 Ft.	80 Ft.	90 Ft.	100 Ft.	110 Ft.	120 Ft.	130 Ft.	140 Ft.	150 Ft.	160 Ft.	170 Ft.	180 Ft.
10	8.25x9.75	11x13	13.8x16.2													
12	6.9x8.1	9.2x10.8	11.5x13.5	13.8x16.3												
14	5.8x6.9	7.8x9.3	9.8x11.6	11.8x13.9	13.7x16.3											
16		6.9x8.1	8.6x10.2	10.3x12.1	12 x14.2	13.8x16.2										
17			8.1x9.5	9.7x11.5	11.3x13.4	13 x15.3										
18			7.6x 9	9.1x10.8	10.7x12.6	12.2x14.4	13.7x16.3	15.3x18.1								
19			7.2x 8.5	8.7x10.2	10.1x11.9	11.6x13.7	13.2x15.3	14.5x17.1	16 x18.8							
20			6.9x 8.1	8.2x9.7	9.6x11.4	11 x13.0	12.4x14.6	13.7x16.2	15.1x17.9	16.5x19.5						
21				7.8x9.3	9.1x10.8	10.5x12.4	11.8x13.9	13.1x15.5	14.4x17.1	15.7x18.6	17.1x20.1					
22				7.5x8.9	8.7x10.3	10 x11.8	11.2x13.3	12.5x14.8	13.7x16.3	15 x17.7	16.2x19.2	17.5x20.7				
23					8.4x 9.9	9.6x11.3	10.8x12.7	12 x14.1	13.1x15.5	14.3x16.9	15.5x18.4	16.7x19.8	18 x21.2			
24					8 x 9.4	9 x10.8	10.3x12.2	11.5x13.5	12.6x14.9	13.7x16.2	14.9x17.6	16 x19	17.2x20.3	18.3x21.7		
25						8.8x10.4	9.9 x11.7	11 x13.0	12.1x14.3	13.2x15.6	14.3x16.9	15.4x18.2	16.5x19.4	17.6x20.8	18.7x22.1	
26									11.6x13.7	12.7x15.0	13.7x16.3	14.8x17.5	15.9x18.7	17 x20	18 x21.2	19 x22.5
27										12.2x14.4	13.2x15.6	14.3x16.8	15.3x18.0	16.3x19.3	17.3x20.5	18.3x21.7
28										11.8x14.0	12.7x15.1	13.7x16.2	14.7x17.4	15.7x18.6	16.7x19.7	17.7x20.9
29											12.3x14.6	13.3x15.7	14.2x16.8	15.2x17.9	16.1x19.1	17 x20.2
30											11.9x14.1	12.8x15.2	13.7x16.2	14.7x17.3	15.6x18.4	16.5x19.5
32													12.9x15.2	13.8x16.2	14.6x17.2	15.5x18.3
34														12.9x15.3	13.7x16.2	14.5x17.2
36															13 x15.3	13.7x16.3

The short focus projection lens is for projecting scenic and color effects over the entire stage opening and the entire width of the orchestra pit. The focus of this lens is determined from table number two below. In each case use the longest measurements in width of stage or orchestra pit as a basis for determining the focus of this lens. Brenkert framing shutters supplied on these projectors frame the projected light horizontally and vertically to cover any smaller area desired.

TABLE No. 2
For projection of scenic and color effects over the entire stage opening and across the orchestra pit on Brenkert "F3" Combination effect projector.
With effect opening 3" high x 4" wide
DISTANCE IN FEET FROM LENS OF PROJECTOR TO STAGE OPENING OR ORCHESTRA PIT

SIZE IN FEET OF SCENIC OR COLOR EFFECT ON STAGE OPENING OR ACROSS ORCHESTRA PIT.

Focus of Lens In Inches	60 Ft.	70 Ft.	80 Ft.	90 Ft.	100 Ft.	110 Ft.	120 Ft.	130 Ft.	140 Ft.	150 Ft.	160 Ft.	170 Ft.	180 Ft.	190 Ft.	200 Ft.
7	26x34.2	30x40													
8	22x30	26x35	30x40												
9	20x25.6	23x31.1	26x35.5	30x40											
10	18x24	21x28	24x32	27x36	30x40										
11	16x21.9	19x25.5	22x29.9	24x32.8	27x36.4	30x40									
12		17x23.4	20x26.8	22x30	25x33.4	27x36.8	30x40								
13			17x24.8	21x27.9	23x30.9	25x34	27x37	30x40							
14				20x25.9	21x28.8	24x31.6	25x35	28x37.2	30x40						
15					20x26.9	22x29.5	24x32	26x35	28x37.5	30x40					
16						21x27.8	22x30	24x32.8	26x33.6	28x37.8	30x40				
17							21x28.4	23x30.5	24x32.9	26x35.5	28x37.6	30x40			
18								21x28.8	23x31.2	25x33.6	26x36.2	28x36.7	30x40		
19									22x29.9	23x31.6	25x33.6	26x35.8	28x36.3	30x40	
20										22x30	24x32	25x34	27x36	28x38	30x40
21											22x30.4	24x32.4	25x34.6	27x36.4	28x38.1
22												23x30.9	24x32.7	26x34.5	27x36.3
23													23x31.7	24x33.1	26x34.8
24														23x31.6	25x33.3

Prices for the new models had increased significantly. The Model F3 sold for $575, and the F5 was $460; the F2 continued to be available for $259.50. None of these included the two rheostats necessary for their operation. As before, these were still available in various amperages, depending on the type of lamp and current (120 or 220 volts), and cost an additional $40–84. Thus, a complete F3 with two rheostats running on 220 volts would have cost $743, or $10,310.00 in 2016.

Although there is no mention of it in the catalogue, the company apparently issued a booklet of "full instructions on popular 'effect' lighting," according to a short note in the 25 February 1927 issue of *Motion Picture News* (p. 698):

> In response to many requests from the three thousand or so users of the Brenkert F-3 effect projector, the Brenkert Light Projection Company has published a new instruction booklet for the setting up and operation of the apparatus.
>
> Coming to the trade at a time when a majority of exhibitors are conducting experiments with new lighting effects, the booklet should prove of more than ordinary interest. The Brenkert Company predicts that this is only a fore-runner of a much more elaborate "effect" lighting for motion picture theatres.
>
> The booklet goes into detail on several subjects, such as projecting blending color effect on motion picture titles; projecting blending colors around border of motion pictures; waving flag on top of moving cloud effect; falling flowers effect over entire stage opening; rainbow prism effect

across entire stage; snow effect; projecting special cut-out effects on titles; dissolving feature picture slide effects and sea scene of moving clouds and moving waves.

Unfortunately, no copy of this booklet is known to survive.

The Model F4

A model F4 seems never to have been released, but this probably does not reflect an abandoned prototype. The number 4 had already been used by the company for its earlier lantern slide projectors, the models 4B, BB, D, DD, and G (models 4D and DD did not disappear from the company's catalogues until Catalogue 28 [1930]), and the company may have wished to avoid any confusion between their smaller lantern slide projectors and their new larger machines. For perhaps the same reason, the letter C was not applied to any of the models 4 because it was used for the various models of the popular Brenkert spot and flood lamps. Thus, all the smaller lantern slide projectors were designated by the number 4, all the spot and flood lamps by the letter C, and all the larger lantern slide projectors and combination projectors by the letter F.

The Model F6

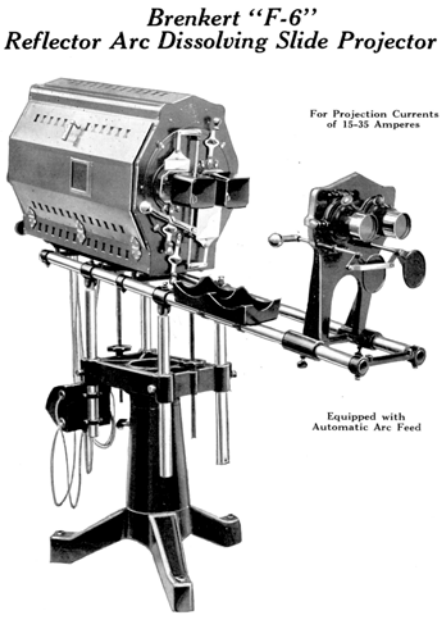
Kurlander Joins Brenkert Engineering Staff

J. H. KURLANDER, who for the past four years has been with the engineering department of the Edison Lamp Works of Harrison, N. J., specializing on incandescent lamp projection, has left there to take charge of the engineering department of the Brenkert Light and Projection Company, of Detroit. Mr. Kurlander will be in charge of all the technical developments.

This addition to the Brenkert staff is in keeping with their present policy of expansion.

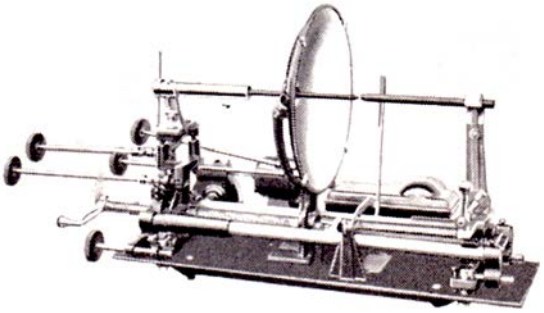
In the mid 1920s, the Brenkert Light Projection Company was experimenting with new and improved models of its projectors under the direction of the new head of the engineering department, J. H. Kurlander, whose hiring was announced in the 29 May 1926 issue of *Motion Picture News* (p. 2605), and by 1927 the company was ready with the Brenkert F6 Reflector Arc Dissolving Slide Projector, introduced at a "Symposium on New Motion Picture Apparatus" held at the September 1927 meeting of the Society of Motion Picture Engineers and reported briefly in their *Transactions* (vol. 11, no. 32, pp. 768–71). It was announced to theatre managers with full-page advertisements appearing in the 7 October, 4 November, and 2 December 1927 issues of *Motion Picture News* (pp. 1073 [with a brief description on the following page], 1422, and 1730) and touted with reducing operating costs more than 50%. According to the description on p. 13 in Catalogue 26 (January 1929):

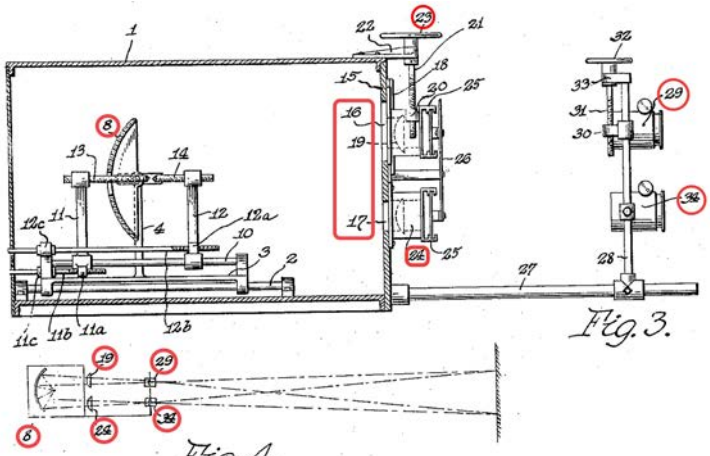
> This new slide projector will lower operating costs more than 50% because it uses but a single low amperage arc for the projection of two slides whereas the old type of double lantern requires two separate arcs. In addition to this, the optical design of the machine, ampere for ampere, gives 30% higher efficiency than the old condenser form of stereopticon. This high efficiency, coupled with the elimination of one arc, results in operating economy which reduces expenses to a small fraction of their former value.



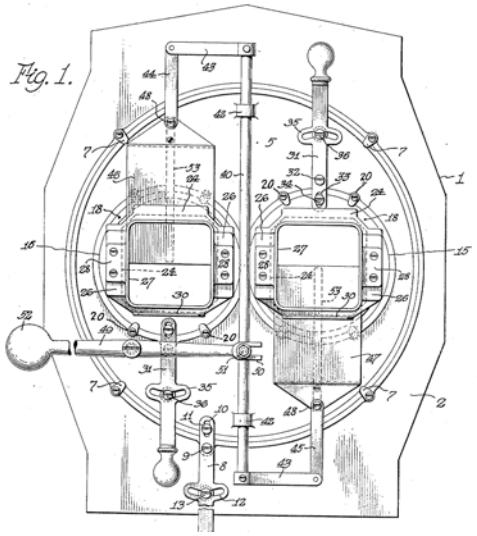
Experiments with the reflector arc are described in the company's patent US 1,591,211 (filed on 15 February 1926; granted 6 July 1926), and details of the innovative design of its new projector are laid out in two further patents: US 1,766,102 (filed on 25 April 1927; granted 24 June 1930) and US 1,738,943 (filed on 9 April 1928; granted 10 December 1929). The first of these pertains to the arc, which was envisioned in a projector with the lenses arranged vertically; the second describes the projector as it was actually constructed with the lenses now arranged horizontally.

As seen, the earlier models F and their competitors produced by other companies were comprised of two completely independent projectors, and all the light from the source in each projector was gathered by the condenser lenses into a single beam projected through a slide or effect and then through the focal lenses selected for distance from the projector to the desired locations within the theatre. But in this new model, there was only a single projector, and the light had to be split into two beams to pass through the pair of lenses, which would, as on all the earlier models F, be alternately opened and closed by a pair of shutters. This feat was accomplished by changing the position of arc burner from vertical to horizontal and positioning it in front of a parabolic mirror (as shown in the picture and labeled as 8 in figure 3 from US 1,766,102), which would then reflect either parallel or converging beams, depending on the exact point of the arc with respect to the focal point of the mirror. The beams passed through two condensing lenses (19 and 24), one for each slide aperture (16 and 17), which concentrated the light through the slide and then through the focal lens (29 and 34). If the projectionist wanted the two slides to appear adjacent to each other, he would set the arc to produce parallel beams, but if he wanted the slides to appear in the same spot in order to produce a cross-fading effect, he would set the arc to produce converging beams. In this case, though, the beams would already begin to converge before they reached the condensing lenses and would not be centered on the lenses. This problem was addressed in the patent by two mechanisms: the first allowed the mirror to be tilted slightly so that one of the beams would pass directly through the lower condensing lens; the second allowed the entire upper lens assembly to be moved downward into the path of the other beam by turning





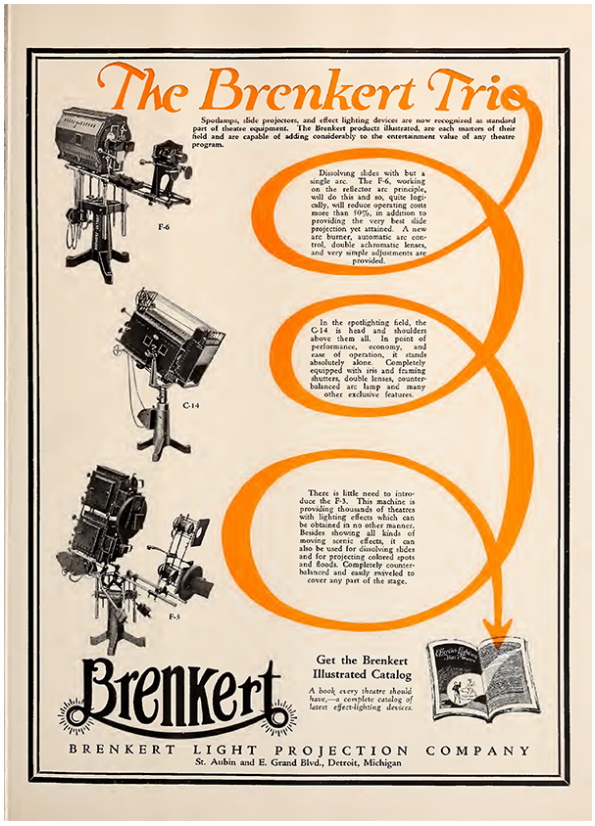
wheel 23. Figure 4 (US 1,766,102) shows the two beams reflected from the parabolic mirror converging on a single area.



Very soon after the Brenkerts filed their patent for this new type of projector, the company must have decided that the housing and cross-fading shutters could be improved: by the time the projector was advertised in October 1927, it already exhibited the design reflected in a new patent, US 1,738,943, which was not filed until April 1928. The principal features of this patent are, first, the ability to adjust the rotation of the entire cross-fading apparatus and each slide holder independently to correct any mechanical unevenness in the position of the projector in the booth or skewed slides so that the slides are absolutely square on the screen and, second, modifications in the cross-fading shutters so that the slides appear to gradually slide across each other as they move from one to another. All these features can be easily seen in figure 1 from the patent.

An additional feature of the model F6 was an automatic arc feeder, described in Catalogue 26 (p. 14) as follows:

> The Brenkert “F-6” dissolving slide projector is equipped with an automatic arc control which obviates the necessity of feeding the arc by hand. Each control is absolutely reliable and is carefully tested before the projector leaves the factory. This feature on the new Brenkert slide projector assures maximum operating efficiency and also relieves the projectionist of the need for watching the arc so that it permits him to devote all of his time to projecting the slides.



The arc feeder is not actually shown in the picture of the projector but is illustrated as an accessory for the Brenkert C-14 High Efficiency Spot-Flood Lamp on p. 17 of the catalogue. It will be discussed more fully below (p. 34).

The model F6 was very widely advertised in all the trade magazines, as in this full-page display (appearing as part of an insert between pages 30 and 31 of the *Better Theatres* section of *Exhibitors Herald and Moving Picture World* for 18 February 1928) for the “Brenkert Trio,” which consisted of the F6, the C14 High Efficiency Spot and Flood Lamp, and the

F3 Combination Effect Projector. The F6 sold for $395 with an arc lamp, but it was also available with a mazda lamp at 900, 1000, or 1500 watts (for projection distances up to 125 feet) for $275. As usual, a rheostat was also required for the arc lamp, which cost an additional $40–84 depending on the type of lamp and current. Thus, a complete F6 with one rheostat running on 220 volts would have cost $479, or $6,647 in 2016, 25% less than a complete F5 ($460 + $168 for two 220-volt rheostats), which seems to have been discontinued by 1928.

Although the F3 was still available in 1928, it was reduced to $460 in advertisements in the 2 June issue of *Motion Picture News* and the 9 June issue of the *Better Theatres* section of *Exhibitors Herald and Moving Picture World*. Even the F6 was slightly reduced in price in an advertisement in the 14 April issue of the same section of *Exhibitors Herald and Moving Picture World*. The reason was surely because the company had developed a totally new projector, and it was just about to appear.

A New Projector

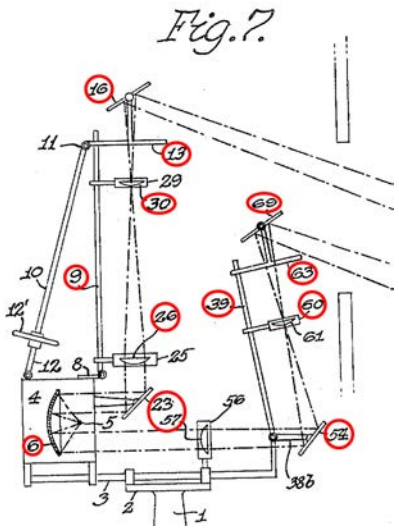
The new projector seems to have gone through several stages of conception. In April 1927, J. H. Kurlander, head of the Brenkert engineering department, presented a paper on "Effect Lighting in Theatres" to the Society of Motion Picture Engineers; the fullest version of this was subsequently published in the August 1927 issue of the *Transactions of the Society of Motion Picture Engineers* (vol. 11, no. 30, pp. 188–207) and somewhat abbreviated versions were published in three parts in the 10, 17, and 24 June 1927 issues of *Motion Picture News* (pp. 2306–7; 2384, 2386; and 2470, 2472) and in the February 1928 issue of *The Motion Picture Projectionist* (pp. 9–14 and 32). The ideal projectors illustrated are the F3 and a version with three units instead of the usual two, although no mention is made of its model or manufacturer. The only new model described is a single high-intensity projector mounted on the same movable base employed by the F3, now

equipped with holders for a variety of framing shutters and slides and with lenses of various focal lengths that can be pivoted into position for the desired effect.

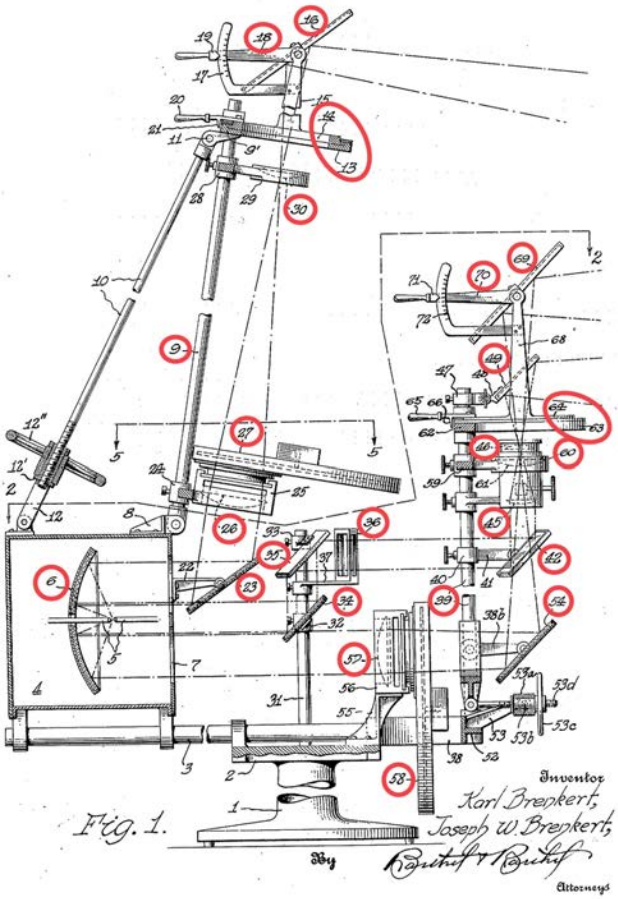
Nothing seems to have come of this new model, and at the very same time as Kurlander was speaking to the Society of Motion Picture Engineers, the Brenkert Company was filing a patent (US 1,857,135: filed 25 April 1927; granted May 1932) for a machine that could project both lantern slides and motorized effects simultaneously with the single basic lamp house employed in the F6 and a set of four reflecting mirrors. Examples of machines in which the light was reflected by mirrors to the desired location rather than projected directly already appear in Bausch & Lomb’s 1917 catalogue, and the Brenkerts must have been quite familiar with this type of projection and the underlying optics. Their patent specifically addresses some of the limitations of the F3, but it does not seem very fully developed. In any case, a year later, the Brenkert Company filed a new patent (US 1,738,942: filed 9 April 1928; granted December 1929) for a machine that could project as many as two lantern slides and two motorized effects simultaneously with, once again, the single basic lamp house employed in the F6 but now with an elaborate series of mirrors. This new machine goes far beyond anything suggested in the Bausch & Lomb catalogue and is also a significant development of the earlier patent. In the words of the patent, it would be a projector

> whereby it will be possible to project stereopticons and effects, separately or simultaneously from a single source of light. This source is of the same amperage as each of the lamps in a two unit machine, but the initial reflector at the source is made of such size and curvature that it throws an original beam which may be divided into at least four parts which are finally transmitted to projecting reflectors directed towards the screen or stage.

The ingenious design represented by the diagrams and description suggests that the Brenkerts initially envisioned their new projector as an adaptation of the F6, in which the light of a single arc was separated into multiple beams, rather than the F3 or F5 with their two separate lamp houses. In this new conception, the single arc would be separated into four beams, two for motorized effects and two for lantern slides. These beams would be reflected by a series of adjustable mirrors so that the images could be superimposed or not, as desired, and projected to any location at the front of the theatre, subject only to the limitations imposed by the port in the projection booth.



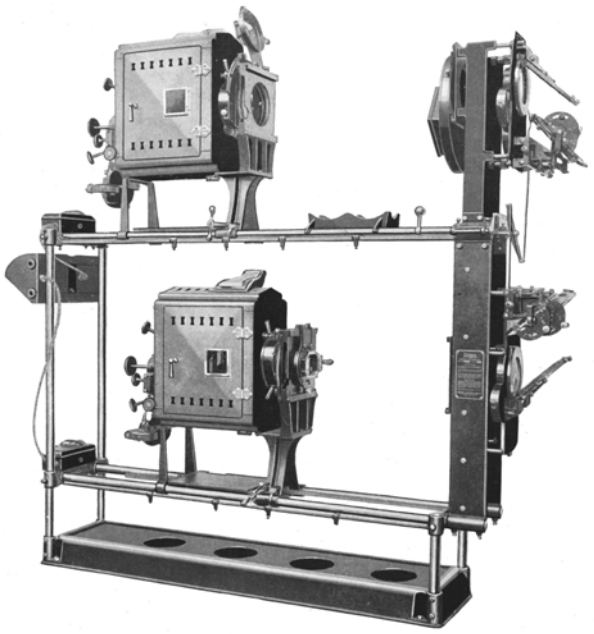
The patent provides more than the usual number of detailed mechanical drawings to illustrate the complicated machine. Figures 1 (below) and 7 (left) show the light provided by the arc separated by the parabolic mirror (6) into four beams. The upper and lower beams are reflected by mirrors (23 and 54) through condenser lenses (26 and 57), motorized effects (27 and 58), and focus lenses (30 and 60). From there, they are further reflected by second mirrors (16 and 69) out through the projection port after passing through rings (13/14 and 63/64), which enable the mirrors to be horizontally rotated. These mirrors can also be vertically adjusted by arms (18 and 70) and by adjusting the angle of their supporting posts (9



and 39). In addition, two further beams of light are produced by the parabolic mirror (6) to the left and right, and these are reflected by two pairs of mirrors (34 and 35; only one pair can be seen in the figure) through two slide holders (36), reflected again by two additional mirrors (42) through a pair of condenser and focus lenses (45 and 46), and finally reflected out through the projection port by another pair of mirrors (49).

It does not appear that this machine was ever manufactured, and if a prototype was constructed, it was probably discovered that the single arc could not provide enough light to effectively project four separate images over the increasingly long distance from the projection booth to the screen as the theatres became ever larger from the mid-1920s to the early 1930s. In addition, the mechanism is complicated and impractical, and it does not provide a system for cross-fading or moving from one lantern slide to another as was required by the ever longer and more complicated sets of slides that were being issued for use in sing-alongs and other musical parts of the theatre's program, of which the motion picture itself formed only a part. Nevertheless, the company retained the idea of reflected rather than directly projected light, and by mid-1928 the concept had evolved, and the new projector had been manufactured as the F7 Master Brenograph.

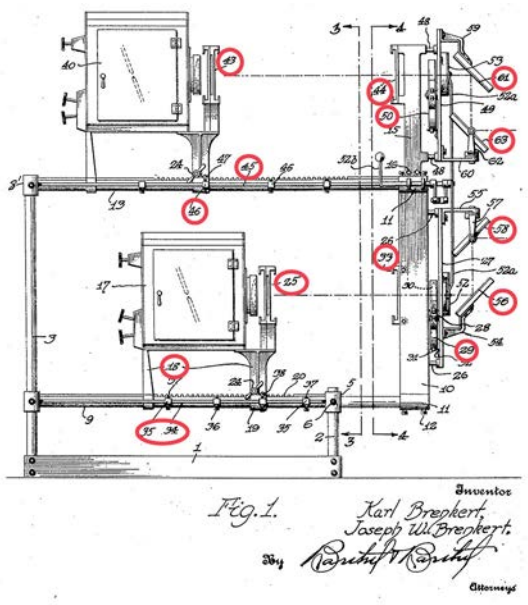
As it turned out, the F7 was not based on the experimental model of a single lamp house with an elaborate reflecting mechanism but rather the earlier design of the F2 with a projector of two lamp houses sitting in a stationary position parallel to the floor. Unlike the F2 and F3 with their direct projection and various other limitations, the F7 would use reflected images so that the light from each lamp house could be independently projected anywhere in the theatre, subject of course to the limitations imposed by the projection booth's port. According to a short article on the new projector appearing in the 14 July 1928 issue of *Motion Picture News* (p. 106), the reflecting mirrors could project 16° above horizontal, 40° below horizontal, and 26° to the left or right of the machine. This meant that one lamp house could project light on the ceiling, the organist, the proscenium, or anywhere else while the other lamp house could project its light towards a completely different part of the theatre; one lamp house could project a narrowly focused spotlight while the other projected a broad motorized effect covering the entire front of



the theatre; one lamp house could project a series of sing-along slides on the screen, easily changing from one to the next, while the other projected twinkling stars or moving clouds on the ceiling; the two lamp houses could be used together to project a series of slides in which one cross-faded to the next, either in the same location or in different locations; and so on. The possibilities were limited primarily by the projectionist’s imagination. Some of these combinations could be produced with the earlier models, but all of them had to be projected to the same location because the two lamp houses were fixed together and their light was projected directly. With the F7, projections from the lamp houses were completely independent.

The F7 Master Brenograph: Patents

The F7 is not fully described in any of the three patents filed on 1 November 1928, a few months after the projector was already in production and on the market: US 1,722,976 (granted 30 July 1929); 1,738,944 (granted 10 December 1929); 1,738,945 (granted 10 December 1929). In fact, the only patent that actually appears on the projector itself is US 1,613,078 (filed April 1924; granted January 1927), the patent for the arc burner, which had been used for years in the company’s other projectors and spot and flood lamps. The name plate for the projector simply lists “other patents pending.”



The first patent granted (US 1,722,976) is primarily devoted to the framework on which the lamp houses sit, the way in which they—rather than the focus lenses—move to adjust the focus, and the general concept of reflected light. Figures 1 and 3–5 illustrate the mechanism. The two lamp houses are mounted on bases (18) that are driven by a rack-and-pinion arrangement along horizontal rods made of heavy steel to pre-set points matching the focal lengths of four lenses mounted at the front of the machine in a rotatable turret (29 and 50). The focal points are indicated by four little indicators (35 and 46) on a pair of thin rods (34 and 45) parallel to the rods on which the lamp houses move;

these indicators can be moved to the proper location and locked in place. Thus, when the desired lens is selected, the projectionist need only drive the lamp house to the appropriate place and the device will be in perfect focus. Light from the lamp houses passes through the rear holders (25 and 43) into which can be placed a variety of shutters, masks, and effects. From there, it travels through the front holders (33 and 44) and any one of four focus lenses (30 and 51) and is reflected at right angles by stationary mirrors (56 and 61) and then out through the port of the projection booth by a second pair of mirrors (58 and 63) at an angle previously adjusted to cast the light at a desired location.

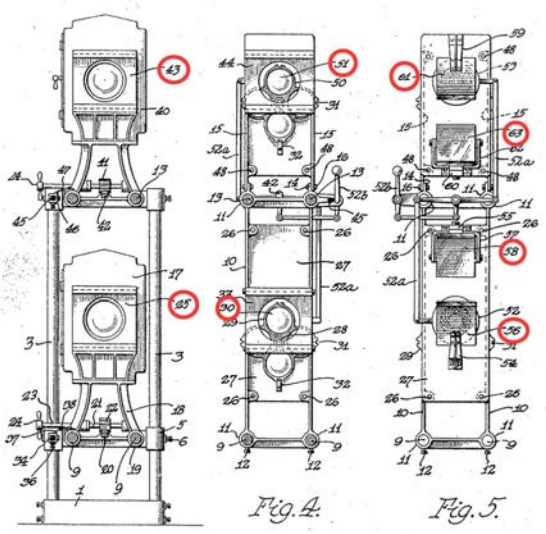


Fig.3. Fig.4. Fig.5.

In this arrangement, the new projector would have had at least one of the same limitations as the earlier projectors: although the vertical position of the light could be independently adjusted for each projector, both of them would still have to project in the same horizontal plane. Nor does the patent make any mention of lantern slides: the rear holders (25 and 43) are shown with three slots, but apparently these were intended to receive only "rotary scenic effects, framing shutters, color screens or other modifying devices." These limitations were expressly addressed in the next patent, which makes it clear that the two of them were intended to be read together: "The operation and utility of this arrangement [i.e., movement of the lamp houses to pre-set positions matching the focal lengths of the lenses] are fully described in our copending application of even date."

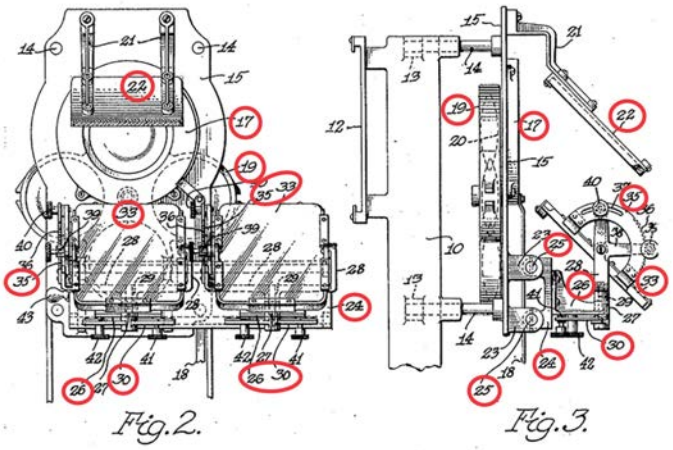
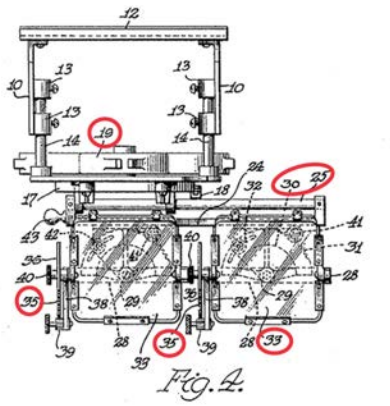
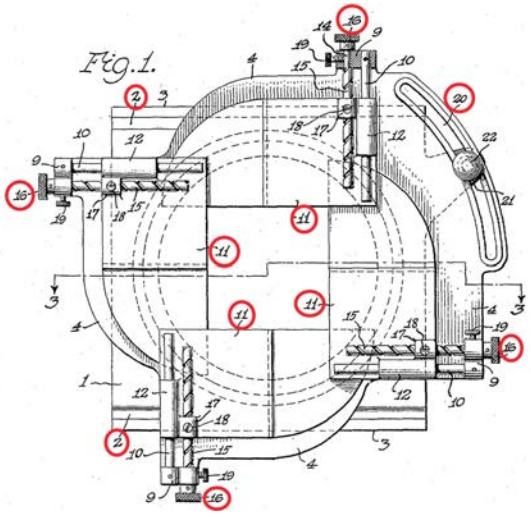


Fig.2. Fig.3.

The second patent (US 1,738,944) was devoted primarily to the front part of the machine. Figure 1 in this patent is almost the same as the corresponding figure in the first patent, but the subsequent figures show significant modifications to the reflecting mirrors. Figure 2 shows the front of the projector with the four-lens turret (19; shown in the background), the upper stationary reflecting mirror (22), a dissolving iris shutter (17), and a pair of mirrors (33) to reflect the light from the stationary mirror (22) through the projection port and out into the theatre. As shown in figures 3 and 4, these mirrors (33) can be rotated up and down as



well as right and left on two semicircular brackets (30 and 35) and then locked into position to reflect the light anywhere in the theatre. The pair of mirrors is mounted on a base (24 and 26) that slides along two rods (25), enabling the projectionist to quickly change the position of the reflected light simply by sliding the mechanism left or right to bring one or the other mirror into the beam reflected from the upper stationary mirror. Although the initial positions would be set, the patent also envisions the projectionist changing the setting of one mirror while the other is in use: “only one projecting reflector at a time can occupy an operative position in the beam of light, and while one projecting reflector occupies such operative position, the other may be set for a future condition in the program.” Because the same mechanism is employed for both the upper and lower lamp house, the projectionist can pre-set four different and completely independent locations for the two beams of light from the lamp houses and can independently change the focal length of the two beams by selecting any one of the four focus lenses in each turret and moving the respective lamp house forward or backward with the rack-and-pinion drive to the pre-set focus position, as described in the previous patent. In theory, if the two turrets had lenses of the same four focal lengths, the projectionist could pre-set sixty-four possible combinations of position and focus for the two beams of light, although in practice the combinations would normally be set for projecting and cross-fading lantern slides with the dissolving iris shutters, projecting a combination of motorized effects or an effect together with a lantern slide (or slides), or using one beam to project something and the other for a spotlight on the organist or some other feature on the stage.



The third patent, US 1,738,945, pertains to a new type of framing shutter intended for use on the new projector. The framing shutters used on the earlier models F, as described above (p. 15) for the F3, were simply vertical and horizontal shades, adjustable in pairs. Depending on the adjustment, the beam could be masked into various sizes of squares and vertical or horizontal rectangles. In every case, the masking would be around a fixed center, and because the framing shutter was fixed to the apparatus that held the lantern slides or other effects, the frame could not be readily changed once it was set. In the new shutter, each shade (11) was independently adjustable with thumbscrews (16); the entire shutter assembly could be rotated up to 45° (along slot 20) on its base (2), allowing both for slight corrections to insure that the beam of light appeared absolutely square in the theatre and for shapes other than squares and rectangles; and because the shutter was not

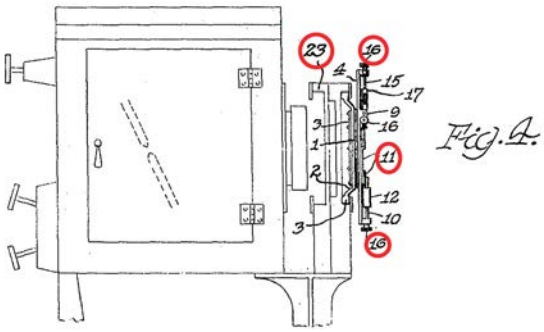


Fig. 4.

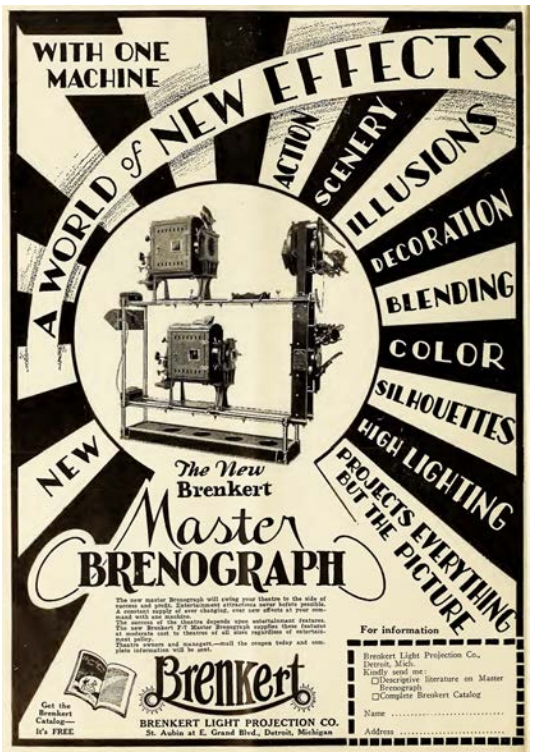
attached to the projector but rather slid in and out of one of the slots in the holders (25 and 43 shown in the figures for the first patent [p. 24 above]; 23 in figure 4 here) that stand just in front of the lamp houses, multiple framing shutters could be set ahead of time and then slipped in and out of the projector as needed. Although figure 4 shows the shutter in the front slot of the holder, it would normally be placed in the rear slot. The center slot was intended for special masking slides made of glass, but this is not described in the patent.

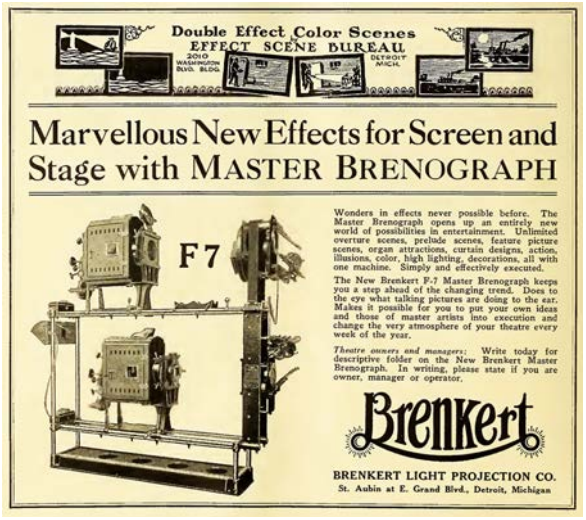
None of the patents mentions the presence of the lantern slide carrier hinged to the top of the rear holder (23) fixed just in front of each lamp house, probably because this feature was simply carried over from the F3. It was an essential feature of the F7, however, because the projectionist did not have to retrieve it from the floor or somewhere else in the booth and then slide it into one of the slots of the fixed holder (23), unlike all the other framing devices or effects. It can be seen in the illustration of the full machine (p. 24 above), swung up and out of the way on the upper projector and down and in position for use on the lower projector.

The Master Brenograph Makes Its Debut

The F7 Master Brenograph was exhibited for the first time at the 29th Annual Convention of the International Alliance of Theatrical Stage Employees and Motion Picture Machine Operators (IATSE & MPMO) held in Detroit in June 1928. Boone Mancall, the editor of *The Motion Picture Projectionist*, offered a review of the convention on p. 7 of the June issue and weighed in again with his evaluation on p. 12. Further "Convention Thoughts" were offered on p. 26, including reference to Brenkert's "new effect projector" and the observation "who will forget the party Brenkert threw at their factory," which followed a prize fight, according to a review of the convention in the 16 June issue of *Motion Picture News* (p. 2048).

The Brenkert Company heavily promoted the F7 with a series of four basic advertisements to complement an article on the new projector appearing in the 14 July 1928 issue of *Motion Picture News* (p. 106) and a longer article by the company's chief engineer, J. H. Kurlander, in the July issue of *The Motion Picture Projectionist* (pp. 7–8 and 32), which was basically reprinted (without his byline) in the 7 July issue of the *Better Theatres* section of *Exhibitors Herald and Moving Picture World* (pp. 45–46). By concentrating on these three magazines, the company was sure to reach the three key figures who had to be persuaded to purchase the new projector: owners, managers, and projectionists.





One or more of these four basic advertisements appeared in several issues of the *Exhibitors Herald and Moving Picture World* and every issue of *The Motion Picture Projectionist* from July through December 1928 and again in the January 1929 issue to coincide with the appearance of the Master Brenograph, together with a variety of attachments, for the first time in Brenkert's Catalogue 26 (January 1929).

The "New Brenkert F7 Master Brenograph for Every Size and Type of Theatre" occupies nine pages of Catalogue 26, more space than any single piece of equipment had warranted in any previous catalogue. The projector was presented, first and foremost, as an effects projector designed not just for stage presentations but also "as a setting for the motion picture," which is compared to "a precious jewel" that needs to be "expertly mounted in a proper setting [so that] its sparkling beauty is revealed to fascinate all." The catalogue continues (p. 5):

> Effect lighting is to the picture what the mounting is to the precious stone; a setting which weaves the spell of enchantment throughout the entire program, bringing forth beautiful color effects to stir the senses of all and scenic effects to assist the illusion of realism created by the motion picture.
>
> What a wealth of ideas are available. No need for duplication as one suggests another. An ever [*sic*] ending variety of the most entrancing lighting effects with every color and shade of the rainbow and every natural effect that can be photographed are obtained with the Master Brenograph which was especially created to enable every exhibitor to achieve enhancing, beautifying and alluring results for his theatre.
>
> The projection of effects is not confined to the stage because the Master Brenograph is so flexible in operation that both of its powerful beams can be instantly trained to cover any object or surface within view of the projection room.
>
> With the Master Brenograph moving and blending color lighting effects are projected in any shape or size with any light intensity desired on to the screen, stage curtains, stage settings, organ console, orchestra pit, proscenium arch or side walls of the auditorium. While moving pictures are being shown [it] will color light with dissolving colors the proscenim [*sic*] arch, the border of the picture screen or parts of the auditorium side walls, the titles of the feature picture or project stationary scenes onto a screen covering the entire stage opening while slides or short moving picture subjects are being shown or during organ or orchestral music, (either with or without such animated effects as moving clouds, running water, etc., projected onto the scene). Will floodlight any part of the stage or project perfect dissolving slides.
>
> The Brenkert Master Brenograph is the result of our eight years' experience in building and using long distance projectors in theatres of all sizes with varied forms of entertainment and has required two years' constant work of Brenkert engineers to develop to its high state of perfection in combining the greatest flexibility of operation of every imaginable kind of scenic and color lighting effect of the present and those appearing on the horizon of the future.
>
> For the small theatre with a limited amount of money to spend, the Master Brenograph is invaluable as it combines within a single equipment the functions of an unequaled effect projector, a spot and flood lamp, and a perfect dissolving slide projector.

Lamp House Assembly Showing Automatic Arc Control, Light Dowser, Lamphouse Ventilator

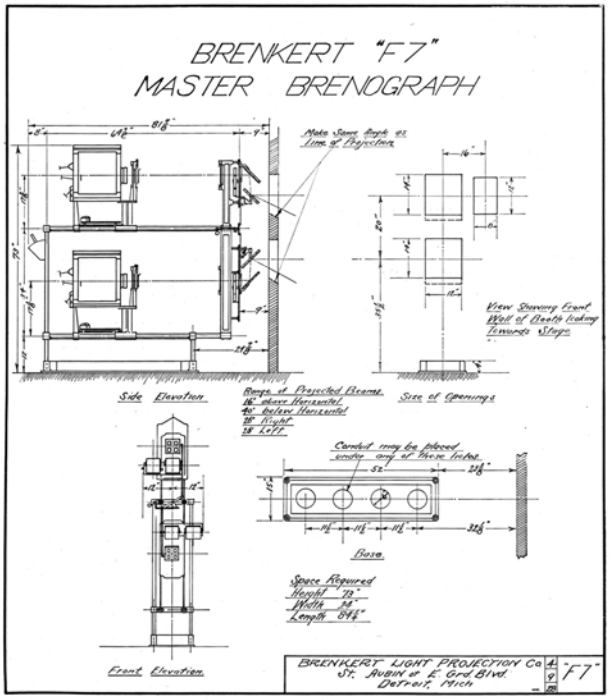
Iris Dissolving Shutter and Pre-set Projection Mirrors

Large Diameter Projection Lens Assembly

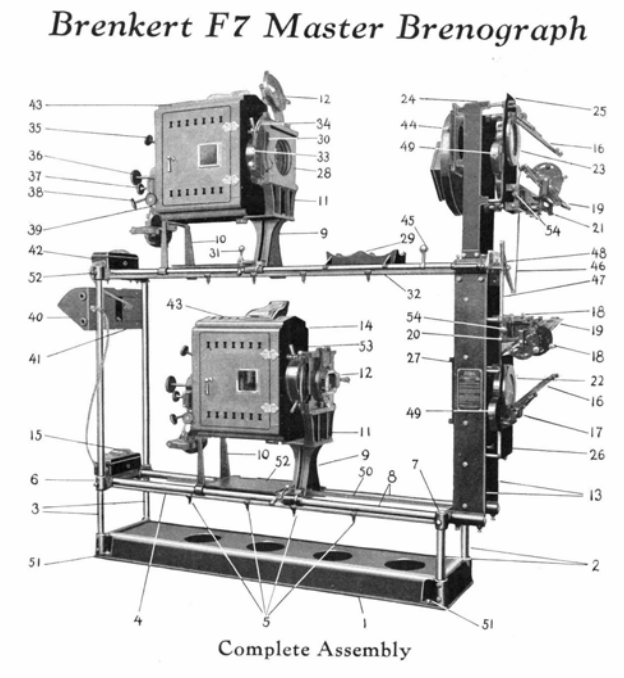
Standard Slide Carrier and Effect-Holder Assembly

Now thoroughly persuaded of the absolute necessity of having this machine in his projection booth, even if the booth might already have an earlier model projector, the owner or manager of the theatre and the projectionist turn to the next page, where they are provided with an overview of the special features: the lamp house, with its patented arc burner and all the knobs to control it, the automatic arc control, and the dowser; the reflecting mirror

assembly with the iris dissolving shutter just behind the upper stationary mirror; the lens turret; and the holder assembly with the hinged lantern slide carrier. The following page lists the projector’s specifications and price ($875; equal to $12,281 in 2016) and promises upon request a free “operating manual” for the projector. Additional accessories are described on the two following pages (pp. 8–9), including glass design slides for projecting patterns of light, glass blanking slides for projecting an aura of light surrounding the motion picture screen or solely on the proscenium arch, additional framing and iris shutters (two of each were included with the projector), a special shutter for projecting light in the shape of a star, extra condensing lenses, reflecting mirrors, lenses of various focal lengths (the projector came with two sets of condensing lenses, six reflecting mirrors, and two lens turrets, each of which held four lenses in 10", 20", 30", and 40" focal lengths), and frames for colored gels. An engineering schematic showing the amount of space required in the booth and the placement and size of the projection ports is given on p. 11, and p. 12 provides a list of the various motorized effects intended for use on the F7.

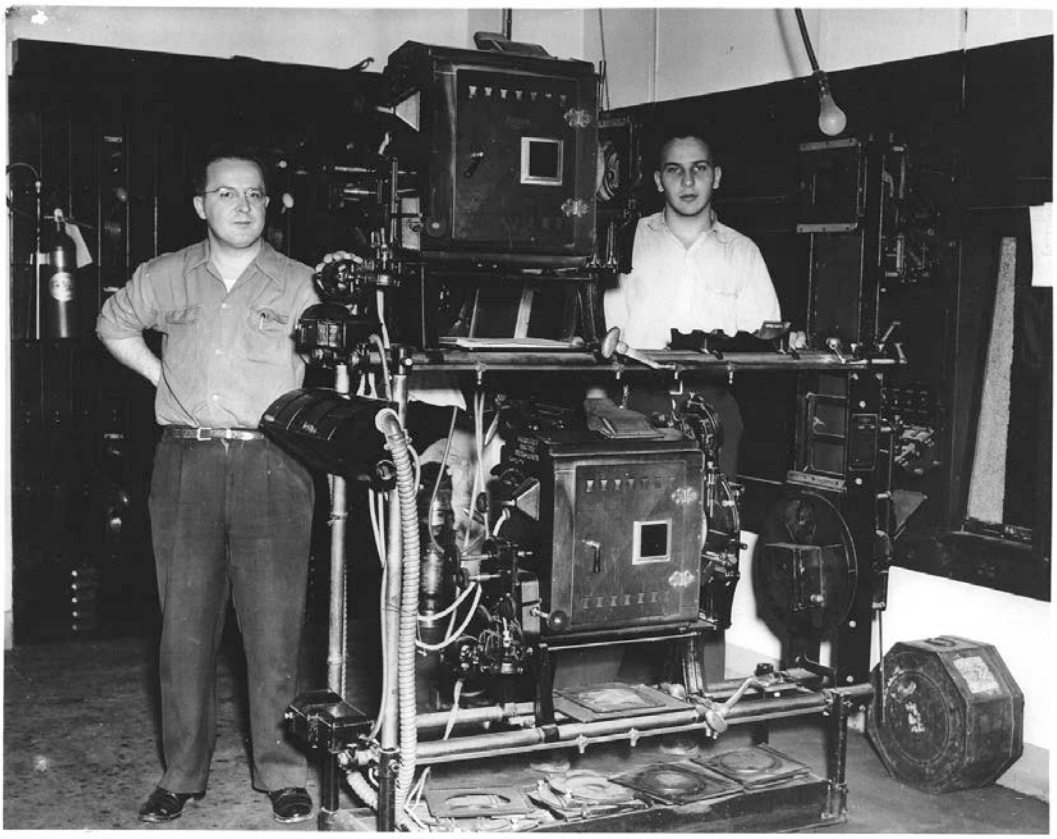


The “free operating manual” was most probably an update of the instruction booklet the company had made available for the F3 (see pp. 17–18 above). In any case, the *Projectionist’s Operating Manual for the Brenkert F7 Master Brenograph* must have been included with the projector as a matter of routine inasmuch as it provides a numbered parts list (pp. 2–3 and 6) and brief instructions (p. 7) for assembling the machine. While this might not have been essential for a skilled projectionist, it would certainly have been helpful.



1. Floor Base.
2. Front vertical support tubes.
3. Rear vertical support tubes.
4. Lower unit pre-set focus rod.
5. Pre-set focus indicators on upper and lower unit.
6. Rear support bracket for lower base tubes.
7. Front support bracket for lower base tubes.
8. Main base tubes for lower unit.
9. Lamp house support front bracket.
10. Lamp house support rear bracket.
11. Main frame, comprised of rear effect holder, mask compartment, and holder for pre-set shutters.
12. Swingout gate and holder for 3 ¼" x 4" lantern slides.
13. Lower front upright support castings.
14. Lower lamp house assembly.
15. Magnetic relay for lower unit arc control.
16. Stationary mirror frame for lower and upper unit.
17. Stationary mirror frame supporting fork.
18. Adjusting knobs for horizontal and vertical adjustment of light directional mirrors.
19. Holder frame for adjustable mirrors on upper and lower units.
20. Sliding bracket for changing pre-set directional mirrors on lower and upper units.
21. Intermediate bracket supporting movable mirror fork.
22. Iris dissolving shutter for lower unit.
23. Iris dissolving shutter for upper unit.
24. Front upright main support castings for upper unit.
25. Main front plate of upper unit supporting lens, mirror and shutter assemblies.
26. Main front plate of lower unit supporting lens, mirror and shutter assemblies.
27. Front effect holder compartment on lower and upper units.
28. Rear effect holder compartment on lower and upper units.
29. Removable slide tray.
30. Compartment for special blanking masks on lower and upper units.
31. Adjusting handle connected to pinion and rack for moving lamp house assembly back and forth to obtain focus.
32. Pre-set focus rod for upper unit.
33. Condensing lens holder on lower and upper units.
34. Compartment for holding pre-set iris and framing shutters.
35. Top carbon back-and-forth-adjustment handle.
36. Arc lamp feed handle.
37. Clutch for engaging arc control.
38. Bottom carbon side-to-side adjustment handle.
39. Handle for moving arc burner back and forth in lamp house.
40. Enclosed knife switch for lower unit.
41. Enclosed knife switch for upper unit.
42. Magnetic relay for upper unit arc control.
43. Lamp house assembly for lower and upper units.
44. Spring-driven color wheel for Blending Colors effect.
45. Operating handle controlling iris dissolving shutters.
46. Connecting rod to upper iris dissolving shutter.
47. Connecting rod to lower iris dissolving shutter.
48. Cross arm actuating lower and upper iris dissolving shutters.
49. Swivel type lens holder for 4 large diameter projection lenses on lower and upper units.
50. Rack for moving lamp house back and forth to obtain a focus.
51. Leveling screws for floor base.
52. Shelf for holding shutters and masks.
53. Dowser shutter handle.
54. Directional mirror push-pull handle.

If the catalogue and various advertisements had their desired effect, an order for the F7 was forthcoming (some of the larger theatres even had two), and before long it would be in place, as shown in this picture of an unidentified projection booth.



The projectionist on the left is resting his hand on the motor of the automatic arc control, with the relay control box just below it and in a corresponding spot at the end of the rods supporting the lower projector. Both projectors are off: the handles on the two switch-boxes at the level of the rear projectionist’s waist are down. With the arcs on, the upper projector is set to project lantern slides (the slide carrier is down), while the lower one will be projecting either a framed spot light or perhaps a glass masking slide or one of the glass design slides (the slide carrier is up, the adjustable framing shutter is in place in the rear slot of the rear holder, and a few glass design slides are in a pile at the front of the base) through a motorized color wheel, which has been placed in the front holder; the front holder for the upper projector is vacant. The cranks to drive the lamp houses for-ward and backward and the pre-set focus indicators for both projectors are clearly visible. Directly opposite the other projectionist’s hand, the little knob that controls the cross-fading iris shutters is visible, as is the projection port at the right edge of the picture.

The Master Brenograph’s Parts and Controls

With the projector assembled, the projectionist might then turn to the manual’s brief description of the working parts on pp. 7–9 (reproduced on p. 31 above): the lamp houses (43), the rear shutter and effect holders (11), and the front assemblies (13 and 24) with the lens turrets (49), iris dissolving shutters (22 and 23) linked by control rods so that as

one closes the other opens (45–48), the stationary reflecting mirrors (16), and the reflecting mirrors and their controls mounted on a sliding assembly (18–21). Also included are descriptions of how to use the four focal lengths available on each projector and the different combinations of carbons manufactured by the National Carbon Company, corresponding to the carbons listed in Table XII (p. 97) of the company's *National Projector Carbons* (1935).

D.C., Low Intensity, Stereopticon and Effect Machines

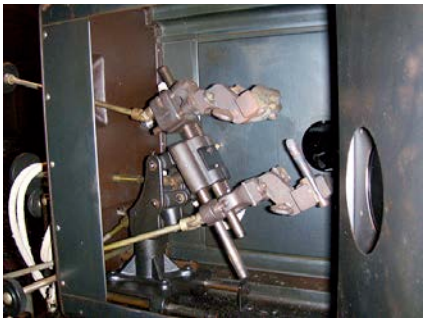
Amps.	*Positive Carbon*	*Negative Carbon*
40-50	5/8″ x 6″ National Cored Projector	5/16″ x 6″ National Orotip Cored Projector
50-55	3/4″ x 6″ National Cored Projector	5/16″ x 6″ National Orotip Cored Projector
55-65	3/4″ x 6″ National Cored Projector	11/32″ x 6″ National Orotip Cored Projector

D.C., High Intensity, Stereopticon and Effect Machines

Amps.	*Positive Carbon*	*Negative Carbon*
60-65	11 mm x 6″ Copper Coated National High Intensity W. F.	5/16″ x 6″ National Orotip Cored Projector

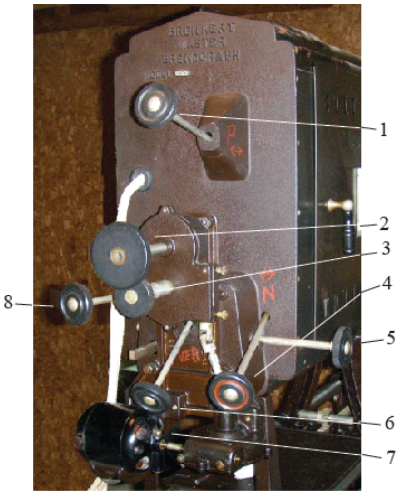
The Arc Burner

The manual does not describe the various controls of the arc burner in the lamp house or installation of the condensing lenses, no doubt because it was assumed every projectionist would already be familiar with these subjects from all of the earlier models F and



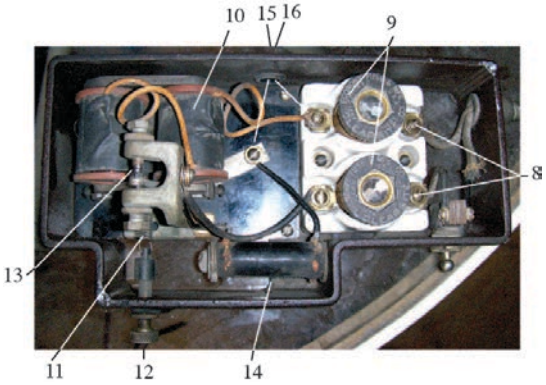
the company's spot and flood lamps, not to mention extensive descriptions of these subjects in the fifth edition of F. H. Richardson's *Handbook of Projection: The Blue Book of Projection*. The first edition of this classic appeared in 1910, and every professional projectionist in the 1920s and 30s would have been conversant with the current edition. Nevertheless, these subjects are no longer familiar to most readers, and they should be reviewed here.

A patent for the burner had been filed in 1924 and granted (US 1,613,078) in January 1927. With its six knobs, the individual position of the upper (positive) and lower (negative) carbons could be very precisely controlled in respect to their front-back (1) and left-right (4) alignment, both of them together could be precisely positioned in respect to their left-right (8) and up-down (6) alignment with the center of the condensing lens, the distance of the arc from the condensing lens could be regulated by moving the entire assembly back and forth in the lamp house (5), and both carbons could be moved together or apart at the same rate (by means of an interlocking gear) to strike and adjust the arc (2). When the arc was properly adjusted, these controls would keep it precisely centered on the condensing lens and produce the maximum amount of light. But without the automatic arc control, as the carbon rods burned down, the arc would eventually go out unless the projectionist constantly monitored the light and slowly turned knob 2 to maintain the proper distance so that the current would continue to arc between the two rods.



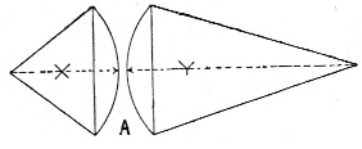
The Automatic Arc Control

The automatic arc control was a particularly important component of the machine because in practical terms two projectionists would be required to operate the projector without it: one to monitor the arc and feed and adjust the carbons as necessary with the company's patented arc burner and the other to run the slides and effects. The control, which was essentially identical to the Peerless Arc Control, solved this problem by adding a motor (7) connected to a pair of gear boxes that would turn the feeder knob (2) if the clutch (3) was locked. The motor was activated by a magnetic relay protected by two fuses (9) and connected across the positive and negative lines (8) that supplied power to the arc. As the carbon rods burned down, the voltage in the lines had to increase in order to maintain the power necessary to create an arc. As the voltage increased, the field produced by the magnets (10) increased until it was sufficiently strong to overcome the power of the little spring (11) holding the contacts (13) open. At this point, the armature was drawn to the magnet, closed the circuit, and sent power to the motor connected at 15 and 16. The motor had been receiving a small amount of power all along through a resistor (14) so that it would start easily and without sparking. As the motor ran, the gear boxes turned the feeder knob and brought the rods closer together. Then, as the arc required less voltage, the magnetic field dropped, the little spring opened the circuit, and the motor stopped. When properly adjusted, the motor would run for only short periods of time, stopping and starting continually, and the movement of the carbon rods would barely be perceptible.



The manual describes (p. 9) the process of adjusting the control (the numbers have been modified to match those used here):

> Before closing projector switch, see that the tightening handle (3) is **loose** so as to disengage the control from the arc feed. Then close projector switch and strike arc by turning handle (2) to the **right.** After the arc is burning **slowly** draw carbons apart and observe whether arc control starts to feed before the arc goes out. If it does not, screw **in** on the knurled adjusting screw (12) located on the left side of the relay box until the arc control functions (while the arc is burning). Then tighten handle (3) and let the control feed the carbons together. Should the carbons feed too close together, screw **out** on the relay control and test again by separating the carbons and again tightening handle (3). Keep testing the arc control after each adjustment of the relay screw until the arc burns steady and maintains a constant arc gap. With both arcs burning, it may be necessary to readjust each relay control to allow for a voltage drop which may occur when the second arc is struck. Do not attempt to adjust arc control until carbons have become heated to working temperature.



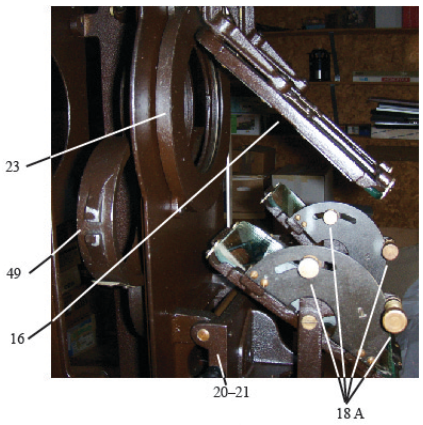
The light produced by the arc was then collected and condensed by two plano-convex lenses included with the projector for each lamp house, sending it through whatever objects were placed in the rear and front effect holders, on through the focus lenses in the turret at the front of the machine, and finally to the screen or elsewhere, depending on the focal length selected in the lens turret and the position

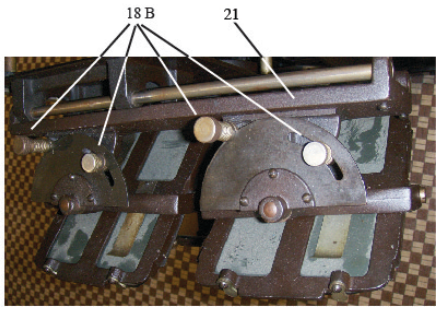
selected by the reflecting mirrors. The lenses were held in place in the condensing lens holder (33 in the complete parts list above [p. 31]) by spring clips, and the holder was attached to the lamp house by placing it on two lugs and turning it clockwise to lock it in place. One of the condensing lenses (more properly the collecting lens) was 5 ½" in diameter; the other (the actual condensing lens) was 6" in diameter. The inside of the condensing lens holder was stepped so that the two were placed with the convex sides facing each other and the flat sides facing outward.

The Mirrors


This box contains one projection mirror
for use on the
BRENKERT
"F7" Master
Brenograph
CAUTION
This mirror is silvered on the front surface and protected with a transparent covering to secure perfect definition and best illumination. The surface should not be touched except to remove dust which should be done with a camel hair brush or absorbent cotton very lightly applied. Chemicals having a tendency to tarnish silver should not be kept near by. Additional mirrors can be purchased at nominal cost or this mirror resilvered by returning, (in this box) to your dealer or to address below. Keep mirror in this box, (do not wrap in paper) when not in use or not on the projector.
Brenkert Light Projection Co.
ENGINEERS AND MANUFACTURERS
DETROIT, MICH., U. S. A.

Beyond cautioning the projectionist not to touch the surface of the mirrors when installing them in their holders, the manual says nothing about the reflecting mirrors used on the F7. These were special front-surface optical mirrors, mirrors silvered on the front of the glass rather than on the back as in conventional mirrors. Back-surface mirrors could not be used because the glass would diffuse the projected light and result in a blurry image. Front-surface mirrors, however, had nothing to protect the reflective surface and required special handling. When the F7 arrived from the factory, each reflecting mirror was in a special box with this explanatory label. Although the label recommends removing the mirrors from the projector when it was not in use, it is rather doubtful that projectionists actually did this: the surfaces were more likely to be damaged by fingers touching them while taking the mirrors in and out of the assembly than by simply leaving them in place. Whatever the precautions, the mirrors certainly tarnished over time, and Catalogue 26 accordingly offered replacements at $8.50 each.





With the mirrors installed in their sliding holders (20–21 in the complete parts list above [p. 31] and here) and the focal lenses in their turrets (49), the entire front assembly was complete, including its lens turrets, dissolving iris shutters (23), cross-fading controls (45–48), and adjustment and locking knobs for vertical (18A) and horizontal (18B) reflection.

The Master Brenograph Projects Everything but the Picture

Now familiar with every aspect of the F7 as a machine, the projectionist could turn his attention to planning the actual projections, and the manual provides numerous suggestions (pp. 11–14), such as:

1. Dissolving slides without disturbing effect settings.
2. Double effect without disturbing lantern slide setting.
3. One or more slides or with a moving effect using projection lenses of different focal length on each system.
4. Colored spots and floods without disturbing effect or slide settings.
5. Colored spot on organist or orchestra leader or flood over entire orchestra together with effect scene on draw curtains across entire stage opening at the same time.
6. Any illuminated effect or picture image completely pre-set so that when the shutter is opened for projection the effect or picture will appear on the screen sharply focused and correctly positioned and will not require further adjusting.
7. Effects can be projected side by side, one above the other, one registered perfectly on top of the other, or one on each side of the stage.

These are further grouped as (1) spot and floodlighting in colors, stationary or moving; (2) animated scenic effects; (3) still scenic effects; (4) blending colors; and (5) song slides with or without silhouettes, scenes, etc.; and the manual provides “a partial list of the specific effects comprising each group with instructions for making the settings.”

Brenograph Slides: Brenkert

Any projectionist of the time would have been quite familiar with the 3.25" x 4" song slides of Group 5 that had been used for sing-alongs in motion picture theatres for many years, but he would probably not have been familiar with the pairs of slides the company was promoting for its new projector in Group 3: slides intended to create elaborate scenes and even approximate a stereoscopic view. These were described on p. 10 of Catalogue 26, followed by a stock list:

We produce these slides from special drawings which we are prepared to make on short notice. They are used, as explained in the F7 Master Brenograph operating manual, as a prelude to the feature picture, as still scenes during musical numbers or as curtain designs.

Three different types are illustrated and several are listed which we have in stock for immediate delivery. These slides are also obtainable from other sources, information and list of which will be given on application. Special positive and negative slides of subject matter to suit individual taste can easily be produced by a local artist and photographer as is already being done in many sections of the country.

The price of the slides as listed herein is $6.00 per set of two slides. Two slides are always necessary to obtain the effect produced by a positive and a negative projected one on top of the other. …

Cat. No. LIST OF POSITIVE AND NEGATIVE SLIDES (In stock)
PN 1. Western scene.
PN 2. Castle and river scene.
PN 3. Capitol Building, Washington, D. C.
PN 4. Pawn shop street scene.
PN 5. Flying geese scene.
PN 6. Sailing vessel on ocean with moon in background.
PN 7. Gypsy scene. (Successfully used with feature picture “Revenge”).
PN 8. Night scene with boy and girl on veranda (Successfully used with feature “Cardboard Lover”).
PN 9. Portrait Norma Talmage with changing colored shawl.
PN 10. Night river scene with stars and moon.
PN 11. Hawaiian beach scene.
PN 12. Street scene with vision of dancing girl. (Successfully used with feature picture “Street Angel”)

PN 13. Indoor scene of elderly lady. (Successfully used with feature picture "Mother knows best").
PN 14. Beach scene with bathing girl in foreground. (Successfully used with feature picture "Dawning")
PN 15. Outdoor scene showing statue of liberty with passing steamer and elderly lady on pier. (Successfully used with feature picture "Four Sons").
[PN 16 is omitted for some reason]
PN 17. Night scene with lonely man in foreground and two lovers in background (Successfully used with feature picture "Lonesome").
PN 18. Southern plantation scene. (Successfully used with feature picture "Uncle Tom's Cabin").
While several of the above have been used as a prelude to a feature picture the scene depicted is sufficiently broad to permit their successful use without particular reference to any certain feature.

Stereoscopic photographs and the hand-held viewer invented by Oliver Wendell Holmes in 1861 were a popular form of home amusement until well into the twentieth century, when experiments were being made with stereoscopic motion pictures, as reported for example in the *Transactions of the Society of Motion Picture Engineers* no. 17 (1923), pp. 149–53, and discussed in James Cameron's *Motion Picture Projection*, 4th ed., pp. 1055–59, and more recently in Ray Zone's *Stereoscopic Cinema and the Origins of 3-D Film, 1838–1952*. Nevertheless, there seems to be no evidence of attempts to project stereoscopic still images as a theatrical effect with any of the earlier lantern slide and effects projectors, even though they were commonly known as stereopticons. But in fact, a "stereopticon" was simply taken to mean a slide (or later, filmstrip) projector, and the term was regularly applied to single, double, or triple projectors. The fourth edition of F. H. Richardson's *Handbook of Projection for Theatre Managers and Motion Picture Projectionists* defines the stereopticon as "a light source and optical train, together with the necessary housing and mechanism for holding and adjusting the lenses, for the projection of still pictures (transparencies) to a screen" (p. 45) and devotes fifteen pages (pp. 800–814) to a discussion of its use without any mention of the possibility of projecting stereoscopic images. Two years later, the *Transactions of the Society of Motion Picture Engineers* no. 18 (May 1924), pp. 245 and 260, reported that the membership had accepted the recommendations of the "Standards and Nomenclature Committee" for the definition of a stereopticon as "an apparatus for optically projecting transparent still pictures" and that "any reference to single or dissolving lanterns be eliminated from the nomenclature." Richardson repeated his discussion of the stereopticon in the fifth edition (1927) of his *Handbook* and added a discussion of the model F3 (vol. 2, pp. 945–52), which he described as a "combination color effect projector," but still with no mention of projecting stereoscopic images.

Whatever prompted the Brenkert Company to develop this special line of slides for the Master Brenograph, they became a particularly important feature in marketing the projector. The *Operating Manual* (p. 14) elaborates on their purpose:

> These slides are made by us from special drawings of scenes alluding to the feature motion picture and are projected just previous to it's [*sic*] showing. In ordering specify for which feature picture desired. They are also made in a number of miscellaneous scenes which are used with great success during musical numbers of organ, orchestra, synchronous or non-synchronous music. Effect produced is in relief and has some characteristic of the third dimension. Any projectionist by the use of these slides can produce these unusually beautiful scene effects in every shade or tone of colors which will satisfy the most critical in large or small theatres. Special curtain designs to suit

individual requirements are produced in this effect and any first class photographer in your locality can produce the slides.

The method for projecting the slides is described on p. 12, under Group 3:

Instructions for Setting

Choose projection lens of proper focal length generally from 12" to 20" so that image of slide carrier will cover width of stage draw curtains between the drapes. Place positive effect slide to be projected first in TOP slide carrier and focus this scene sharply on draw curtains. Then insert gelatine color frame No. 61 of light blue, light green, or light blue-green in rear shutter holder (34). Lock directional mirror tightly in position. Place second scene in bottom slide carrier, remove first slide from screen, and focus second negative slide sharply on screen. Place light red, light orange, or straw color gelatine frame in rear shutter holder. Then project both slides to screen at the same time and if second slide does not perfectly match first slide, adjust directional mirror on bottom system until they do.

Method of Projecting Several Different Sets of
Positive and Negative Slides in Sequence

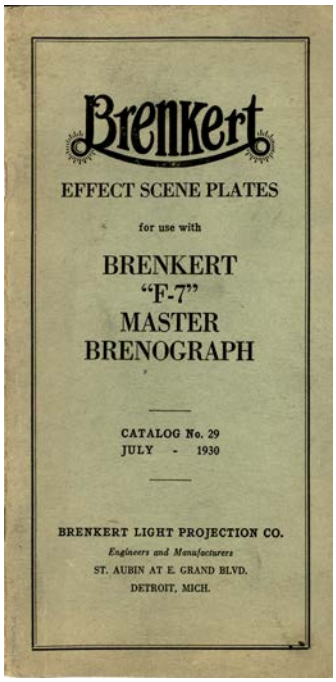
To operate, dissolve negative slide on slowly using front iris shutter (23). Allow effect to remain on screen for about one minute, then with iris connecting rod (47) disengaged, slowly dissolve positive slide on top of first and allow combined effect to stand. To remove, dissolve both slides off at same time.

By dissolving back and forth, various colors can be inserted to project the same effect in a variety of colors so as to make the effect require more time.

How to Use Still Scenic Effects

(a) Positive and negative slide scenes for curtain designs.
(b) Positive and negative slide scenes for feature pictures.
(c) Positive and negative slide scenes for preludes.
(d) Positive and negative slide scenes for Orchestra, organ or non-synchronous music.
(e) Single Slide scenes for preludes and curtain designs.
(f) Single slide scenes as a background when running short motion picture subjects on a large or magnascope screen (center blanking mask No. 65 must be used).

Catalogue 26 offers only eighteen pairs of slides, but in that same year, the company issued Catalogue 27 (1929), *Brenkert Scenic and Color Effects for Use with Brenkert “F-7” Master Brenograph* with many additional designs, and a year later, Catalogue 29 (July 1930), *Brenkert Effect Scene Plates for Use with Brenkert “F-7” Master Brenograph*, which advertised 104 pairs (including both scenic and framing designs) as well as 12 individual scenes and 12 individual framing slides. Now that “talking pictures” were in vogue, Catalogue 29 also offered some background on their previous use and proposed further applications:



Effect Lighting, as it is now known and practiced in theatres, was pioneered by the Brenkert Light Projection Company who early recognized its entertainment value and created a special projector for the sole purpose of projecting a wide variety of distinctive lighting effects with but little effort.

While effect lighting was widely used prior to the introduction of talking pictures, it remained for this new form of entertainment to

reveal the extensive possibilities of lighting effects to provide a relieving break in the picture program, which diversion here-to-fore, had been obtained through the means of organ renditions, orchestral selections, stage presentations and the like.

A comparatively recent extension of the effect lighting art; Viz., the positive and negative EFFECT SCENE PLATES, gives beautiful results which can be applied in a variety of ways. These effect scenes can be used either alone or in combination with song slides, special short motion picture subjects, feature pictures, or animated scenic effects.

Prologues can be devised for feature presentations, or a special effect program can be planned as a separate unit of the main program. Whenever two, or more separate and unrelated picture subjects are to be joined to form a continuous program, effects are the logical means for bridging the gap between subjects and forming a smooth continuity which is free from harsh contrast and sudden readjustments of emotions.

The slides were now available in two sizes: the traditional 3.25" x 4" lantern slide and a new large-format 4" x 5". Catalogue 29 explains that the larger size is preferable because it "permits using longer focus lenses, resulting in better definition, and also produces brighter screen results without increasing the heat intensity on the plate." In order to accommodate this larger size, however, the projector needed a larger slide holder. This became part of the standard equipment on "The Improved Brenkert F7 Master Brenograph" (see pp. 51–54 below), but it must have already been available by late 1928 because it is shown in the first of the four advertisements reproduced on p. 28 above.

Whatever size was selected, each slide was sent in an individual protective envelope, but very few of the slides and even fewer envelopes seem to have survived. The slide collections at the Embassy Theatre, Fort Wayne, IN, contain sixteen of these, including five pairs (one with both a hand-colored and an uncolored pair), four without their pair, one framing slide, and fourteen original envelopes (the catalogues are viewable from links on fwembassytheatre.org/about-us/historic-brenograph/).

In general, Brenkert scene plate designs were fairly sedate and often featured a single figure, a couple, a landscape, or a familiar patriotic image. Designs 63 and 40 are quite typical of the scenic effects, and design 40 is also an example of a hand-colored slide (the slides were normally issued as black-and-white positives and negatives).

Design 63-A

Design 63-B

Design 40-A

Design 101-B

Design 101 is an example of a typical framing slide. These were intended to be used together with a set of song slides, which would be projected into the central medallion as is described on p. 13 in the *Operating Manual* under Group 5 (see p. 36 above). If the framing slide was used in conjunction with a motorized color wheel, the audience would see a frame of shifting colors as the song lyrics progressed.

Brenograph Slides: Maurice Workstel and Harry Rubin

Brenkert was not the only company producing scenic effect slides: they were also produced in the standard lantern-slide format by the Bond Slide Company, C. D. MacGregor (in Canada), Kansas City Slide Company, Quality Slide Company, Ransley Studios, and Maurice Workstel. All these companies produced a wide range of images, most of them in color rather than black and white. As described in the introduction to *A Catalogue of Brenograph and Lantern Slides at the Embassy Theatre, Fort Wayne, Indiana* (the numbers in parentheses are the catalogue numbers):

> The backgrounds and Brenograph effects slides could have been used for many different purposes; they represent a wide range of images, such as an American Flag, Christmas scenes, musical notes, Mother’s Day, Easter, Valentine’s Day, outdoor scenes, and so on. Some of them are frames (e.g., B12, 33–34, and 47, as well as most of the Brenograph slides) over which an additional slide could be projected…. These two groups of slides exhibit some of the most appealing and beautiful images and also demonstrate the different shapes of the 3.25"x4" lantern … and 5"x4" Brenograph … slides ….

Of all the companies, the Maurice Workstel Company was by far the most prolific manufacturer of scenic effect slides and apparently the only one other than Brenkert to produce both lantern-slide format and the large-format scenic effect slides for the F7 that came to be commonly known as “Brenograph slides.”

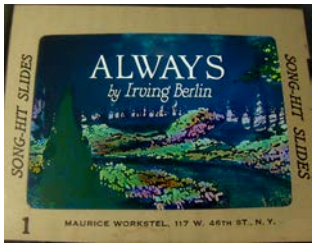
Maurice Workstel was born ca. 1895, came to the United States in 1906, and by 1920 had established himself as a commercial artist specializing in hand lettering. In 1923, the issue of *Film Daily* for 29 July reported (p. 11) that he, Howard Turrill, and George B. Williams had “taken over the Old Masters Studio, formerly devoted to advertising and fashion photography.” According to a fuller story that appeared in *Motion Picture News* (18 August 1923), p. 810:

> Howard Turrill, who has long been identified with the motion picture business and has recently been engaged in the production of art titles, has formed, in association with Maurice Workstel, the well known artist, and George B. Williams, banker, a new corporation which has purchased the Old Masters’ Studio in the Wurlitzer Building, at 120 West 42d street.

> The Old Masters' Studio will be operated by the new corporation under its present name, but instead of being devoted entirely to advertising and fashion photography, for which it has established a high reputation in advertising and art circles, will specialize in art titles for motion pictures. The departments devoted to advertising and fashion photography will be continued, however.

This must have been a press release from the new company because a slightly abbreviated version of the same story also appeared in *Exhibitors Trade Review* (11 August 1923), p. 470. By 1924, the name of the company had been changed to Maurice Workstel, where according to the advertisement on p. 2 of *Film Daily* (21 November 1924) and other trade journals "the best in hand lettering can be obtained." Later, the company became Workstel Studios.

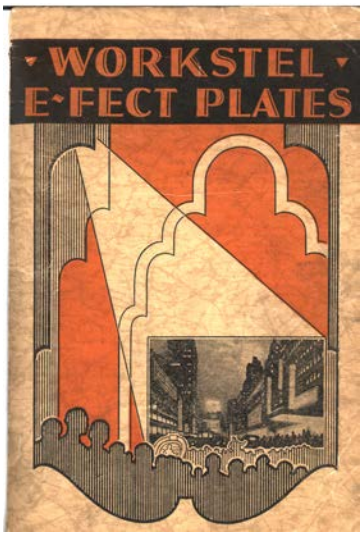
Workstel probably began issuing its "Song-Hit Slides" almost immediately. Some of them are simply text with no background, but others are beautifully illustrated, such as these samples from the series of eight slides for Irving Berlin's *Always*.



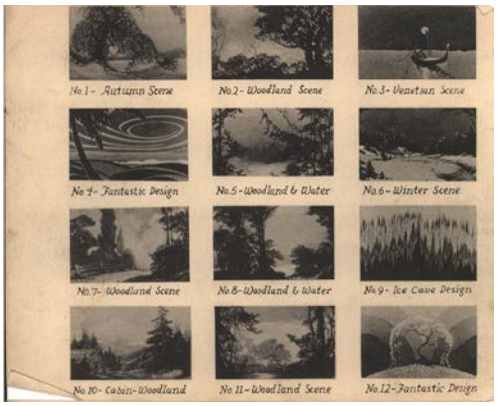
It is not known whether there was any formal agreement between the Brenkert and Workstel companies to produce scenic effect slides for the Brenograph, but almost as soon as the projector appeared, Workstel began to produce them with frames stating "Workstel 'E-FECT' Slides Made Exclusively for Use with Brenograph F-7," and in the April 1929 issue of *The Motion Picture Projectionist* (p. 21), the company advertised that a catalogue of "E-FECT Slides" was in preparation as "Workstel's Contribution to Brenkert's F-7 Success." By May, the catalogue was available, and as its advertisements often appeared on the same page with Brenkert's, it seems probable that the companies were at least collaborating. This full-page spread appeared in the May, June, and July 1929 issues of *The Motion Picture Projectionist*.

By January 1930, Workstel's advertisements in *The Motion Picture Projectionist* (p. 36) were emphasizing that their plates could be used with the F7 and "other types of effect projectors," noting further:

> The growing needs of all types of theatres have already established our slide business on a firm and prosperous basis . . . We are now supplying the leading circuits with all their slides . . . We have slides specially prepared and stocked for all special and ordinary presentations, holiday events, and every type of special effect desired . . .
>
> If we haven't what you want we will make it up at once and ship immediately . . . Order from us and build up your own slide library . . . We cater especially to Projectionists who strive to improve the quality of the show by originating special curtain effects to surround and amplify the entertainment value of the program . . . You can get beautiful effects at slight cost . . . Write us today for further information.
>
> A valuable catalogue will be sent to you immediately if you will write to us.



The reference to Workstel "now supplying the leading circuits" probably reflects an arrangement with Paramount's Publix theatre chain: at some point, the wording on the frames of their Brenograph slides changed to "Workstel 'E-FECT' Slides Created by Harry Rubin for Publix Theatres." Rubin began in the 1910s as a film cutter and technical manager and by the end of the decade had become chief projectionist at several of the most prestigious theatres in New York City, the Rialto, Rivoli, and Criterion. By mid 1925, he was appointed Supervisor of Projection for the Publix circuit, the largest and most prestigious theatre chain of the 1920s, and he was chief projectionist for the flagship New York Paramount Theatre at 43rd Street and Broadway when it opened in 1926. He remained a dominant figure in the profession until well into the 1960s.



The Workstel catalogue was a short pamphlet with instructions for projection, enclosing loose pages, each of which illustrated twelve designs. Additional loose pages must have been added from time to time, and it is impossible to know how many designs were included in the first release. The only known copy of this pamphlet (in the archives of the American Organ Institute at the University of Oklahoma) has one set of eighteen pages and a second—clearly later—set of eight pages, each with six designs. Projectionists probably posted these pages on the wall or the doors of a slide cabinet for ready reference. Even though only 216 designs are included on the first set and 48 more on the second set, close to 300 designs (at least) were released: the highest design number

on any slide in the collection of the Embassy Theatre is 283, but there are several slides without the design-number labels that must be higher than this.

The text of the Workstel catalogue of "E-Fect plates" is worth quoting nearly in full because it goes far beyond the *Operating Manual* in clarifying some of the ways in which the slides were intended to be used on the F7.

> … The E-FECT Plates can be used in two ways. The plates are made up in positive and negative. One way to use the plates is to put both plates on together. The other way is to put either the negative or positive plate on, giving one E-Fect. Then by adding the other plate, another effect will be obtained. It is also possible, in using an E-Fect Plate, to get either a day effect or a night effect simply by employing different color gelatines.
>
> When using E-FECT Plates it is best NEVER to show a blank screen or close in on a blank screen. Therefore it is good practice to fade E-Fect Plates on your front house house [*sic*] curtain slowly and then when the curtains open, the E-Fect is already there on the screen for the audience to see.
>
> When closing in, draw in the curtains and then fade the Plate out slowly. The reason for this is that a blank screen when fading out would destroy the illusion created.
>
> ATMOSPHERIC EFFECTS FOR FEATURES
>
> The procedure for E-FECT Plates is to project the Effect on a Magnascope Screen a few seconds before beginning the film, to register an atmospheric impression on the audience. Then project the picture onto the effect. The E-Fect is generally kept on the big screen until the main titles, credit titles and cast of the film is run off. At the end of the titles, the Magnoscope Screen is drawn down to the small standard size picture and the effect dissolved off the Effect Machine. By leaving the E-FECT Plate on only to this point, you succeed in creating a colorful surrounding or atmosphere to the picture, sufficient enough to create something different and unusual. Beyond this point, the effect would clash with the action in the picture.
>
> ORGAN SOLO WORK
>
> E-FECT Plates are invaluable in organ recitals and presentations. E-FECT Plates are projected on the full magnascope screen, using suitable designs and color combinations, and kept on the screen through the entire recital. Word or letter plates can be superimposed on the effect design with the regular stereopticon. This serves as a colorful background. By changing effects weekly you can always have an interesting variety to give your patrons.
>
> ON CURTAINS AND OVERTURES
>
> E-FECT Plates are also used to produce atmospheric effects on front curtains while musical overtures or prologues are presented. These front curtains, however, must be constructed of material that will take projection.
>
> COLORS
>
> The enclosed selection of plates are accompanied by suggestion for negative and positive colors to be used with each plate. Experiments with color combinations other than the ones listed may be tried to suit individual taste. However, those recommended on our list have been tested in New York theatres and found suitable, or can be considered as basic colors to work with if it is desired to improve an Effect.
>
> Colors may not always produce the same effect in all theatres, as it is possible they may be affected by house lights and the destiny of light coming from your Effect Machines. Therefore, the coloring used with the E-FECT Plates should be partly determined by these light sources as they apply to your house.
>
> Color Wheels can be used on designs adapted for them. Also in conjunction with the E-FECT Plates moving effects can be used, such as clouds or water ripple, etc. on such designs suitable for them.

OPAQUING

E-FECT Plates of suitable design are particularly helpful when desiring to present short-length material, such as novelties, trailers, musical or singing numbers, etc. In this connection, it is necessary to block out the center of the plate to allow for the picture. In blocking out the plate, it is necessary that the picture fits perfectly into the blocked out portion of the plate, when both effect and picture appear on the screen. When this is properly done, you get an illusion of depth.

Plates are opaqued or blocked out in the following manner:

The plate effect should first be registered and set for the Magnoscope Screen before attempting the opaquing of the plate. A plate cover glass is opaqued by putting on a Photopaque preparation. The blacked out plates are then placed in the Effect Machine Plate Holder. Make the house lights and Projection Room lights dark. Then put on the white light of the projector which will be used for running the short film, on the screen. The image of this machine’s aperture, is reflected back to the lens of the Effect Machine, and the outline of the aperture will be seen upon the specially opaqued glass plate.

By using a pencil this outline can be traced on the glass cover. The rest of the opaque, around the indicated lines, is wiped off the glass, leaving the center section as the mask.

PRE-SETTING MIRRORS

If there is occasion to use two sets of E-FECT Plates during a program at different times, you can pre-set the two sets of mirrors found in the Effect Machine to assure perfect registration when in use with both effects.

One set of mirrors is first set for the No. 1 Presentation (this may be an organ recital or novelty, etc.) and then the second set of mirrors is set for the No. 2 Presentation (a feature, for example). This setting can be done during rehearsal before the start of a new show.

REFLECTING MIRRORS

These mirrors should be dusted before use, using only the Camels Hair Brush which is supplied as part of the equipment. They should never be wiped with cloth or water and surface should never be touched with the hand, which would leave an impression.

When this machine is not in use, the mirrors should be kept in the wooden boxes in which they were originally received. This will relieve unnecessary wear.

Harry Rubin was probably the author of this text because of the references to the Magnascope Screen (an approximately 44'-wide screen of his design used at the New York Paramount Theatre), testing the effects in New York theatres, and the use of a stereopticon together with the effect machine (the Paramount projection booth had both an F7 and an unidentified stereopticon, probably an earlier model F). In addition, much of the wording is identical to the text of his article “Effect Slides Valuable Projection Aid” published in the October 1930 issue of *The Motion Picture Projectionist* (p. 30).

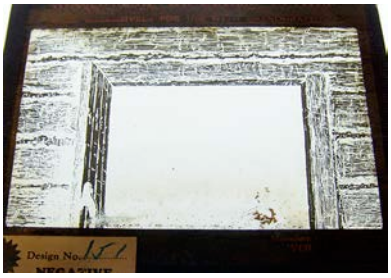
All the Workstel designs were produced as pairs of slides labeled as positive and negative, but unlike the Brenkert slides, these were usually either two versions of the same image with different coloration or masking, two similar images that could be superimposed (sometimes including masking so that something else could be projected on top of them), or two different images designed to be superimposed. Design 70 is an example of the first type:

Design 70 positive

Design 70 negative

Designs 151 and 279 are examples of the second type:

Design 151 positive



Design 151 negative

Design 279 positive

Design 279 negative

And Designs 104 and 186 are examples of the third type:

Design 104 positive

Design 104 negative

Design 186 positive

Design 186 negative

Whatever the type, when superimposed one on top of the other, they would create a composite image with a wide variety of effects, depending on the way in which the projectionist handled them. Contrary to speculations that appear in some modern discussions, superimposition of the two slides does not produce a blank or grey image, as one might imagine if the eye were to look through a traditional positive and negative image placed together and held up to the light. Because two separate beams of light are projected through the two slides onto a screen or curtain, black or masked sections of one slide simply block one beam but have no effect on the other. If one or both slides have images in color or are projected through colored gels, the two colors blend in projection.

The use of design 186 is described in the column “Publix Stunts” on p. 56 of the 5 July 1930 issue of *Exhibitors Herald–World* in the *Better Theatres* section:

> The Publix projection department, has, under the supervision of our old friend, Harry Rubin, pulled a number of very excellent stunts, the latest being the livening up of what has always heretofore been a rather dull trailer used to advertise coming features. I know that I have myself sat through the running of a great many of them without anything very much resembling interest. Now, however, it is different in the Publix theatres, thanks to Rubin and his competent staff of assistants. The various effects are arranged and remarkably competent instructions are sent out with each one, so that the receiving projectionist has small trouble putting it on. These effects were described in a previous article in this department. But here is a new one, the effect for Clara Bow in the “True to the Navy.” It necessitates the use of two motion picture projectors and a Brenkert F-7 effect projector. The thing ran about as follows:
>
> A glass effect design representing a life preserver was made and projected to the Magnascope screen with the Brenkert F-7 effect projector. Both the center and the area outside of the life preserver were opaqued to prevent the transmission of light, except through the design. Of course nothing but the life preserver was projected by the F-7. The light was tinted slightly by using gelatine in front of the lens, this to maintain the proper balance of illumination.
>
> Then a motion picture projector with a circular aperture, inserted just large enough to cover the center of the aforesaid life preserver, was brought into use, and through this aperture were projected the titles and close-ups of this trailer. The regular projection lens was used in this projector.
>
> Next came the second motion picture projector with a specially made aperture which blanked out the entire life preserver on the screen but permitted the rest of the Magnascope screen to show. Through this aperture was projected film taken from a review of battleships, the particular scene used being one of battleships in a heavy sea coming head-on toward the camera. A lens of short focus was used in this projector. [This may actually have been the second of the two slides illustrated just above.]
>
> You will thus see that with the two film projectors and the effect projector in operation we would have a really stunning effect. There would be the stationary life preserver, in the center of which would be Clara Bow’s face with the titles, etc., upon and around it, while outside the preserver great battleships come rushing toward us.

> My compliments to Rubin and his staff. It is such stunts and really beautiful novelties that help fill theatres. Audiences not only receive the desired advertising impression, but also they are highly entertained at the same time.

A similar but even more elaborate effect is described by James J. Finn on pp. 23–24 of the December 1933 issue of the *International Projectionist* as an example of the imagination, creativity, and skill required of projectionists in making use of their effects machines:

> That rarity in the theatre field—real showmanship in projection work—was on view recently at the New York Paramount Theatre as a result of some intelligent planning and precise projection work by Harry Rubin, director of projection for Publix Theatres. Utilizing the magnascope screen, which Rubin perfected several years ago, this demonstration was significant in emphasizing the great value of showmanship in projection.

The effect involved a combination of two motorized effects to produce moving clouds and the impression of a rotating globe. A masking slide just the size of the globe is placed in front of the moving clouds so that the globe appears to rotate in front of the clouds (figure 1). The newsreel projector is fitted with a special aperture plate so that the film image will exactly match the size and location of the globe. The effect continues with the newsreel projecting the opening titles and credits on top of the globe. Then, as the news begins, the clouds and globe fade out and an effect design that has its center masked to match the size of the newsreel's aperture (and the globe) fades in (figure 2). As the newsreel ends, the globe reappears in the center of the effect design (figure 3).

Figure 1

Figure 2

Figure 3

Finn comments on the "expressions of pleasurable surprise" he heard from the audience, noting that "close attention to the many details and exact timing are absolutely necessary for good results in putting on this or any similar effect." He concludes:

> It is interesting to note that this effect was not the product of any art department or effect slide manufacturer, having been conceived, designed and executed in its every detail by Harry Rubin. As an example of splendid showmanship in effect work, and in emphasizing the many ways in which the conventional projection room equipment may be utilized to dress up a program, this particular effect has never been equalled. Practically the same equipment as was used in this demonstration stands in countless projection rooms throughout the world, but apparently only a very few projectionists are aware of its possibilities or are willing to devote the time necessary to thinking out a special effect, such as Harry Rubin did and does on any number of occasions.
>
> With this effect Harry Rubin once more proved his right to be recognized as the foremost projection effect man in the field, an honor which has been his for many years.

Both of these effects and any of the others described in the *Operating Manual* and the Brenkert and Workstel catalogues of slides required careful planning and rehearsal. J. H. Kurlander, Brenkert's chief engineer, stressed this point and provided further examples of

the use of the Brenograph in his 1928 presentation "Effect Lighting in Theatres" delivered at the September meeting of the Society of Motion Picture Engineers (published in *Transactions of the Society of Motion Picture Engineers* vol. 12, no. 36, pp. 998–1009). Although the title is exactly the same, this is not the same presentation he made at the April 1927 meeting (see p. 21 above), at which time there was no hint of the F7. This is a completely new presentation, now firmly centered on the F7 and its elaborate effects. A particularly valuable part is the cue sheet included (pp. 1003–4) for effects employed at the United Artists Theatre in Detroit to accompany the *Tempest*, a Joseph M. Schenck production starring John Barrymore and released with a Vitaphone soundtrack. Kurlander introduces the cue sheet by observing (p. 1003):

> The projection of lighting effects is not such a simple matter that successful effects can be produced on the spur of the moment. Careful planning is necessary and a complete rehearsal of the entire program in which the effects are incorporated should be conducted.
>
> To facilitate smooth operation and to avoid mistakes, a suitable cue sheet should be devised on which are marked the projector adjustments, effect settings, starting and finishing cues, etc.

For the *Tempest*, the projectionist needed two effects projectors because the program had to be "somewhat elaborate to compensate for the lack of diversion created by the absence of stage presentations and other features apart from the picture program," a common complaint among projectionists and exhibitors of the time.

Cue Sheet for Effect Lighting
United Artists Theatre
Projection Department
H. S. Morton, Chief of Projection

Date: September 3, 1928
Subject: Effect Lighting
Presentation: "Tempest"

Overture

Projector Adjustments

Machine No. 1.–Directional Mirror No. 1; Projection lens 14"; Color wheel in front holder; Design glass No. 3 in rear holder; Framing shutter No. 1; Focusing indicator No. 4.

Machine No. 2.–Upper System–Directional Mirror No. 1; Projection lens 14"; Color screen No. 24 in front holder; Boat slide in slide carrier; Focusing indicator No. 4.

Machine No. 2.–Lower System-Directional Mirror No. 1; Projection lens, 40"; Water Ripple effect in rear holder; Framing shutter No. 2; Focusing indicator No. 1.

Operation

As orchestra begins to play, slowly dissolve blending colors effect on Machine No. 1. over stage opening and allow to stand for 1 minute 30 seconds.

As monitor begins to sing "Old Man River" slowly dissolve Boat slide onto draw curtains (Machine No. 2, Upper) and when full open slowly dissolve Water Ripple in lower system into Boat slide.

Close both upper and lower as song ends and immediately dissolve blending colors onto screen and allow to stand as background for News Pictorial titles. Remove before picture appears.

Prelude

Projector adjustments

Machine No. 1.–Upper-Directional Mirror No. 2.; Projection lens, 14"; Color screen No. 18 in front holder; Slide No. 1 in slide carrier; Focusing indicator No. 4.

Machine No. 1.–Lower-Directional Mirror No. 2; Projection lens, 14"; Color screen No. 7 in front holder; Slide No. 2 in slide carrier; Focusing indicator No. 4.

Operation

As Monitor horn begins to play *very slowly* dissolve upper scene onto draw curtains and allow to stand for 1 minute; Slowly dissolve lower scene in register with upper and allow both to stand for 1 minute; slowly close off upper scene and when removed exchange color screen No. 18 for screen No. 14; after upper scene has remained off for 1 minute slowly dissolve it back in register with lower scene and allow both to stand for 1 minute after which close off both scenes to clear stage for picture "Tempest."

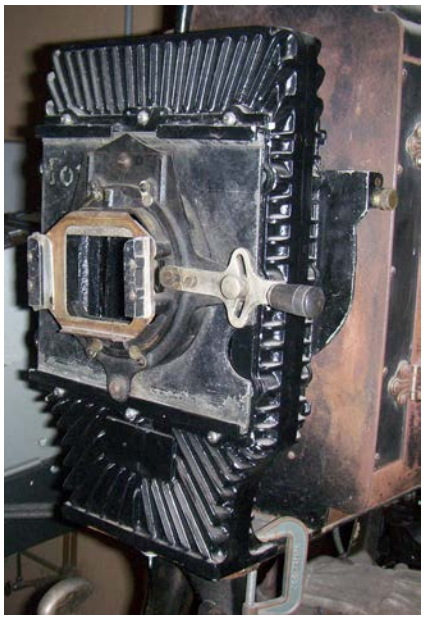
Important

After last effect has been shown and picture projectors have been attended to incident to starting feature picture restore both effect projectors to their former condition in preparation for the succeeding show. This work should be done immediately and before any other general work in the Projection Room is attended to.

Kurlander's presentation also touches on many other features of the F7, including technical aspects, slides, glass design plates, and motorized effects. Following the presentation, comments from members of the audience once again emphasized the importance of effects in counteracting the "monotony" of the motion picture. Mr. Morton, the projectionist who designed the cue sheet, remarked: "The effects were very well received during the first four weeks run of 'Tempest.' I think it holds great possibilities, especially if projected on a screen several feet in front of the curtain as there is then created an illusion of depth." Another speaker, Mr. Briefer, observed: "I regard the effects shown, very striking. Natural effects offer no surprises. In the picture itself an effort is made to conform to natural laws … but as in music, the unexpected, or surprise effects add a brilliance to the performance without which it may become monotonous."

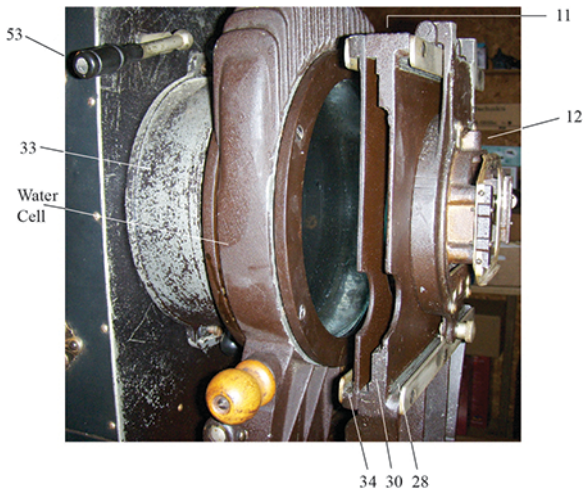
The F7 Master Brenograph: Keeping Cool

Despite all the possibilities the F7 presented when well stocked with a supply of attachments, lantern slides, motorized effects, and Brenkert or Workstel scenic effect plates, it also had one significant defect that had been recognized even in the earlier models F but never fully addressed: the arc lamps generated a lot of heat, and if a motorized effect was allowed to stop or a slide was left on too long, the light projected through the condensing lens would burn the image. Lantern slides, and especially song slides, would normally be in front of the light for only a minute or two at most, and as long as the projectionist did not allow the clockwork motors to run down on the effects, the heat from the arcs would not be damaging. But because the F7 was designed for use in the largest motion picture theatres with the most elaborate programs, its arc lamps regularly ran at a relatively high amperage to generate the amount of light needed to project images across the increasingly long distances between the projection booth and the front of the house. Likewise, its effect and framing slides were intended to be on for extended periods of time, certainly as long as a sing-along and perhaps as long as an entire feature film. Under these circumstances, the very hot light projected through the condensing lens would damage the slides, and the mica discs inside many of the motorized effects could be damaged if they stopped for even a minute.



The Brenkert Company attempted to solve this problem by adding water-filled heat sinks between the condensing lens and the rear effects holder of each lamp house. But until their appearance in Catalogue 28 (July 1930), they seem never to have been advertised as an accessory for the F7, and projectionists may have devised their own solutions along the way. At the Embassy Theatre, for example, the Brenograph was fitted with two water tanks precariously attached in place of the rear effects holder. The lantern-slide carrier originally hinged to the rear effects holder and a piece of the holder were removed and combined to form a new lantern-slide carrier that could be slipped into a slot on the front of the tank; a similar slot on the back of the tank held the framing shutter. The slide holder itself was slightly insulated from the tank by strips of rubber. This arrangement did dissipate some of the heat but not nearly enough. The heat absorbed by the tank itself flowed to the slide holder, which was in direct contact with it, through the little strips of rubber, and into the slide. After only a few minutes, the slides would become quite hot (the water tanks have now been replaced with the correct Brenkert water-filled heat sinks).

The Brenkert water cells were advertised on p. 14 of Catalogue 28 as an accessory that “can be quickly attached to all Master Brenographs by removing the front [actually the rear] effect holder assembly and mounting the complete cell on the front lamphouse supporting base after which the effect holder assembly is mounted on the sub base of the water cell.” The cell was filled from the top, and it had a little brass valve at the bottom as a drain. It was mounted on a slide so that it could be moved out of the way if one of the projectors was to be used as a spot or flood lamp where heat would not be a concern. When it was installed, there were gaps between the condensing lens holder (33 in the complete parts list above [p. 31]), the water cell, and the effects holder (11), with its compartments for the framing shutter (34), blanking masks (30), and effects (28). The dowser handle (53) is also visible. Here, the hinged lantern slide carrier (12) is in its lowered position, ready for use, but if a motorized effect or a Brenograph slide or some other effect was desired, the carrier (12) would be swung



up, and the effect would slide into compartment 28. Because air circulated around the water cell and it did not touch the effects holder, no heat from the cell was directly transferred and the slides remained significantly cooler.

Brenkert's Catalogue 29 of Effect Scene Plates stresses the importance of retrofitting original F7s with the water cells and 4" x 5" slide holders:

> Water cooling cells should always be used in projecting effect scene plates as they not only protect the glass from breakage but also reduce to a minimum the scorching of the photographic emulsion. These water cells are now standard equipment with each Brenkert F-7 Master Brenograph as listed in our No. 28 Catalog.
>
> Two 4x5 plate holders are necessary in projecting the 4x5 effect plates. These are now standard equipment with each Brenkert F-7 Master Brenograph as listed in our No. 28 Catalog.
>
> If your Master Brenograph is not equipped with these water cells or 4x5 plate holders they can be obtained at prices listed for these items in our No. 28 catalog copy of which will be sent free on request. They are quickly attached to any Brenkert F-7 Master Brenograph.

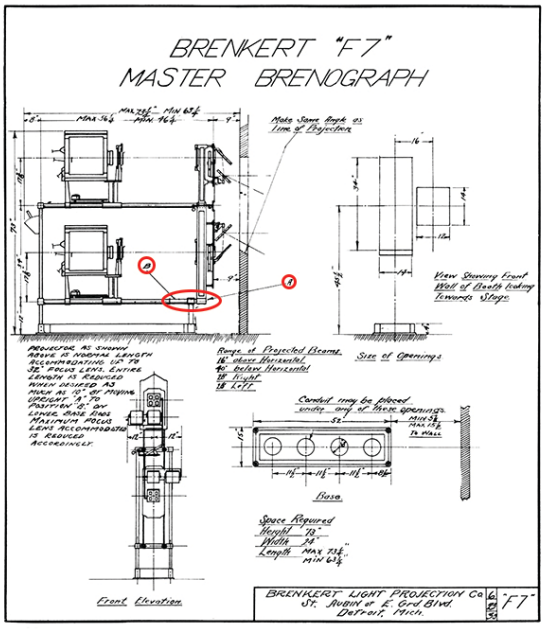
The cost of retrofitting was not insignificant: a pair of cells cost $140 and a pair of slide holders was $45, or $2,659 altogether in 2016 dollars.

The Stock Market Crash

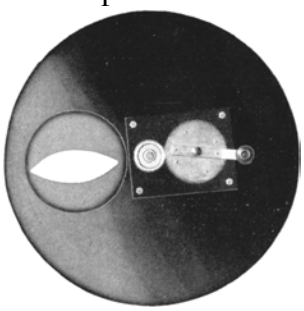
Between the time when the F7 first appeared in mid-1928 and the publication of Catalogue 28 (July 1930), the transition from silent to sound film continued, but of much greater importance to the movie-going public and thus the entire motion picture industry was the stock market crash of 29 October 1929 that, despite a few rallies in the following year, eventually slid to its lowest point in mid-1932 with a loss of ca. 89% in value. Owners of the largest theatre chains, Paramount, Fox, and Loew's (MGM), were also engaged in an internecine battle for dominance and had been building or buying ever-larger theatres that were very costly to operate. Following the crash, theatre owners cancelled contracts, reduced their staffs, and slashed admission prices. Only a few flagship houses such as the New York Paramount managed to maintain their pre-crash grandeur, but by 1933 even the Paramount had to scale back.

The Improved F7 Master Brenograph

Apparently undaunted, the Brenkert Company made a few modifications to the F7 and featured it in Catalogue 28 (July 1930) at a substantially higher price ($1,285 as compared to $875; $18,468 and $12,281 in 2016 dollars) as "The Improved Brenkert F7 Master Brenograph for the Sound Picture Theatre" (previously it had been "for every size and type of theatre"). In this version of the F7, the water cells were now standard equipment, but the only other real difference was the enlargement of the condensing lenses from the former 5 ½" and 6" diameters to 6 ½" and 8" diameters to increase the amount of light

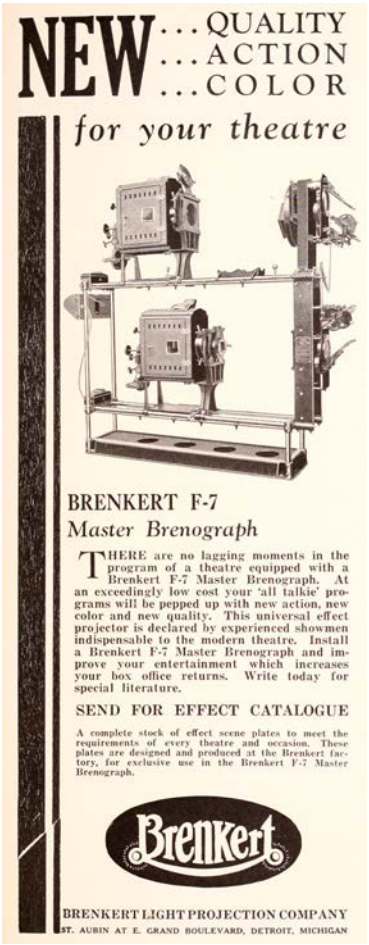


projected from the lamp houses (8" was also the diameter of the opening in the water cell). The castings of the front vertical assemblies were slightly modified so that the front assembly could be mounted closer to the lamp houses (at B instead of A as circled in red in the schematic) and the overall amount of space required for the F7 could be reduced. Finally, the switch boxes were upgraded from 60 to 100 amperes and a few additional accessories were included as standard equipment: a “star shutter” for projecting star-shaped spotlights, two carriers for the 4" x 5" effects plates, and seven embossed glass scene plates, one shown here. One or two new optional accessories were also offered: a double lantern slide holder so that song slides could be projected one after another from one lamp house while the second lamp house projected something else; and the “lobsterscope,” a hand-cranked shutter that opened and closed rapidly to produce a flashing light effect, somewhat like a strobe light. And of course, much the same wide array of motorized effects that had been offered since the very first model F continued to be offered on p. 15, but the prices had now increased by 20–40%.



The most significant modifications were the focus and tone of the catalogue and advertising copy. In Catalogue 26 (January 1929), effect lighting and the motion picture were compared in rather hyperbolic language to the setting for a precious stone. In Catalogue 28 (July 1930), the hyperbole is gone and the focus is practical: the F7 can relieve monotony in the absence of stage shows that used to be part of motion picture exhibition by adding colorful projections, save the cost of scenery by projecting it instead of building it, and put the audience into a receptive mood. The catalogue also stresses its commercial value and, incidentally, gives some idea of the relatively small number of F7s that had been sold over the past year and a half:

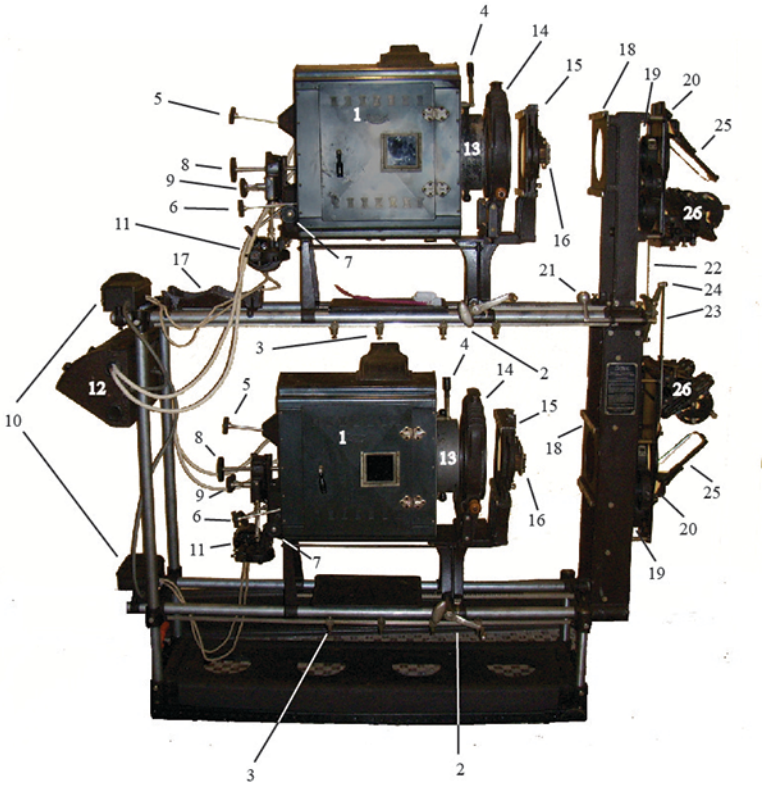
> The Brenkert Master Brenograph was placed on the market eighteen months ago and is used in several hundred theatres throughout the United States and Canada and in many of the foreign countries, where its value has been proven in producing a better show at less cost. Successful showmen enthusiastically endorse this method of theatre entertainment.
>
> Many of the de luxe theatres have installed two Master Brenographs for producing a larger number of color and scene effect changes during each show and quickly changing from one to the other. For the neighborhood theatre, however, the installation of one has proven sufficient.



Advertising copy, too, was much more subdued, stressing the value of the F7 at the box office. This advertisement in *Motion Picture News* (1 February 1930), p. 65, and *The Motion Picture Projectionist*

(February 1930), p. 6, for example, pointed out that the F7 would "pep up" talking picture programs and improve their entertainment value, "which increases … box office returns." Moreover, "This universal effect projector is declared by experienced showmen indispensable to the modern theatre." Another appearing on p. 956 of the *1931 Film Daily Yearbook* observed that the F7 would "add dignity" to the theatre and "charm" to the program. The projector is being "used by successful showmen the world over to relieve the monotony of a sound picture program." Its value has been "proven by hundreds of installations," and therefore "Your theatre can profit by these advantages."

The F7 Master Brenograph reached its final and most complete form (shown below) just as theatre owners and managers were facing the effects of the October crash, and the Brenkert Company must have realized that advertising could not offset the increasingly dismal prospects for the F7. No advertisements at all for the F7 seem to have been placed after 1931, although passing mention of the projector appears from time to time in the trade journals of the 1930s and 40s.



1. Lamp house assemblies
2. Adjusting handle connected to pinion and rack for moving lamp house assembly back and forth to obtain focus
3. Pre-set focus indicators on upper and lower units
4. Dowser shutter handle to block arc light
5. Top carbon (positive) back-and-forth adjustment knob
6. Bottom carbon (negative) side-to-side adjustment knob
7. Knob for moving arc burner back and forth in lamp house
8. Arc strike and feed knob
9. Clutch for engaging magnetic arc control
10. Magnetic relays for upper and lower unit arc controls
11. Arc control motors
12. Enclosed knife switches for power to upper and lower units
13. Condensing lens holder on upper and lower units
14. Water-filled heat sinks
15. Main frame, comprised of rear effect holder, mask compartment, and holder for pre-set shutters
16. Swing-out gate and holder for 3¼" × 4" lantern slides
17. Removable slide tray
18. Front effect holder compartment on upper and lower units
19. Swivel type lens holder for 4 large-diameter projection lenses on upper and lower units
20. Iris dissolving shutters for upper and lower units

21. Operating handle controlling iris dissolving shutters
22. Connecting rod to upper iris dissolving shutter
23. Connecting rod to lower iris dissolving shutter
24. Cross arm actuating upper and lower iris dissolving shutters
25. Stationary mirrors for upper and lower units
26. Pairs of horizontally and vertically adjustable light directional mirrors for upper and lower units

The Brenograph Junior

The F7 was not the only projector the Brenkert Company offered as a "Brenograph." As an apparent paradox, six months **before** the original F7 Master Brenograph was introduced at the 29th Annual Convention of the International Alliance of Theatrical Stage Employees and Motion Picture Machine Operators (IATSE & MPMO) in Detroit in June 1928, the "Brenograph Junior" was advertised in the second section of the 30 December 1927 issue of *Motion Picture News* with a full-page advertisement (p. 14), touting the projector for use in atmospheric theatres:

> The Appeal of Light in Motion.
>
> A canopy of clouds, moving majestically across a field of twinkling stars! Atmosphere! Illusion! The romance of pictures viewed beneath nocturnal skies! The atmospheric theatre, combining light and motion, produces these effects that carry an almost irresistible appeal.
>
> Brenograph Junior creates this—and more. Animated scenic effects, projected back stage from the wings, from overhead or, in small theatres from the projection room, are now available, at a minimum cost—through Brenograph Junior.
>
> Its interchangeable discs, projected at any desired speed, give you, easily and realistically, moving clouds, flying birds and swiftly passing country panoramas. Or, at a moment's notice, you may have a driving rain, falling flowers or ocean waves. …

It is certainly no coincidence that this advertisement appeared where it did: the second section of the 30 December issue of *Motion Picture News* was the "Theatre Building and Equipment Buyers Guide," which included an elaborate 28-page (unpaginated) section featuring the work of John Eberson, the most important architect of theatres designed to appear as if the audience were sitting outdoors under a starlit sky with exotic buildings, niches, fountains, birds, and so on arrayed along the walls. Or, as Eberson put it, his theatres provided "indoor entertainment with a correct outdoor setting." Eighteen full-color drawings of his interiors were included, as well as several pen-and-ink drawings and photographs of interiors. This example illustrates the Riviera Annex in

Detroit, "a one-floor picture theatre incorporating many interesting features. The castle with its garden in the foreground forms the projection room, and the balconies provide a spacious promenade."

The advertisement further explained that:

> … Like every unit in the complete line of Brenkert projectors and lighting devices, Brenograph Junior was designed to produce certain results, effectively and well. It is absolutely reliable.
>
> It may be operated over a wide range of speeds and is automatic and reliable over the entire speed range. Brenograph Junior is especially well adapted to short range work for covering large areas, and its automatic operation and compactness make it ideal for remote control, with the origin of the effects hidden from the patrons of the theatre. …
>
> For concealed work, Brenograph Junior with its motor driven effects and automatic operation requires a space but 24" wide 30" high and 30" deep. No matter where located it may easily be controlled from the main switchboard.

An explanation for the seeming anomaly of the Junior preceding the Senior is not difficult to find. By the end of 1927, the company must have already settled on a name for the new projector they were readying to launch at the IATSE & MPMO convention and decided to capitalize on the anticipated market by applying it to an assembly they had been selling for years: the C503 incandescent spot lamp with a 6" short-range lens, fitted with a second 5" condensing lens, a motorized effect, and whatever projection lens was necessary to focus the effect in the desired location. This assembly is described on p. 15 of Catalogue No. 24 (1927) and p. 27 of Catalogue No. 26 (1929), but all the necessary parts are already present even in Catalogue No. 15. The primary difference between the Brenograph Junior and the earlier C503 assembly was the use of a variable speed electric motor to drive the effect, which made it possible to set up the projector in a remote location and then start, stop, and regulate it from a switchboard elsewhere in the theatre. Similar assemblies were available in the catalogues of other companies: Display Stage Lighting Company's *Catalogue of Theatrical Lighting Equipment and Effects* (1927), pp. 33–35, features a machine that is virtually identical to the Brenograph Junior.

The Brenograph Junior received short reviews in the 7 January 1928 issue of *Motion Picture News* (p. 47) and the 5 and 26 February issues of *Film Daily* (p. 8 in both issues). Another full-page advertisement for it appeared in the 4 February issue of *Motion Picture News* (p. 348), emphasizing once again its reliability:

> The subtle charm of the atmospheric theatre rests largely in its ability to create the impression of out-of-doors, beneath nocturnal skies.
>
> To complete this illusion, a canopy of clouds moving across a field of twinkling stars, forms an essential part of the setting.
>
> The Brenograph Junior produces these cloud effects most realistically and with the least amount of trouble. With this simple, inexpensive machine, every theatre can add the atmospheric effects now looked for by theatre patrons.

> The Brenograph Junior, equipped with a short pedestal, occupies a space measuring only 30 x 30 x 24 inches. This permits easy concealment in any part of the theatre, increasing the illusion.
>
> The Brenograph Junior is furnished with electric motor-driven effects and can be controlled from any part of the house by means of a switch. The motor-driven mechanism is the result of long experimentation and is absolutely reliable for all conditions. It is noiseless, has a wide range of speeds, and will start under full load at reduced speeds.

After the F7 Master Brenograph was launched in June 1928, the company no longer placed any advertisements for the Junior in the trade journals, although it was given a two-page spread in Catalogue Nos. 26 and 28. The catalogues list twenty-three effects, all of which are repetitions of effects also advertised for the F7 and available as far back as Catalogue No. 15 and the first model F. But because the Junior was intended to create a single permanent effect for an atmospheric theatre, the effects offered for sale were simply the rotating discs, not the full canister, motor, and disc assembly. The Junior came with one motorized canister, and the buyer selected the particular effect to be installed. If other effects were desired, the buyer would have to remove the canister from the projector, take it apart, replace the old disc with a new one, and then reinstall the canister. The majority of theatres almost certainly ordered the Junior to project moving clouds (there were two cloud options) or perhaps flying birds or butterflies, and over time, these discs might be damaged and need to be replaced. It is difficult to envision, however, theatre managers ever ordering babbling brooks, blizzards, fire and smoke, flames, ocean waves, sandstorms, or falling roses for projection on the ceiling or walls of an atmospheric theatre!

The cost of the Brenograph Junior when it first appeared at the very end of 1927 is not known. It probably appeared in Catalogue No. 25, but no copy of this catalogue has come to light and no prices are given in the advertisements or reviews. When it appeared in Catalogue No. 26 (January 1929), the Brenograph Junior sold for $225 (plus the cost of the mazda bulb) and in Catalogue No. 28 (July 1930) for $290 (equivalent to $3,158 and $4,070 in 2016 dollars), a significant amount of money for theatre owners following the crash of 1929. John Eberson's final atmospheric theatre, the Midwest Theatre in Oklahoma City, was built in 1931, and there was little demand for the Brenograph Junior after that.

The Iris Closes

Construction of any type of large motion picture theatre was over by the end of 1932 when Radio City Music Hall and the RKO Roxy Theatre opened to disastrous reviews, and it is unlikely the Brenkert Light Projection Company sold very many, if any, new Brenographs after 1932 (sales records for the Brenkert Light Projection Company have not been available for examination, if they even survive). J. H. Kurlander left the company in 1930 for a position with the Westinghouse Lamp Company, and as noted above (p. 9), Joseph W. Brenkert must have died in the very early 1930s, leaving Karl to chart the future direction of the Brenkert Company. Long attuned to trends in motion picture exhibition, Karl must have sensed that economic reality and changing tastes would doom the stage shows and theatrical effects that had formed an important part of theatrical exhibition in the 1920s and that the company's future lay in motion picture projection, not in something that "projects everything but the picture." Already by 1930, the Brenkert Company had turned its attention to the manufacture of motion picture arc

lamps, such as the "Super High Intensity Projection Lamp," leading in 1935 to its much-admired projection lamp, the Enarc (model N), and in 1939 to its famous and rugged BX-80 35mm projector with an enclosed oil-bath lubrication system and dual counter-rotating rear shutters.

Theatres that already had Brenographs or any of the earlier projectors certainly could and did continue to use them as long as they could still afford competent and imaginative projectionists, and the trade journals continued to promote their use. The January 1932 issue of *The Motion Picture Projectionist*, the cover of which featured a note from editor Boone Mancall reading "To our thousands of readers—Better and Happier times for all in 1932," reprinted an abbreviated version of J. H. Kurlander's "Effect Lighting in Theatres" (pp. 18–19 and 29) presented in 1928 to the Society of Motion Picture Engineers (see p. 48 above) as if it were a new article. Perhaps Mancall assumed that projectionists would have forgotten Kurlander's detailed advice on using the Brenograph and needed to be reminded that

> The projection of lighting effects is not such a simple matter that successful effects can be produced on the spur of the moment. Careful planning is necessary and a complete rehearsal of the entire program in which the effects are incorporated should be conducted.

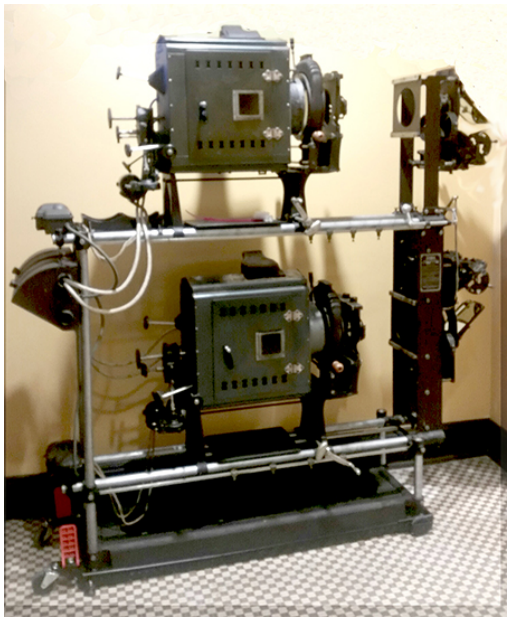
The *International Projectionist* for December 1933 extolled Harry Rubin's Paramount Newsreel effect (see p. 47 above), and in the *Better Theatres* section of the *Motion Picture Herald* for 10 February 1934 (pp. 6–7), the Managing Director of the Paramount Theatre in Stapleton (Staten Island, NY), Edwin Sedgwick Chittenden Coppock, opined:

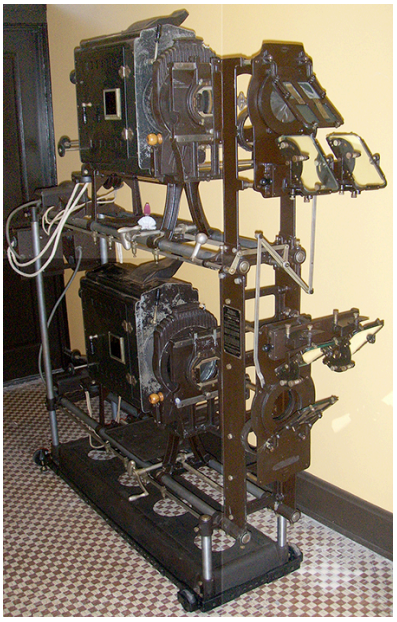
> I personally believe that the greatest possibilities for the relief of sameness about your theatre is in the presentation of the program itself. Those houses that are fortunate enough to be equipped with a Brenograph (Brenkert effects projector) have almost unlimited possibilities to color up a program, but the theatres that are not so equipped are in the majority.
>
> For those theatres which have effect projectors, almost unlimited change is possible. Instead of just putting a background design on the screen, why not occasionally divert the beam with the mirrors on the front of the lamp and put a design on the sides of the proscenium arch or on the organ grilles or ventilator grilles at the sides of the front of the auditorium?

All this notwithstanding, the Depression eventually took its toll. Publix went bankrupt in 1935 (although it quickly reorganized), fewer and fewer theatres retained even their organists (the pit musicians had been largely eliminated by 1930), and managers were unwilling and unable to maintain expenses that were not essential. Most projection booths were no longer staffed with more than the two projectionists required to run the film projectors in any shift, and there was no time or inclination to plan special projections.

Some theatres with Brenographs had enough foresight or luck to retain and maintain or restore them. The Byrd Theatre (Richmond, VA), the Fox Theatre (Atlanta, GA), the Embassy Theatre (Fort Wayne, IN), and the Majestic Theatre (Pomona, Queensland, AU; originally installed in the Prince Edward Theatre, Castlereagh, Sydney) are four examples. The Embassy Theatre, in fact, has three of them: the original one fully restored and still installed in the projection booth (originally on the right side [as viewed from the stage] and moved to left side at some point), a second one on permanent exhibit to the

public in the theatre’s “Heritage Room” (pictured), and another nearly complete one in storage.





As time passed, all but a few of the Master Brenographs were pushed aside, the bulbs in the Juniors burned out, and the projectors were scrapped, cannibalized (especially the lenses), stolen (especially the Juniors), or simply left to rust away. After all, when motion pictures were now the only thing anyone wanted to project, what use was there for the machine that “Projects Everything but the Picture”?

Acknowledgements: Illustrations of the Brenkert and Workstel slide catalogues on pp. 38 and 42 are from the James Grebe Collection, The American Organ Institute Archives and Library at the University of Oklahoma and are used by permission. The photograph of the Brenograph at Stanford Hall, Nottinghamshire, UK (above left) is by www.bcd-urbex.com; the photograph of the Brenograph at the Los Angeles Theatre (above right) is by Dan Solosan, www.lahtf.org. Both are used by permission.

Works Cited
(excluding catalogues)

Butterworth, Mark. "The Brenograph in Action." *The New Magic Lantern Journal* 10, no. 2 (2006): 19–22.

Cameron, James. *Motion Picture Projection*. 4th ed. Manhattan Beach, NY: Cameron Publishing Company, 1928.

The Cost of Living among Wage-Earners, Detroit, Michigan, September, 1921. Special Report No. 19, October, 1921. New York: National Industrial Conference Board, 1921.

Craig, Robert M. *Atlanta Architecture: Art Deco to Modern Classic 1929–1959*. Foreword by Richard Guy Wilson. Gretna, LA: Pelican Publishing Company, 1995.

Hall, Ben. *The Best Remaining Seats: The Story of the Golden Age of the Movie Palace*. New York: Clarkson N. Potter, 1961.

Judson, Jack. "The Wondrous Brenkert Master Brenograph." In *Realms of Light: Uses and Perceptions of the Magic Lantern from the 17th to the 21st Century*, ed. Richard Crangle, Mervyn Heard, and Ine van Dooren, 211–13. London: The Magic Lantern Society, 2005.

King, Lila. *Framing the Cinema: Brenograph Slide Images from the Fox Theatre Collection*. Atlanta, GA: Preservation Maintenance Press, Restoration Department of the Fox Theatre, 2000.

Koszarski, Richard. *An Evening's Entertainment: The Age of the Silent Feature Picture, 1915–1928*. History of the American Cinema, vol. 3. Berkeley: University of California Press, 1990.

"The Machinery Markets." *Iron Age* 88 (1911): 435–43.

Michigan State Gazetteer and Business Directory. Also Containing a Business Directory of Windsor and Walkerville, Ontario. 1907–1908. Detroit, MI: R. L. Polk & Co., 1907.

Richardson, F. H. *Handbook of Projection: The Blue Book of Projection*. 5th ed. 2 vols. New York: Chalmers, 1927.
Fourth edition (1922): *Handbook of Projection for Theatre Managers and Motion Picture Projectionists*.

Rosenblum, Constance. *Boulevard of Dreams: Heady Times, Heartbreak, and Hope along the Grand Concourse in the Bronx*. New York: New York University Press, 2009.

Sprague, Robert. "The Brenkert Story." *Sixteen Frames: Journal of the Movie Machine Society*, Winter 2000, 12–22.
Pp. 12–14 deal with the early days of the company; pp. 15–22 pertain to the later development of their famous motion picture projectors.

Valentine, Maggie. *The Show Starts on the Sidewalk: An Architectural History of the Movie Theatre, Starring S. Charles Lee*. New Haven, CT: Yale University Press, 1994.

Zone, Ray. *Stereoscopic Cinema and the Origins of 3-D Film, 1838–1952*. Lexington: University Press of Kentucky, 2007.

Trade Journals

Exhibitors Herald and Moving Picture World, Section Two: Better Theatres 90, no. 7 [32, no. 10] (18 February 1928); 91, nos. 2 [33, no. 5] (14 April 1928) and 10 [33, no. 13] (9 June 1928); 92, no. 1 [34, no. 4] (7 July 1928); 100, no. 1 (5 July 1930); and 114, no. 7 (10 February 1934).

The *Better Theatres* section was published every fourth week as a supplement. The name of the publication was modified to *Exhibitors Herald–World* and eventually *Motion Picture Herald* as it merged with *Motion Picture News*.

Exhibitors Trade Review 14, no. 11 (11 August 1923).

Film Daily 25, no. 24 (29 July 1923); 30, no. 45 (21 November 1924); and 43, nos. 30 (5 February 1928) and 47 (26 February 1928).

International Projectionist 6, no. 3 (December 1933).

Motion Picture News 24, no. 20 (5 November 1921); 28, no. 7 (18 August 1923); 33, no. 22 (29 May 1926); 35, nos. 8 (25 February 1927), 23 (10 June 1927), 24 (17 June 1927), and 25 (24 June 1927); 36, nos. 14 (7 October 1927), 18 (4 November 1927), 22 (2 December 1927), and 26 [Buyers' Guide Section] (30 December 1927); 37, nos. 1 (7 January 1928), 5 (4 February 1928), 22 (2 June 1928), and 24 (16 June 1928); 38, no. 2 (14 July 1928); and 41, no. 5 (1 February 1930).

Motion Picture Projectionist 1, nos. 4 (February 1928), 8 (June 1928), 9 (July 1928), 10 (August 1928), and 11 (September 1928); 2, nos. 1 (October 1928), 2 (November 1928), 3 (December 1928), 4 (January 1929), and 7 (April 1929); 3, nos. 3 (January 1930), 4 (February 1930), and 12 (October 1930); and 5, no. 3 (January 1932).

1931 Film Daily Yearbook of Motion Pictures. 13th Annual Edition, ed. Jack Alicoate. New York: Film Daily, 1931.

Showmen's Trade Review 42, no. 25 (7 July 1945).

Transactions of the Society of Motion Picture Engineers nos. 17 (1–4 October 1923 [pubd. 1924]), 18 (19–22 May 1924), 30 [vol. 11] (25–28 April 1927), 32 [vol. 11] (26–29 September 1927 [pubd. 1928]), and 36 [vol. 12] (24–28 September 1928 [pubd. 1929]).

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