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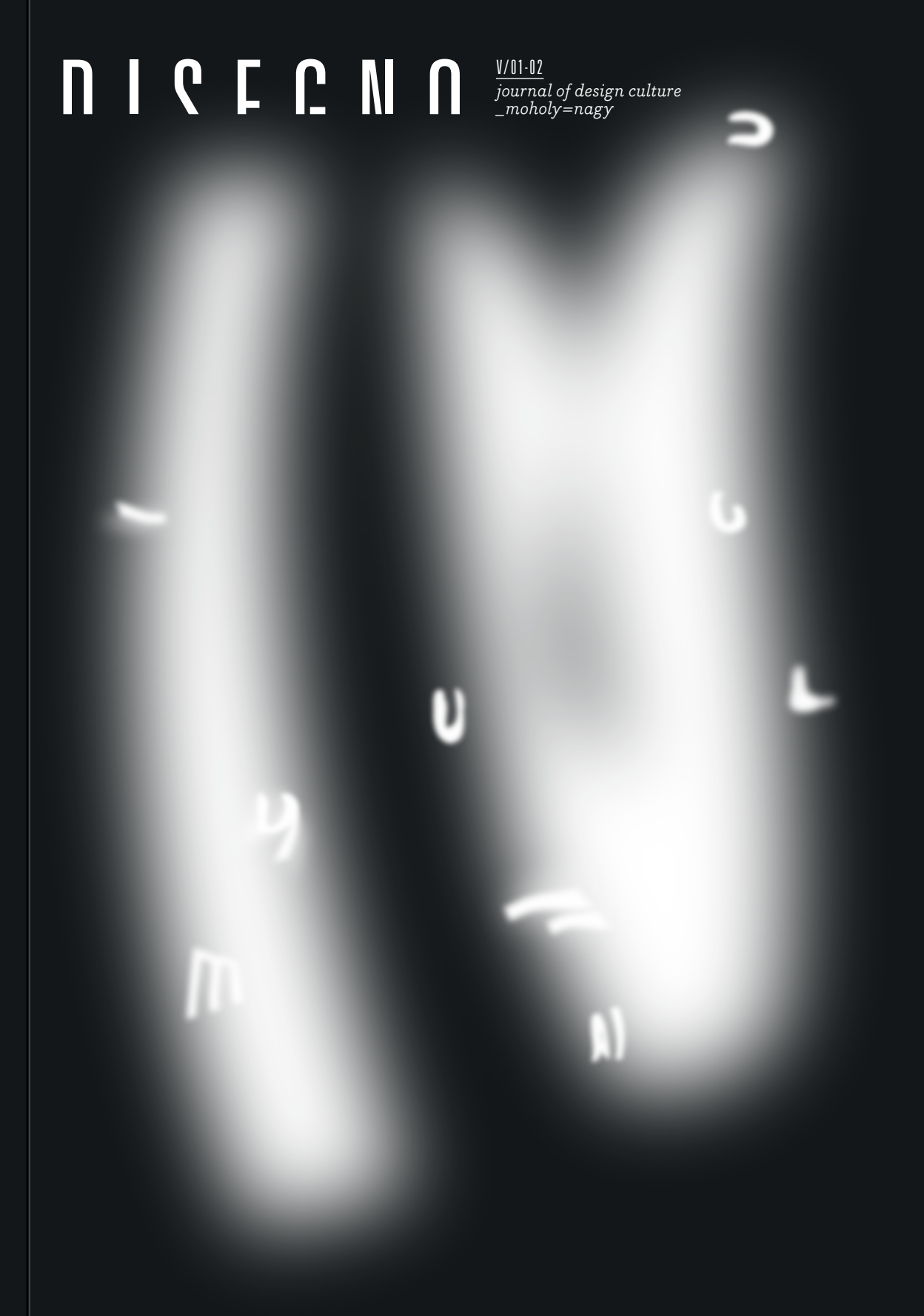

Disegno

Journal of Design Culture

Double-blind peer-reviewed, open access scholarly journal. Not for commercial use.

Aims and Scope

Disegno publishes original research papers, essays, and reviews on all aspects of design cultures. We understand the notion of design culture as resolutely broad: our aim is to freely discuss the designed environment as mutually intertwined strands of sociocultural products, practices, and discourses. This attitude traverses the disciplinary boundaries between art, design and, visual culture and is therefore open to all themes related to sociocultural creativity and innovation. Our post-disciplinary endeavor welcomes intellectual contributions from all members of different design cultures. Besides providing a lively platform for debating issues of design culture, our specific aim is to consolidate and enhance the emerging field of design culture studies in the Central European academy by providing criticism of fundamental biases and misleading cultural imprinting with respect to the field of design.

All research articles published in Disegno undergo a rigorous double-blind peer review process.
This journal does not charge APCs or submission charges.

Contact: *Moholy-Nagy University of Art and Design*
H-1121 Budapest, Zugligeti út 9-25.
Editors: disegno@mome.hu

The full content of Disegno can be accessed online: ***disegno.mome.hu***

Published by: *József Fülöp*
Publisher: *Moholy-Nagy University of Art and Design, 1121 Budapest, Zugligeti út 9-25.*

ISSN: *2064-7778 (Print)* ***ISSN:*** *2416-156X (Online)*

MOHOLY-NAGY
művészeti egyetem
university of art and
design budapest

DISEGNO_V/01-02_MOHOLY-NAGY

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MAN WITH A LIGHT PROJECTOR: LÁSZLÓ MOHOLY-NAGY'S CINEMATOGRAPHIC TOOLKIT

Attila Csoboth

ABSTRACT

The Light Prop for an Electric Stage—*also known as the* Light–Space Modulator—*is a major piece by László Moholy-Nagy, yet its intended use has remained subject to debates. Does its importance lie in being a stage lighting tool, a three-dimensional mobile sculpture, or conversely, a projector which shows its full glory in* Light Play: Black–White–Grey, *the film Moholy-Nagy created with and about it? As a cinematographer, I will argue in this essay that the* Light Prop *stages an elemental engagement with light by someone constantly tinkering with the kind of lighting props that are still very much in use in photography and filmmaking today.*

#cinematography, #lighting, #light props, #projection, #re/production

https://doi.org/10.21096/disegno_2021_1-2acs

DISEGNO_V/01-02_MOHOLY-NAGY

László Moholy-Nagy is known and acclaimed in many disciplines, but cinematographers like me—part artist, part technician—are drawn to his work primarily due to the way he played and experimented with light in any medium he turned to. We relate to his techniques because in our early studies we ourselves experimented with light by making photograms, building pinhole cameras, and creating shadow plays.

This manipulation of light, shadow and space is something that still defines our professional work life. As cinematography students at the Hungarian Academy of Theater and Film (SzFE), we were constantly reminded to study light all day every day, everywhere we went because as cinematographers we must construct moods via light, and if we study moods every day in our own surroundings, we will be able to reconstruct or augment lighting setups that we have previously experienced or have an emotional connection to. Having to regularly improvise on set with makeshift tools is the norm in cinematography no matter the size of production. Building or customizing our tools is how we think and a source of pride. Moholy-Nagy was a polymath tinkerer who collaborated with engineers, drafters, mechanics, and machinists in his quest to open new artistic horizons, just as we use technology, machines, and electric light to create a new cinematic experience.

Moholy-Nagy's *Light Prop for an Electric Stage* which has become better known as the *Light-Space Modulator*, is one of the key elements in his collaborative work.[1] It immediately arrested my eyes and mind.

Joyce Tsai, Angela Chang, Matthew Battles, and Jeffrey Schnapp's article "László Moholy-Nagy's Light Prop as Design Fiction: Perspectives on Conservation and Replication" is one of the most concise pieces of writing and analyses of his signature kinetic structure (2017). The article tracks the travels of the device, and its repairs and refurbishments until it found a home at Harvard University, where it is now switched on monthly, without its original encasement. The essay is focused on a very thorough breakdown of the parts and movement, but, as with many articles I have encountered, it deals purely with the mechanics from an engineering perspective.[2]

After careful studying of this kinetic object, I came to realize that the individual parts of *Light Prop* have an uncanny similarity to the light shaping tools that have traditionally been used on a movie set since the early days of cinematography. This essay will discuss how we can find counterparts of these tools in *Light Prop*, which I understand to essentially be a kinetic cluster of movie lighting and light shaping instruments.

[1] Light-Space Modulator *is a posthumous title. During his life, Moholy-Nagy used the concepts of "space modulators" (plastic sculptures) and "light modulators" separately (see Henderson 392–393n66). By the latter, he meant any sort of light reflecting surface used in photographic image making, from a sheet of paper to the exact curvatures of a model's body and face (Szilágyi 2011, 65–66).*

[2] *For a detailed discussion of the views of Tsai et al. and others on the logic, history, and reconstructions of the Light Prop see "Moholy-Nagy's Light Prop for an Electric Stage. Design, Copies, and Reproductions" by Sofía Quiroga Fernández in the present issue.—Eds.*

FIGURE 1. *László Moholy-Nagy*, Photogram, *1926. 23.9 × 18 cm (gelatin silver). Courtesy of the Moholy-Nagy Estate.*

Moholy-Nagy became fascinated with light early in life. His 1917 poem on light pondered the question, "Space, time, material—are they one with Light?", to conclude that the "total Light, creates the total man. (S. Moholy-Nagy 1969, 11, 12) His profound interest in the play of light is evidenced in work ranging from his trademark photograms all the way to his reflective kinetic structures and projections in works like the emblematic *Light Prop*. Often referred to as perhaps the world's first piece of electric kinetic art, it shares similar mechanics to those of a cinema camera with cogs, cylindrical drums with sprockets, and a spinning mirror. Indeed, Moholy-Nagy already envisioned turning reproductive devices into productive, creative tools in "Production—Reproduction" (1922) by utilizing, in the case of the camera, "the bromide plate's sensitivity to light to receive and record various light phenomena [...] which we ourselves will have *formed* by means of mirror or lens devices." (Published in English in Passuth 1985, 289–90.) The cinematic effect that is created when the machine is put into motion reaches far beyond

its technical operation alone. The work not only consists of the physical object, but also the fleeting impressions of movement, light, shadow, and reflection, which are also the main elements of cinematography.

This kinetic sculptural apparatus is more than the means by which Moholy-Nagy manipulated light effects, as he had previously done in photograms (fig. 1). It generates light effects and puts them into motion. In an essay from 1923, Moholy-Nagy called his early experiments with light in various media, not least his famous photograms, "creation with light" (Moholy-Nagy 1923). By the 1930s he was specifically referring to the *Light Prop* as a tool for "experimenting with painting with light" (quoted in Iskin 2004, 53).

In a letter from 1934, Moholy-Nagy showed his commitment to light as a natural medium of modern art and a means to move behind traditional painting: "Ever since the invention of photography, painting has advanced by logical stages of development 'from pigment to light.' We have now reached the stage when it should be possible to discard brush and pigment and to 'paint' by means of light itself." (Moholy-Nagy [1934] 1936, 30)

MOTIVATION OF LIGHT

In cinematography the motivation of light refers to the imagined source of light in a narrative way. For example, if there is a window in the background (daytime) the subject will be backlit. In cinema, light is always motivated, usually by some kind of source. Even if the source is imaginary. A lighting setup should serve purely aesthetic purposes, a narrative or an emotional purpose; our primary goal is to express emotions through light.

As a cinematographer with a particular toolkit, I have the means to manipulate light at many stages, starting from its source (the sun or artificial light) all the way to the film plane. I can place light shaping tools in front of a movie light, in front of a lens by using filters, inside a lens, and in front of the film plane. I can even manipulate light by placing diffusion in the air, to create the effect of mist or smoke. On multi-million-dollar budget films, a cinematographer might stretch a stocking behind a lens or spread grease with a paintbrush on the front of a lens that costs tens of thousands of dollars, just to play with light.

When I began studying the *Light Prop* I started to think about the kind of light it is trying to create. What is the purpose of the metal objects spinning around? There must be a reason behind these shiny reflective objects. Was it constructed to be used in theater on a stage to create a lighting effect? Or to be center stage and the lead performer? I turned to Alice Arnold, a media artist, photographer, filmmaker, and Adjunct Professor at the City University of New York who has studied Moholy-Nagy for years. She credits him with fusing the roles of artist and engineer, and besides being artists, we cinematographers could also be thought of as instinctive engineers. As she explains:

[A] combination of photography, working with light (photographically and directly with electric lighting products); working with new materials, such as metal and electric infrastructure; the influence of theatrical experiences (specifically at the Bauhaus); the rise of new urban experiences in the 1920s, such as neon lighting, advertising signs, window displays, and urban lighting; and experimental ideas about abstraction and creating new […] experiences are all manifest in Moholy's ideas for the Light Prop. (Arnold 2021)

Nevertheless, Arnold' recalled that her first reaction to the *Light Prop* was how much of it resembled items in her kitchen, such as "strainers and graters and silverware. Metal tools with long handles and surfaces that include holes and or wire mesh. 'Everything but the kitchen sink.'"

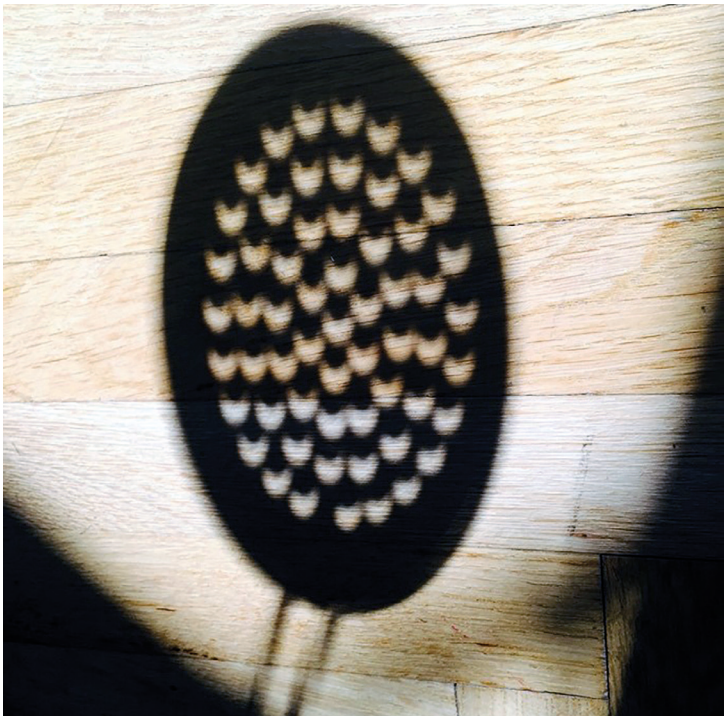

FIGURE 2.
My kitchen tools

FIGURE 3.
My kitchen skimmer during the eclipse

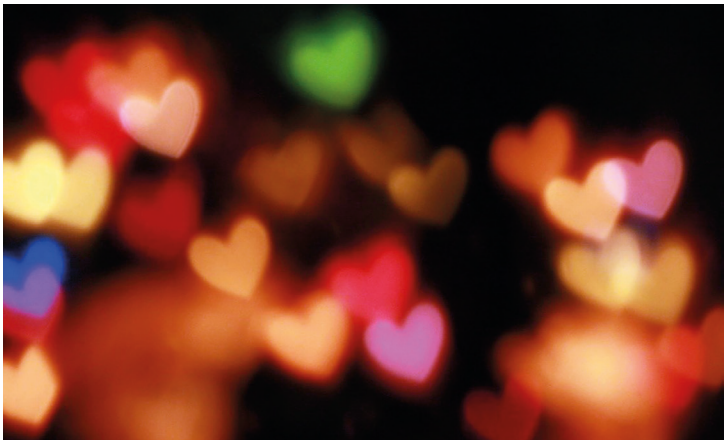

FIGURE 4.
Shaped "bokeh" effect.
Source: author's archive

(Arnold 2021) My conversation with Arnold opened my thoughts in a new, more playful direction. Her comments drove me to rummage through our kitchen drawer to find tools that might resemble the kinetic elements of Moholy-Nagy's *Light Prop* (fig. 2).

As I held the skimmer (the left most object in fig. 2), it dawned on me just how clearly it resembles the round perforated chrome plate in the *Light Prop*. Before venturing into my kitchen in search of utensils, I imagined the *Light Prop* as a cluster of cinematic light shaping tools put in motion. As I drew more objects out of the drawers, I realized many of them resemble tools used in my trade, where cinematographers play with light professionally.

On March 20, 2015, there was a partial eclipse in Budapest. I was busy all day, but suddenly when the eclipse was total during the day, I realized I might miss out on it. Not having prepared in any way to watch the eclipse, I improvised. I knew that when you project light through a shape, but the source is partially blocked, the shape of the projected light will be altered. So if the moon is covering the sun, and I let the sunshine through a round hole, the shape of the moon will be visible in the projected image. The best object I could find for this on the spur of the moment was this kitchen skimmer. Lucky for me, I took a picture of it. Notice how the round holes of the skimmer project crescent shapes (fig. 3).

Behind this was my experience as a cinematographer of using so called matte masks when playing with light. If you put a matte or mask that has a shape in front of the camera, it will alter the shape of the out of focus light shapes (commonly referred to as "bokeh") in the background. Figure 4 shows a bokeh effect created by placing a black heart shape cutout in front of a lens. It is important to note that the heart shape is not visible in the image, it just shapes the path of the light rays entering the lens in general as they travel into the camera towards the sensor.

LIGHT MODIFYING TOOLS USED IN FILMMAKING

The tools used to shape light in the film industry have remained relatively unchanged since the early days of cinema and since Moholy-Nagy built his mesmerizing contraption.

REFLECTOR AND MIRROR

Anything we use to reflect light is called a "reflector" (fig. 5). This can be a metal or glass apparatus. If it is inside a movie light then it is curved in some manner, and typically used to direct light rays emanating from a light source. If a reflector is used on its own then it is usually flat and covered with metallic or reflective fabric panel (sometimes called a reflector board) and is used to bounce or redirect light, with the light source being an artificial light or sunlight. They are available in a variety of sizes and shapes and materials of varying reflectivity, often custom built to the cinematographer's needs.

Flags, which are also known as black flags or cutters, are the most basic tool used for shaping light in film. They are usually available in rectangles and squares and are placed in front of lights to shape how the light falls onto a scene. A flag is an opaque rectangle (usually black cloth stretched over a wire frame) that is used to block light from a certain area. In the early days they were made of metal or wood. A standard flag is attached to a small metal handle and short rod that can in turn be attached to a stand and placed so that it blocks the light from reaching something in the shot. Flags can be used to prevent light from reaching background walls, for example, leaving only the central subjects illuminated. Types of flags include singles and doubles to cut down hard light, or solids to block light. Silks, though similar in shape, are translucent and used to diffuse, rather than block light. All the *Light Prop*'s elements are shiny and reflective, the exact opposite in function of the black flags, but the shapes are very similar. Despite being reflective they create the same kind of kinetic shadow play that a flag would create. A gobo is a large flag, cutter, or even a full-sized flat used to cast a shadow on part of the set (fig. 6). The name comes from the early days of film, when the

FIGURE 5. *A reflector. Source: author's archive*

FIGURE 6. *A gobo. Source: author's archive*

director would call "go black out" a portion of set. This was abbreviated on the production notes as "GO B.O." and later became gobo. Many gobos appear to be like shapes cut in a cookie sheet (and indeed many are) but they consist of a material able to withstand the heat put out by the fixture, with shapes cut out for the light to travel through.

FRESNEL LENS

The high-powered lights seen on movie sets are known as Fresnels, due to the Fresnel lens they house, which are named after the French inventor who sought a way to strengthen the beams sent out from lighthouses. A Fresnel is divided into concentric circles to make it thin enough to fit in a portable device (fig. 7). The light from a Fresnel is more even and allows for the beam to be varied from flood to spot by changing the distance between the lamp/reflector unit and the lens. Many light sources employing this type of lens have a stippled pattern on the flat side of the lens to smooth out the beam. The translucent plexiglass spiral shaped rod in the *Light Prop* reminds me of a section slice of a Fresnel lens.

FIGURE 7. *Fresnel lenses. Source: author's archive*

CUCALORUS COOKIE

A cucalorus, which is commonly known as a "cookie", is used to break up light into patterns. Almost anything can be used as a cookie. A cinematographer might use natural objects like tree branches, woven fabrics, or patterns specifically made for lighting tools. They include hard cookies, made from plywood or poster board with random shapes cut out; soft cookies, made from plastic impregnated screen with random shapes cut out; and natural cookies, which include tree limbs or other objects that can be placed between the light and the subject. An opaque or translucent material having one or more cutouts that will allow light to pass through in order to project a dappled form or pattern, such as the suggestion of the shadows of tree branches, on the subject and background (fig. 8). An irregularly perforated shadow-forming flag, opaque or translucent, made of plywood or plastic, for example. The perforated spinning metal disks of the *Light Play* are essentially cinematic, kinetic cookie sheets.

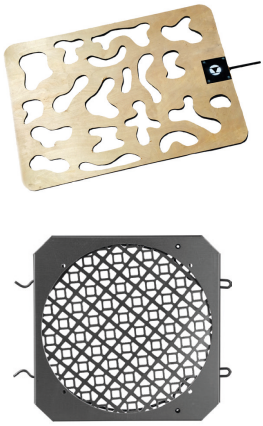

FIGURE 8. *Cookies. Source: author's archive*

SCRIM AND NET

A scrim is a circle of wire mesh, which slides into the ears in front of a fixture and reduces the intensity of the light, without changing the color temperature. A scrim is a type of material used to manipulate the intensity of the light source. Typically, scrims are quite large, either 10 × 10 or 20 × 20 feet, and used to diffuse the harsh sunlight when shooting exteriors. In the film and video industries, a round, framed metal screen, available in various densities, is placed on the front of a light source to act as a dimmer (fig. 9). They are also available so that only half of the frame is

FIGURE 9. *Scrims and nets. Source: author's archive*

screened, therefore allowing for only a portion of the light to be dimmed. For us, a metal screen used in front of a light to reduce intensity without diffusion. A net is a bobbinet or black net fabric on a frame, used to reduce light intensity and is available in single (half-stop) or double (full-stop). The scrim and net shape and material is also present in *Light Prop*.

DIFFUSION

Diffusion refers to anything that spreads or softens the harshness of light. We usually use the terms "heavy" or "lite" to define its diffusing properties. Heavy diffusion softens the light so much that there are practically no shadows, while lite only softens the edges of the shadows. In the *Light Prop* there is a large frame on the central axis that holds a material which only softly diffuses the light. It looks very similar to a modern-day standard ultra lite diffusion material called Hampshire Frost. As the name suggests its light altering properties are similar to a frosty window in Hampshire, England.

Now that we see the direct parallels of movie lighting equipment to Moholy-Nagy's apparatus, does it change our opinion of what the *Light Prop* actually was, or was intended to be? (fig. 10). It is crucial to remember that *Light Prop* was initially shown in a box with a large aperture lined with colorful flashing lights, but Moholy-Nagy subsequently exhibited it without the enclosure, and it appears in the film *Light Play: Black-White-Grey* without them as well. The film itself shows several tightly composed shots of different objects such as photographic film interspersed with passages of manipulated film—positive-negative reversals, inversions, or double-exposed frames (Tsai et al, 2011). As Arnold explains:

> *The machine never worked as intended. It did not have the smooth, continuous motion needed to create the intricate dance of shadows and light that are needed to create an immersive theatrical experience. So the film he created was actually the realization of his ideas for this machine. In the film he is able to selectively film and edit the motion of reflected light and cast shadows to create something both playful and theatrical. And also sublime, because the space created by these kinetic lights and shadows is deeply perceptual and taps into our own creative processing powers.* (Arnold 2021)

When Moholy-Nagy fled World War II, he lugged the bulky apparatus to America, but never did anything with it, so we will never know what its future might have been. Today the modulator is displayed in a different gallery lighting, it is not enclosed in the box, and therefore the reflected light is different. Similar to how its name changed over time, it has changed from a piece of equipment to an art piece. Might we consider the film *Light Play* a big photogram machine? What kind of light play are we talking about? What mood or source does the light play suggest to us? These are questions Moholy-Nagy himself probably did not feel the need to answer. Born into a world accelerating towards rapid change, Moholy-Nagy quickly found a place at the forefront of art, light, and communication. His fascination for industry, technology and the engineering culminated in his *Light Prop*, an object and idea he carried with him literally and figuratively into the new world.

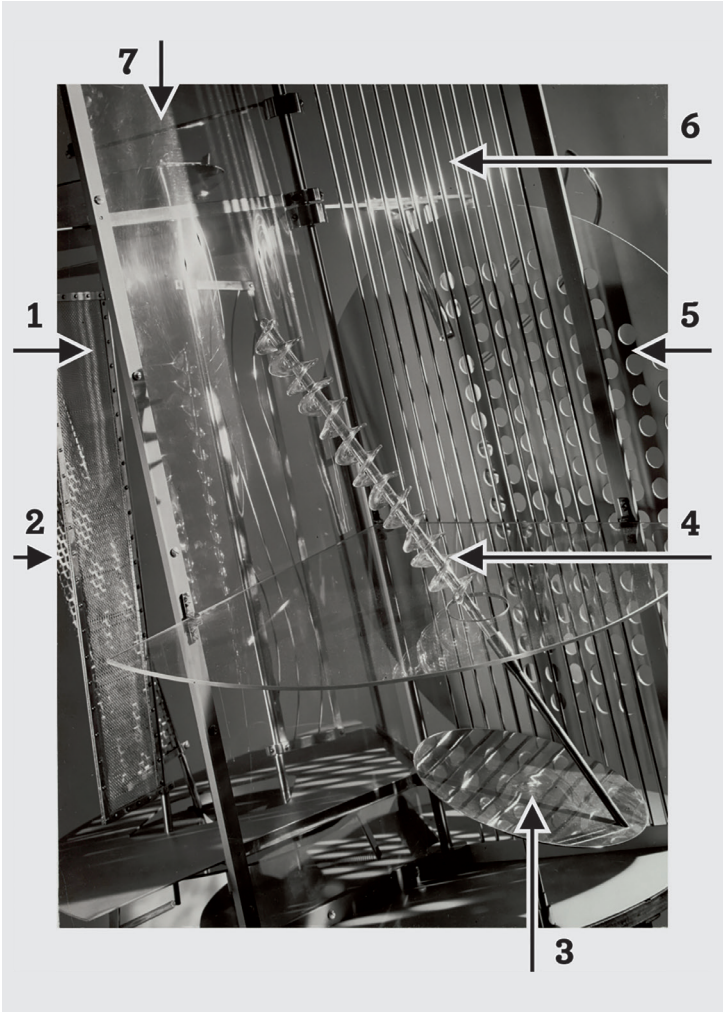

FIGURE 11. *Parallels between movie lighting equipment and the Light Prop. 1: net; 2: scrim; 3: reflector; 4: Fresnel; 5: cookie; 6: flag/solid; 7: diffusion. Author's visualization, superimposed on László Moholy-Nagy's 1930 photograph of the piece. Courtesy of the Moholy-Nagy Estate.*

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