

## SYMPOSIUM OF NEW MOTION PICTURE APPARATUS

*Summary.*—An innovation at the Spring, 1931, Meeting of the Society at Hollywood, Calif., was an exhibition of new apparatus held in the annex of the American Legion Auditorium. The exhibit aroused such great interest that it is hoped to hold similar exhibits at future conventions.

Exhibitors were required to conform to the following regulations: (a) It was necessary that the apparatus be new or have been developed or improved within the previous twelve months; (b) No pamphlets or advertising literature were permitted; (c) Each exhibitor was permitted to display a small card giving the name of the manufacturing concern and each piece of equipment was labeled with a plain label free of the name of the manufacturer; (d) A technical expert capable of describing the features of the apparatus exhibited was required to be present during the period of the exhibition.

### PORTABLE RECORDING SYSTEM FOR STANDARD CAMERAS\*

This recording system was primarily designed for industrial, news, and travel work. It employs two direct current motors operating in synchronism, and enables the cameraman to use any motion picture camera in synchronism with the recorder and produce a separate sound track on positive film. The camera motor hangs under the camera by two straps which are snapped on and off quickly, and operates the camera through a flexible shaft which can be plugged into the regular Bell & Howell or Mitchell cameras. The motors operate on 10 volt d-c. and are electrically interlocked for synchronism (Fig. 2).

Fig. 3. shows the recording head. A tachometer, footage counter and a 1,000 ft. Mitchell magazine are included. The motor mounted on the base is one of the d-c. interlocking motors. One switch controls the recorder, another switch the camera motor, and a third is the interlocking switch which throws the camera and motor into synchronism. The recording lamp holder is removable for cleaning and threading. When replaced it slips on a pilot pin with a stop screw so that it will always be in proper register. A mechanical filter is included between the motor and the recording head.

The amplifier consists of 4 resistance-coupled stages, provision being made for accomodating two microphones. A lamp voltage regulator, plate current meter, and volume indicator are also included

---

\* Audio-Camex System of the Hollywood Camera Exchange, Hollywood, Calif.

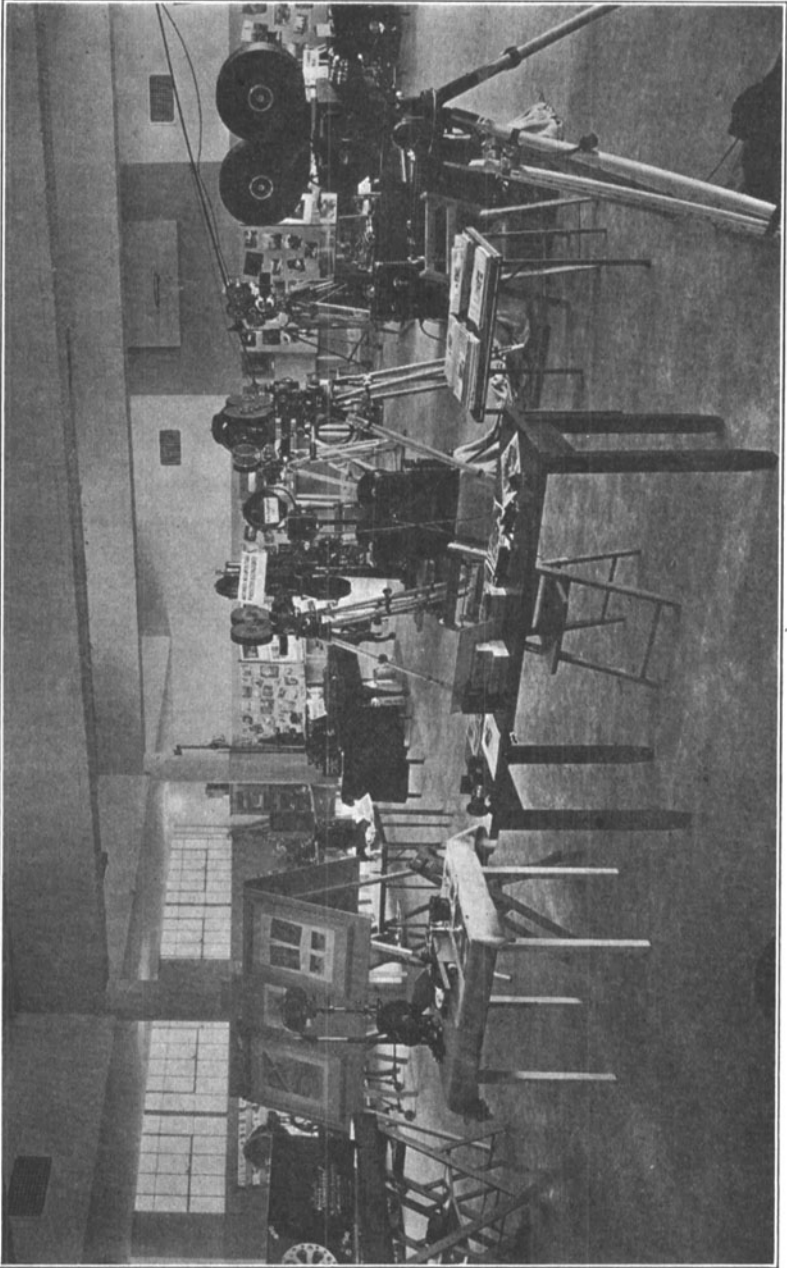


FIG. 1. Apparatus exhibit, Hollywood Convention, May, 1931.

with the amplifier. The recording glow lamp used is known as the Audio-Lite and is said to have a life equivalent to the recording time of 30,000 to 100,000 feet. of film. Its impedance is about 7,000 ohms, and it is constructed of non-volatile electrodes.

The amplifiers, motors, recording head accessories, *etc.*, are all contained in seven metal cases.

All the connectors are arranged differently; the microphone connectors are 5 point connectors, the battery cable connectors 6 point, and the Audio-Lite connectors 4 point, *etc.*, thus making it impossible to connect the apparatus incorrectly. The bullet type microphone is a two stage microphone and is used as a condenser transmitter. It is mounted on the swivel head and has a cannon connector. The microphone stand is collapsible.

#### A CAMERA WITH OPTICAL INTERMITTENT\*

The Moreno-Snyder continuous camera employs an optical system in which the image is moved in synchronism with the film by means of a single moving part which intercepts the light. The light passes directly from the objective to the film through the optical system without being handled by reflectors or similar elements. A means is provided for controlling the framing of the picture on the film in addition to a light control for governing the exposure. The film moves continuously, and the film feeding mechanism is synchronized with the moving element of the optical system. Included with the camera is an exposure meter employing a photoelectric cell which permits matching of the exposure for a given scene with that of any scene photographed previously. For the standard film speed of 90 feet per minute, the exposure time per picture frame is  $\frac{1}{24}$  of a second. The lens turret provides for three lenses (Fig. 4) and the focusing position and the exposure position of either lens or camera are the same.



FIG. 2. Audio-Camex portable recording system attached to a camera.

\* Moreno-Snyder Camera Corp., Hollywood, Calif.

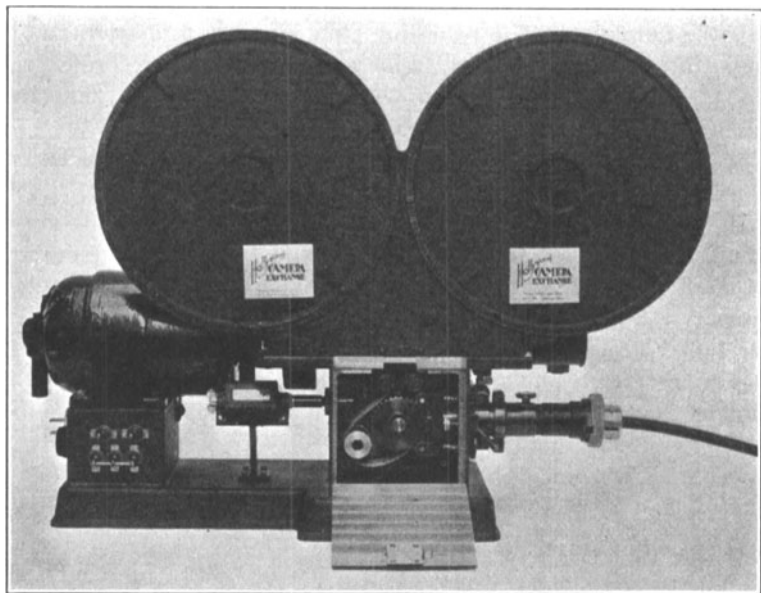


FIG. 3. Recording head of Audio-Camex portable recording system.

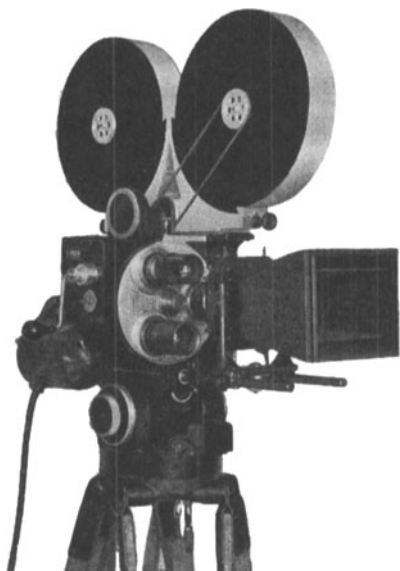


FIG. 4. Moreno-Snyder non-intermittent camera—front view.

By exerting a slight pressure on a small piston a prism is made to intercept the rays of light and direct them to the eye through a focusing finder (Fig. 5). This prism withdraws automatically after the third frame of film is past the aperture. The camera is silent and requires no blimp or muffler. Due to the continuous motion of the film, buckling is eliminated. Delivery and wind-up film magazines are detachable and interchangeable, while the camera can be operated as a

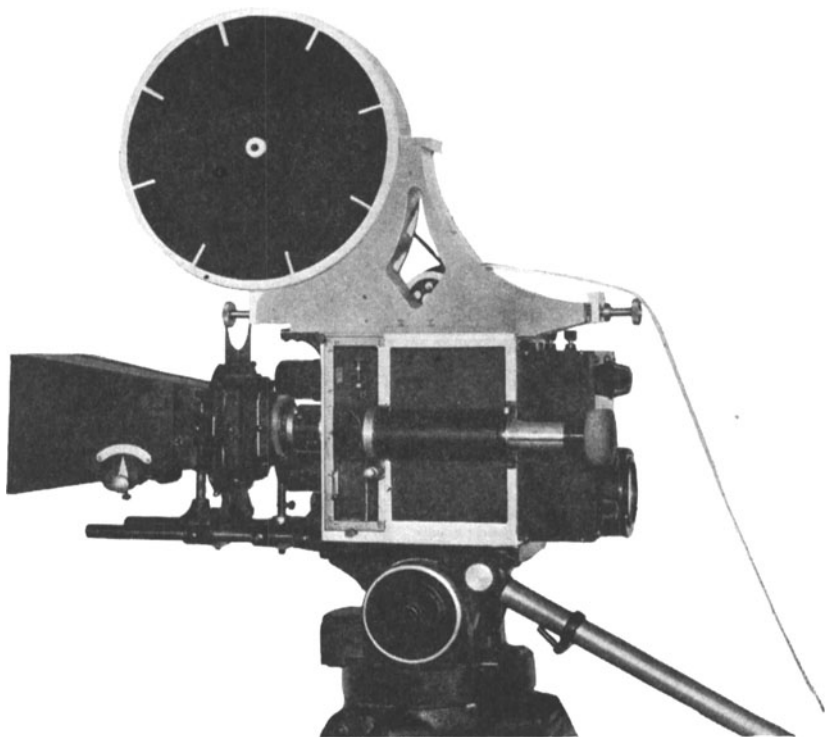


FIG. 5. Left side view, Moreno-Snyder camera showing focusing device.

speed camera for slow motion photography, and will run at 300 frames per second, or 125 ft. of film per minute, without change or adjustment.

The optical system includes a matte or exposure aperture, an objective lens, a moving lens unit, a corrective lens, and an exposure control, arranged on the camera in the order named. The moving lens unit moves the image-bearing shafts of light in synchronism with the film. It intercepts the light beam passing from the objective to

the film at one point only in the optical system, and moves it across the axis of the optical system constantly, and in a direction opposite to that in which the film is moved. The moving lens unit moves across the axis of the optical system at a point behind the objective lens, *i. e.*, at a point located between the objective lens and the film. The moving lens element is annular in general configuration and is rotatively mounted, so that it intercepts the axis of the optical system at the desired point, while the portion of the film that is exposed is

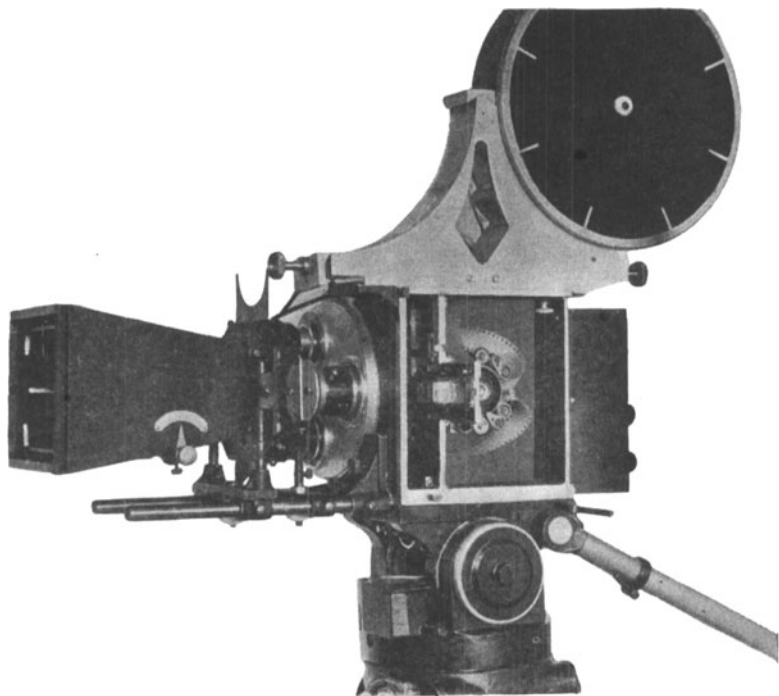


FIG. 6. Interior of Moreno-Snyder non-intermittent camera.

within the moving lens unit. In general the inner face of the moving lens unit is curved concentric with the axis of rotation of the unit, while its outer face is polygonal (Fig. 6).

A corrective lens is located immediately behind the moving lens unit between the latter and the film. The exposure control is located immediately in front of the film and includes a pair of shutter plates normally spaced apart to admit light to the film and adjustable in opposite directions parallel with the axis of movement of the film to

widen or narrow the opening through which light is admitted. Fig. 7 shows various details on the rear of the Moreno-Snyder continuous camera.

**NEW SILENT MOTION PICTURE CAMERA\***

This camera was designed particularly for quiet operation. The movement is entirely new, and no cams are used. The motion of the film is accomplished by eccentrics pivoted with levers, and the

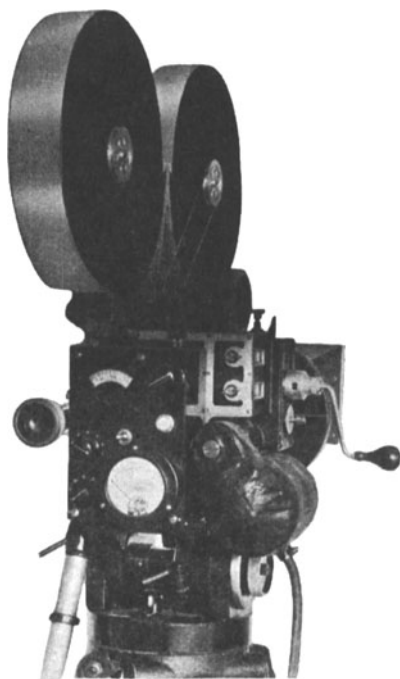


FIG. 7. Moreno-Snyder non-intermittent camera—rear view showing exposure meter and "Thermo-Head."

film travel is approximately the same as in the standard Mitchell camera. The pilot pins have a longer "dwell" or stationary period during exposure. Sawing of the film head is present but has been considerably reduced. A pair of gears from shutter shaft to movement and the worm of the shutter shaft drive the sprocket through a worm wheel. Another pair of gears is necessary in the motor mounting to change the speed to 1,440 rpm. By this means the number of

---

\* Mitchell Camera Corp., Hollywood, Calif.

gears required is made as small as possible. The gears and worm wheel are enclosed in an oil-proof housing, while the magazine is made slightly larger to allow room for sound proofing material and more silent bearings. An adjustor plate is provided between the camera and the magazine which insulates the magazine from the camera with sound-absorbing material. An adjustor shutter is incorporated but the dissolve mechanism has been eliminated. The face of the camera is of new design, having one lens mount focused from the rear of the

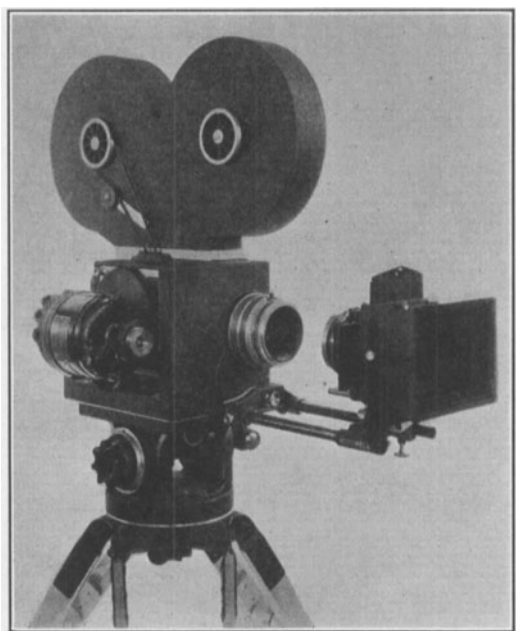


FIG. 8. Silent Mitchell camera for studio work.

camera and a scale plate in the face indicates the setting of the lens. The motor is integral with the camera door. The one shown in Fig. 8 is to be changed, and will be enclosed in a case containing sound-absorbing material.

#### AUTOMATIC SOUND AND PICTURE PRINTER\*

This 35-mm. fully automatic sound and picture printer prints both sound and picture at a single operation (Fig. 9). Notches on the edge

---

\* Bell & Howell Co., Chicago, Ill.

of the film and similar devices generally likely to get out of order are eliminated. Interlocking of operating levers makes it impossible to operate the machine incorrectly and means for stopping the machine automatically have been provided in case the film breaks, a lamp burns out, *etc.* After being set up, the machine only needs to be



FIG. 9. Bell & Howell 35-mm. automatic sound and picture production printer.

threaded with fresh positive stock at the completion of the printing of each reel. It runs equally well in either direction. One handle starts the machine either forward or backward, and controls the motor, brake, lights, air, vacuum tension, weights, trip locks between gates, *etc.* It is impossible to start the machine if any gate is open or if

any lamp is burned out. A traveling matte is used between the printing light and the negative film to control the printing value of the light without using notches on the film or similar devices. The traveling matte runs at one-fourth the speed of the negative, the purpose of the matte film being to secure control of the densitometric value of the final print. Densitometric control of printing light values is sufficiently exact to permit the same negative and traveling matte to be used in any printer, irrespective of location, with assurance of exact

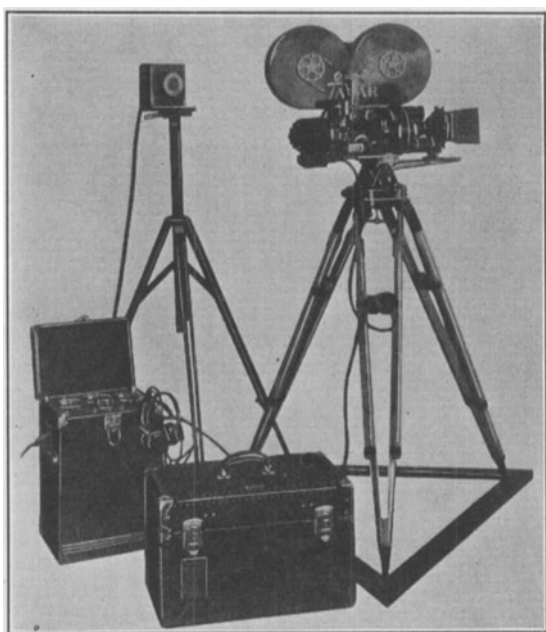


FIG. 10. Tanar portable sound recording equipment.

duplication of print densities. One operator can take care of several printers and each man should be able to handle six to twenty-five printers, depending on the nature of the work and the number of set-ups required.

#### RECORDING SYSTEM FOR STANDARD CAMERAS\*

The complete Tanar portable sound equipment used in the single system is shown in Fig. 10. It is carried in two moisture-proof cases weighing 60 pounds each. The upright case contains the amplifier

---

\* Tanar Corp., Ltd., Hollywood, Calif.

tube batteries for the amplifier and three batteries for supplying current to drive the camera motor. The flat case contains the "B" and "Tanar-Light" batteries, head phones, camera motor, two Tanar-Lights, and a microphone. A compartment in the lid of this case carries three cables for batteries, microphones, and camera connections. In the complete equipment a case is supplied for housing the camera. On the amplifier panel is included a volume indicator meter. The motor drive is very compact, light in weight, and is shown attached to the camera in Fig. 10. The drive operates on three "B" batteries.

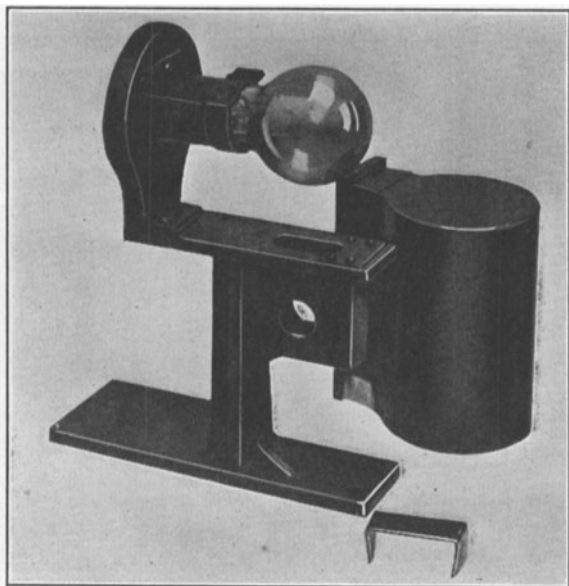


FIG. 11. Photoelectric cell monitoring device.

The tachometer is carried directly to the main shaft, and the drive to the camera is completed through Celeron silent gears. A switch to start and stop the motor independent of the control panel and the variable speed knob are mounted on the motor assembly. The motor plugs directly into a Bell & Howell camera or a Mitchell camera with a suitable adaptor. A short length of cable with a Tanar socket on the end completes the connection to the Tanar-Light. The Tanar-Light is a glow tube with electrodes of tantalum. The variable density system of recording is used.

## PHOTOELECTRIC CELL MONITORING\*

Metro-Goldwyn-Mayer Studios of Culver City, Calif., exhibited several light valves, a photoelectric cell monitoring device, and a photograph of a new valve stroboscope. The last-named device was in use at the studio at the time and could not be exhibited. The light valves are described in Mr. O. O. Ceccarini's paper entitled "Recent Contributions to Light-Valve Technic," published in this issue of the JOURNAL. They have a single grease-damped ribbon as compared with the standard valve, which has double ribbons with no damping.

The photoelectric cell monitoring device was designed to divert



FIG. 12. Stroboscope for viewing light valves in operation.

part of the light between the light valve and the recording objective into an efficient photoelectric cell, thereby eliminating part of the photoelectric cell amplifier and assuring quiet uniform PEC monitoring (Fig. 11).

The light-valve stroboscope is a projection microscope with a stroboscope wheel in the beam of light, which permits examination of the light valve in operation. This machine is used in the routine adjustment and maintenance of light valves (Fig. 12).

\* Metro-Goldwyn-Mayer Studios, Culver City, Calif.

## PROJECTION LENS TURRET\*

This lens turret is adapted for use on either the standard Simplex or the Super-Simplex projection mechanism. The use of this turret makes it possible to change to any one of three lenses without having to remove them from the projector. This makes it particularly adaptable where different lenses are used on sound-on-film, silent, or sound-on-disk prints, magnascope, or other special lens effects (Fig. 13).

The turret carries three lenses in individual lens mounts, and has both tilt and pan, as well as straight, vertical, and lateral adjustment.

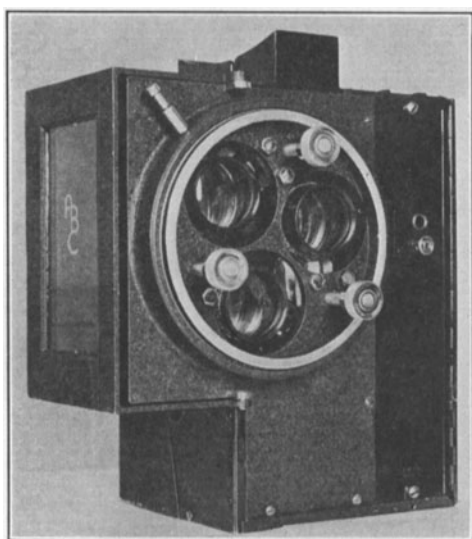


FIG. 13. A. B. C. projection lens turret—front view.

Each lens may be independently focused by a micrometer focusing screw. By means of adapters, the lens mounts accommodate all makes and focal lengths of lenses.

Any one of the three lenses may be swung instantly into position and rigidly locked by means of a hardened steel taper locking pin. The turret proper is mounted in a double race ball-bearing mount, and provision is made for adjustment to compensate for wear. The turret can be easily attached to the projector without changing the

---

\* A. B. C. Products, Culver City, Calif.

original mechanism in any way. It is merely necessary to remove the front plate from the projector mechanism, and remove the old lens mount. Since the turret mechanism is self-contained and mounted on a new front plate it fits easily into place. The new door is so

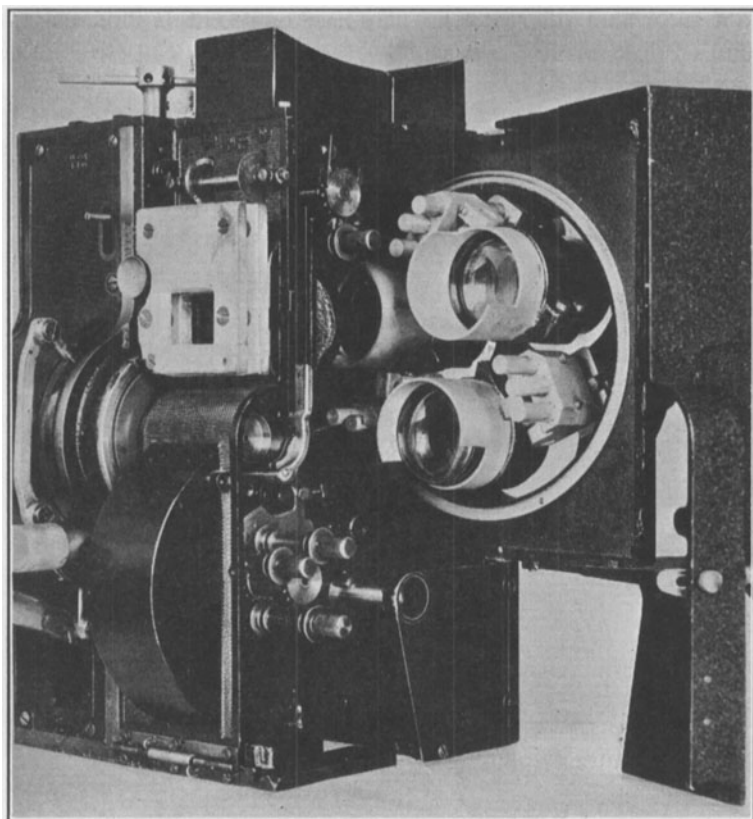


FIG. 14. A. B. C. projection lens turret—rear view.

designed and hinged that it will clear any light shield douser or other mechanism which the original Simplex door will clear (Fig. 14).

#### REAR SHUTTER ATTACHMENT\*

Of late there has been a trend toward the larger picture in the theater. This has made it necessary to increase the light intensity in

---

\* Fox West Coast Service Corp., Los Angeles, Calif.

order to illuminate the larger screen area properly. The resultant increase in light intensity at the source and at its concentration at the film aperture often causes sufficient heating of the film to make it warp and buckle, and get out of focus.

A device for relieving this situation, which readily lends itself to attachment to the Powers mechanism, is fastened to the head mechanism at three triangular points, making a rigid assembly which can readily be installed by any competent projectionist without extensive

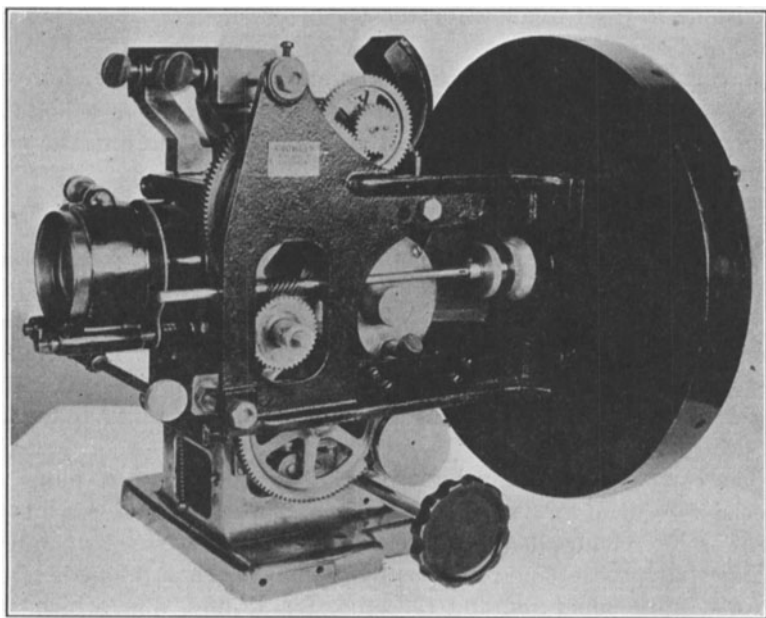


FIG. 15. Rear shutter attachment for a projector.

alterations to the mechanism (Fig. 15). The shutter adjusting device has two parts—a screw bearing and a locking nut. When the adjustment is made, this nut locks the assembly in position. The old Powers shutter assembly is discarded. The shutter housing is of cast aluminum alloy and the shutter blades are equipped with vanes which create a rapid circulation of air. The shutter shaft bearings are phosphor bronze bushings which are easily replaceable.

The standard set by other manufacturers in regard to the distance between the shutter plane and the film plane has been followed, per-

mitting any of the modern types of light sources to be used. The shutter diameter has been increased to take care of any wide angle light beam.

With this type of shutter it has been found necessary to discard the old style framing lever. In its place has been substituted a rack and pinion method of changing the position of the framing carriage, the latter being operated by a shaft which extends through the head mechanism, with a suitable knob conveniently located on each side of the projector head. The shutter shaft has been extended beyond the frame in front to allow for the use of cue-meters, speed indicators, *etc.*

A collapsible light shield has been developed, which effectively blocks out any objectionable light reflection. This is mounted on the film-gate, but in no way hampers the threading of film into the projector.

#### SILENT SUPER-FILM RECORDING CAMERA\*

This camera is designed to be used in the open without sound-proof covering for ordinary shots; to be adaptable for use with 65 mm. film; to be readily convertible to accommodate the special 62 and 70 mm. films with which some producers are experimenting; to be used for taking colored pictures in the camera without any alteration; to be suitable for recording sound directly in the camera if so desired; and for using 35 mm. film (Fig. 16).

The camera is normally built for the standard 65 mm. film. A special movement for 35 mm. film has been developed, and this movement is interchangeable with the 65 mm. movement. Two interchangeable sprocket and roller assemblies have been developed. One is for 65 mm. super-film and the other for 35 mm. film, which are interchangeable.

By removing one movement and sprocket assembly and substituting the other, the camera can be used for either size film. This feature applies to any other size film as special movements and sprocket assemblies can be furnished for any size film up to 70 mm.

In regard to the magazines, relative to this change in film size, when the camera is purchased for 65 mm. standard film or for special size wide film, the accompanying magazines are designed so that 35 mm. film can also be used in them. This is accomplished by providing the film rollers with a relief so that the 35 mm. film is properly guided into

---

\* Fearless Camera Corp., Hollywood, Calif.

the magazine, and by furnishing special take-up spools for the narrow film. These spools hold the film centrally in the magazine and prevent it from creeping to one side or the other.

Standard 35 mm. magazines can also be used on the camera when using 35 mm. film, making it possible to use some of the existing equipment of the producer. This is accomplished by a special adapter which fastens on top of the camera. This adapter partially covers the hole for the large size film and excludes all light from the inside of

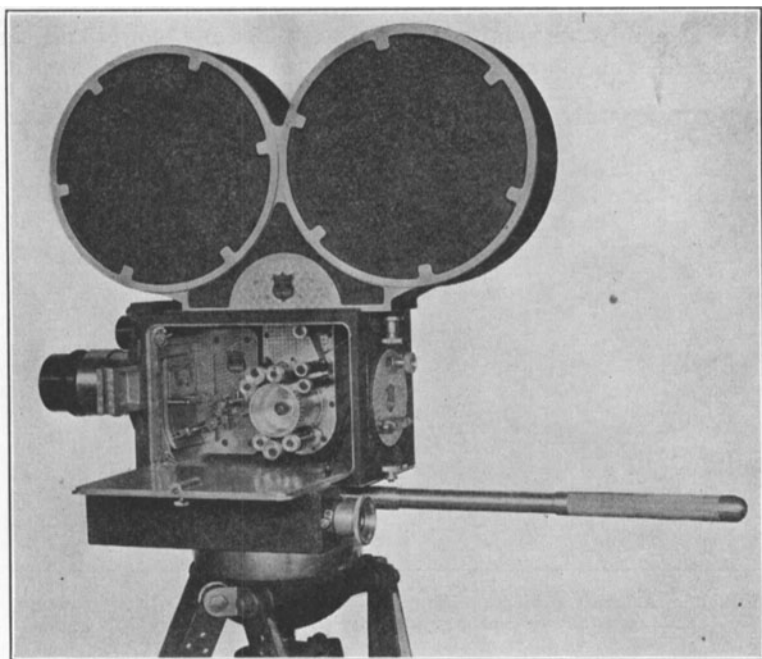


FIG. 16. Fearless silent film recording camera showing interior design.

the camera when using the 35 mm. magazines. With the adapter in place, standard 35 mm. magazines can be used.

Other features furnished as standard equipment with this camera include a quick focusing device; full force feed lubrication to all major driven parts; and two built-in footage counters. As special equipment, the camera can be furnished with a built-in speedometer, a built-in, three-speed, high-speed gear box, and a built-in sound recording mechanism.

A standard silent movement of enlarged size is used to feed the film intermittently past the aperture. Two claw pins are used on each side of the film to pull it down and pilot pins are used to lock the film during the exposure. This movement is easy to thread and, due to the simplicity of design and accuracy of workmanship, is so silent that only by placing the ear against the frame of the movement can any sound be heard while in operation.

#### AIR-BLAST PROJECTION LAMP\*

This new lamp is composed of four units: the enclosing housing, the burner assembly, the combination arc controller and blower unit, and the heat-resisting elliptical reflector.

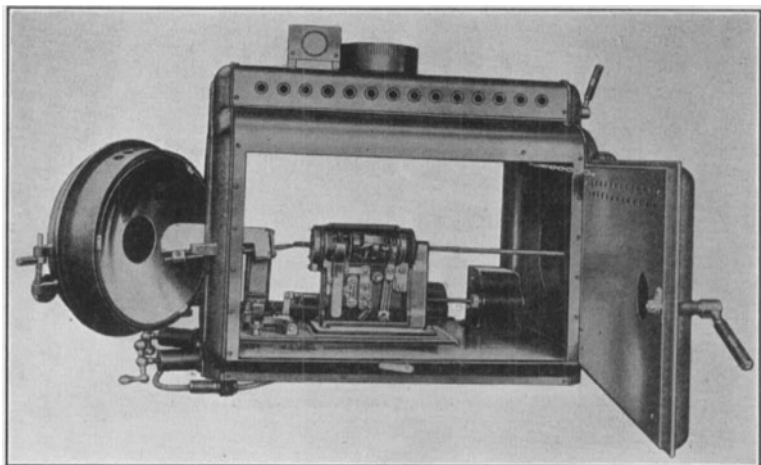


FIG. 17. Ashcraft projection lamp showing interior construction (burner assembly in center is normally covered by a plate).

A comparatively large motor is used for driving the arc control and the carbon feeding mechanism, as well as a drum-type blower rotor mounted on the opposite end of the arc control driving the motor armature shaft. The action of this rotor, which is almost silent, is to drive a strong blast of air through the working parts of the main burner or element. This blast of air, after passing over all parts subject to the effects of the radiated heat of the arc, passes out of the mechanism at an opening at the top of the enclosed burner housing, and is driven through the lamp house stack directly above the air

\* Ashcraft Automatic Arc Company, Hollywood, Calif.

exit opening in the burner, carrying with it heat and gases generated within the lamp house by the arc.

The benefits of this air cooling system are: protection from oxidation of the working parts, protection of springs and heat-treated parts from over-heating, and maintenance of a temperature below the deterioration point of the lubricant. The air cooling is also applied to the contact shoes which conduct the current from the mains to the rotating positive electrode.

The working parts, such as gearing, feeding mechanism, ball bearings, contacts, *etc.*, are entirely enclosed. A plate normally covers those parts exposed in the burner assembly shown in the cut (Fig. 17). The

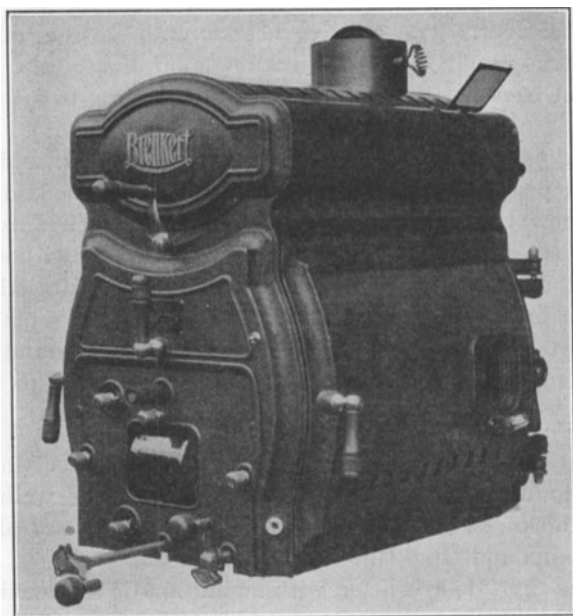


FIG. 18. Brenkert high intensity projection lamp.

air cooling arrangement, new contact assembly, and other features are in reality provided for the sole purpose of improving the mechanism to such an extent that it will withstand a much higher current density in the positive electrode than was formerly possible.

**HIGH INTENSITY PROJECTION LAMP\***

This high intensity projection lamp has all its moving parts enclosed

---

\* Brenkert Light Projection Co., Detroit, Mich.

and protected from dirt and dust (Fig. 18). All moving parts are lubricated and are quickly accessible for removal and replacement. Means are provided for continuously feeding and rotating the positive carbon, and for intermittently feeding the negative carbon. Care has been taken to make the entire feeding mechanism extremely accurate and the feed of the negative carbon is adjusted with an accuracy generally greater than needed. Accurate and convenient means are provided for adjusting the condensing lens for focusing and the condensing lens can be separately removed from the lamp house. The lamp accommodates a 20-inch positive carbon with continuous feed throughout its entire length, and a 9-inch negative carbon. The positive carbon is released through the outside of the lamp house at the rear. The positive head unit, negative unit, control unit, condenser unit, and the entire lamp house can be taken out and put back in a few minutes, without having to make any adjustments.

Separate manually controlled handles for positive and negative carbons are provided and may be operated whether the lamp is hot or cold. A new type of arc striker is included which automatically establishes the arc and is operated at full current load without causing injury to the positive carbon. The arc striker permits trimming of the carbons in the separated position. Removal and replacement of 4 small parts permits using the 16-mm. carbon compound for those who desire to use this size carbon when projecting wide film.

#### **FIREPROOF FILM CABINET\***

This film cabinet accommodates eight 2,000-foot reels of film enclosed in double walls of 18 gauge steel plate. The walls are 1½ inches in thickness, and are tightly filled with approved plastic fireproofing compound (Fig. 19).

The fume-tight door is fitted with an automatic self-locking device and an adjustable plunger type self-closing door pull. Adequate venting area is provided directly from the cabinet through a double walled steel vent pipe packed with fireproofing compound. A humidifier provides moisture for stored film. The top of the cabinet is made at an angle to discourage the tendency to use any flat surface in a booth or storage room for miscellaneous storage. The cabinet is constructed as a unit to permit using them in pairs where fire and insurance regulations permit.

---

\* Neumade Products, Inc., New York, N. Y.

## FILM VIEWING AND SOUND REPRODUCING MACHINES\*

In editing sound motion pictures it is important that the cutter be able to see and hear the action and sound of each of the scenes to be assembled. Where the sound and picture are on separate films, this is done by adding a separate sound-head to the desired model of picture-viewer used in the past. A photoelectric cell takes the place of the light source within the machine, and a specially designed exciter-lamp unit replaces the viewing-lens, while the film is moved between the two much as in the picture-viewer, but continuously.



FIG. 19. Neumade fireproof film cabinet.

Synchronism is maintained by connecting the two units with a flexible shaft coupling, fitted with a slip-clutch, so that either unit may be operated independently. Power is supplied by two motors: the accustomed variable-speed motor on the viewer, and a constant-speed induction motor for the sound-reproducer. The two machines may be operated by either motor, or both, and both motors are reversible. Since it is desirable that both machines be kept in perfect alignment with each other, they are mounted on a sturdy hardwood stand equip-

\* Moviola Company, Hollywood, Calif.

ped with casters, so that the machine may be readily moved about. In addition, this stand houses the a-c. operated amplifier for the sound reproducer, while the loud speaker is mounted above and behind the sound and picture movements. This machine is known as model UD.

For use with single-system sound and picture recordings, where the sound and picture are on the same film, and for final prints of the double-system recordings, where the sound and picture have been

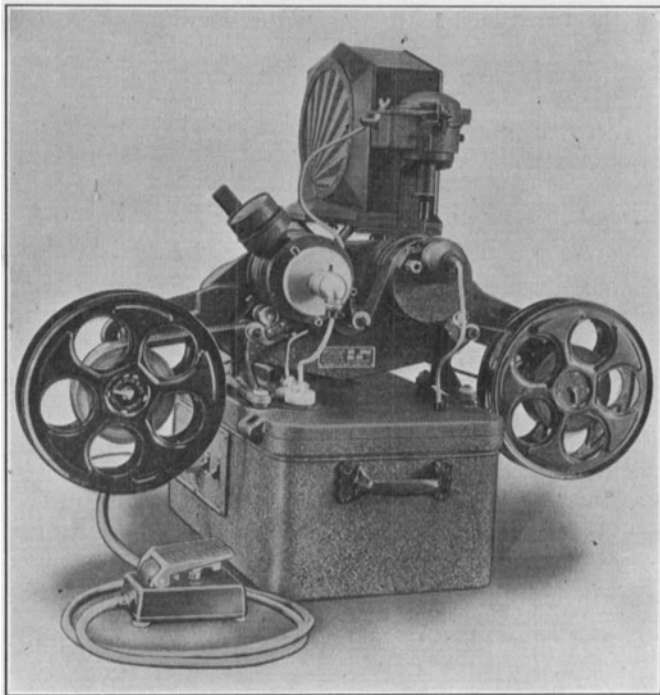


FIG. 20. Moviola sound picture inspection device for use with picture films which have the sound record on the same film.

combined on a single film, it was necessary to place a sound-head behind the picture-viewer.

In model MT (Fig. 20) the film moves continuously past both the picture aperture and the sound pick-up. The motion picture effect is obtained by means of a double walled cylindrical, rotary shutter with a slot, which revolves around the small lamp which furnishes the illumination. This shutter is geared to the film motivating sprockets so as to make one revolution per frame on the film. The double walls of

the shutter serve to concentrate the light on the film and improve the definition of the picture. The part of the film that is viewed, as well as the part that is scanned by the light line, is stretched over curved tracks. This eliminates the difficulty of keeping the film from buckling, which is encountered on flat tracks. The film is held and motivated by two sprockets, one at each end of the machine, and the tension of the film is assured by a tension roller placed in the center, between the two tracks.

The aperture over which the film passes under the viewing lens is the size of a "frame," and "framing" is effected by rotating the entire viewing system—lamp, diffuser, and viewing lens by means of a conveniently placed lever. The device is regularly operated by a constant-speed, reversible induction motor which drives it at a film-speed of 100 feet per minute. A variable speed motor may be used and this machine may be run at very high speed, if desired, without danger of damage to the film or to the machine, but running at low speed is not desirable with this machine, as the principle of its design allows only one short flash of light per frame to reach the observer's eye, resulting in flicker when the speed drops below a certain value. The entire assembly is mounted upon a metal case, which contains the amplifier, the transformer for the 6-volt lamps, and the connecting and switching devices.

A standard 50-cp. automobile headlight bulb, which is used in all the sound heads of the "Moviolas" as an exciter lamp, is used in this Model MT also as the viewing lamp, and operates from the same transformer as the exciter lamp. The latest development is a "Moviola" projector specially adapted for editorial work with sound equipment for sound on separate films as well as on composite film (Fig. 21).

There are two separate sound pick-ups, operating through a common amplifier. Either of these pick-ups may be used, and reproduction may be switched from one to the other by throwing a switch. The two units are each operated by a separate motor, a constant-speed motor for the sound unit, and a variable-speed motor for the sound-and-picture unit. Both motors are reversible, and the units may be run independently or synchronously, by means of a flexible-shaft coupling with a slip-clutch connection. The motors are controlled by either hand or foot controllers.

The lamp house of the projector is of the same design as that used for the exciter lamps of the sound pick-ups and the lamp used is the same, a standard 50-cp. automobile lamp. The illumination is

sufficient for a picture three or four feet wide at a distance of 4 to 30 feet, according to the focal length of the objective lens used. The

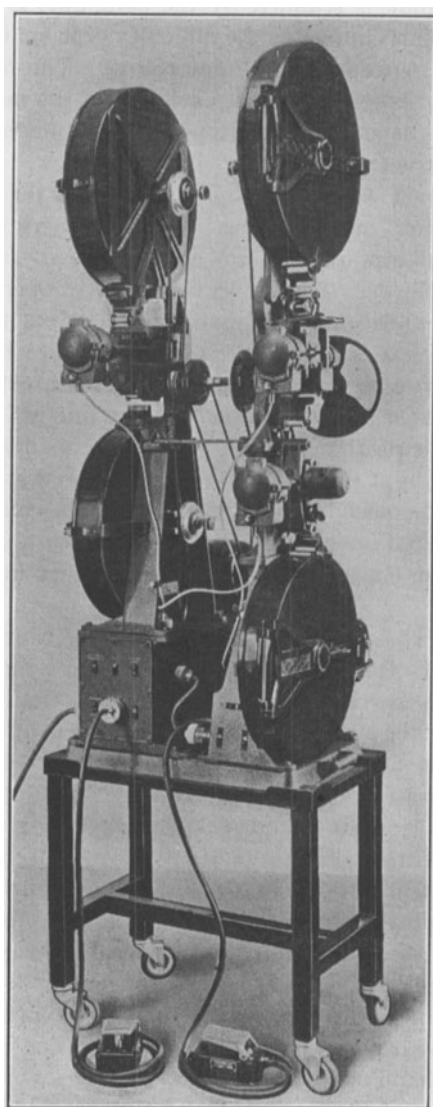


FIG. 21. Sound picture inspection projector for examining picture films which have their sound record on another film.

take-up devices are equipped with ratchets and automatically take care of the film when the direction of operation of the projector is reversed.

#### CAMERA AND PROJECTION LENSES\*

*Raytar Lenses.*—A new series of photographic lenses has been developed especially to meet the ideas of the cinematographer working at a speed of  $f/2.3$  and a range of focal lengths from 35 mm. to 152 mm. Tests have shown that these lenses are ideally corrected for use with Mazda lamps and the new high-speed film.

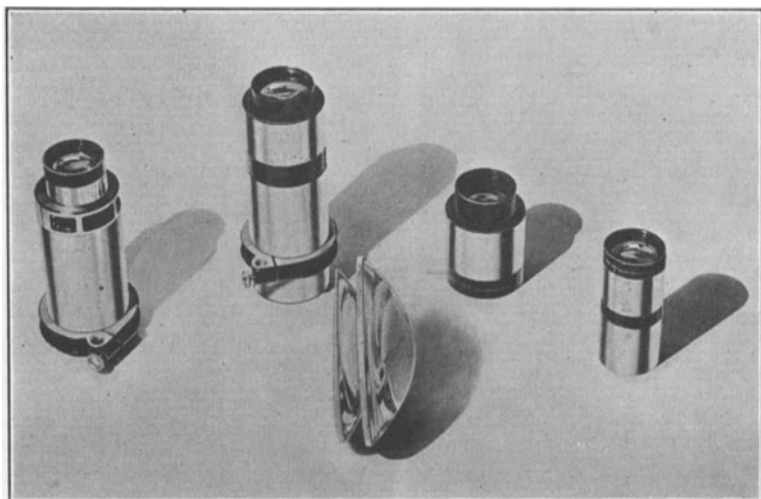


FIG. 22. Mounted super-cinephor lenses and cinephor condensers No. 5124 and No. 5125.

*Super-Cinephor Projection Lenses.*—These lenses are the first truly anastigmat projection lenses to be offered, and are notable for the quality of image—flatness of field, definition, and freedom from color fringes. They were developed to meet the anticipated demand for wide film, which would require lenses corrected for twice the angle compared to their use on 35 mm. film. More recently these have been developed in focal lengths down to 2 inches so that there is now available a series of short focal lengths for use with standard film that makes possible the projection of the large size picture now in vogue in many of the theaters with a quality of image heretofore impossible.

\* Bausch & Lomb Optical Co., Rochester, N. Y.

*Super-Cinephor Condensers.*—These condensers have been specially developed for use with high intensity arcs producing from 50 to as much as 100 per cent increase in illumination with very uniform distribution over the entire field. The rear condenser of 5½-inch diameter has a rear surface of convex cylindrical form, and a front surface of parabolic form. The front lens of 6-inch diameter has had a meniscus rear surface and a parabolic front surface.