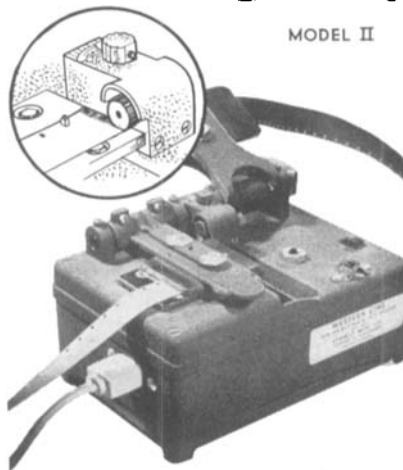


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Equipments exhibited by Marconi's Wireless Telegraph Co. at the Second Industrial and Television Exhibition, held in London in November, included the Marconi-Siebe, Gorman underwater television camera. There was also a selection of closed-circuit television units and accessories. The underwater camera is designed to be handheld and can be buoyancy-adjusted for virtual weightlessness under water. Overall dimensions are 3 ft by 2 ft, 3 in. The closed-circuit equipment exhibited included a camera Type 4339A, lens turret, weatherproof housing and an industrial synchronizing generator.

Biographical Note



Fred E. Altman

Retirement of Fred E. Altman, Assistant Director of Optical Design for the Apparatus and Optical Division of Eastman Kodak Co., has been announced.

Widely known as an authority on optical design, he is a Fellow of the Society and his interests during his 45-year career with Kodak have been reflected in papers published in the *Journal*. He presently holds more than 40 U.S. Patents in the field of optical design. As early as 1934 he was engaged in the development of a lens for the "the so-called wide film . . . 70mm" ("A Revolving Lens for Panoramic Pictures," by F. Altman, *Jour. SMPE*, 24: 383-394, May 1935).

With the Kodak Lens Design Department during World War I, Mr. Altman was engaged in designing optics for gun-sights and for the new field of aerial photography. During World War II, with the same department, he again worked on military optics, participating in the development of a telescopic tank sight in the short space of three weeks. Among Mr. Altman's inventions and the developments on which he worked is the $f/1.9$ Cine lens which has been continuously manufactured for 35 years.

Other interests of Mr. Altman's described in *Journal* papers include "An Optical System for the Reproduction of Sound From 35mm Film (co-author, J. H. McLeod), *Jour.*, 37: 36-45, July, 1938, and "35mm to 16mm Sound Reductions printer." (co-authors, C. W. Clutz and J. G. Streiffert) *Jour.*, 52: 669-675, June 1949.

Mr. Altman's retirement plans include further studies in optics, and a number of recreational activities including golf, wood-working, mountain hiking and photography.

Abstracts

Abstracts from other Journals, chosen for importance and timeliness, are published in the *Journal* from time to time. The greater numbers of these abstracts are translations, chiefly from the U.S.S.R., and made available by the *Kodak Monthly Abstract Bulletin*

The subject areas are grouped below

High-Speed Photography and Instrumentation
Printing and Optics
Projection
Sensitometry and Image Structure
Sound Recording and Reproduction
Television

HIGH-SPEED PHOTOGRAPHY AND INSTRUMENTATION

Light Sources and Shutters for High-Speed Photography and Cinematography. (in Russian), V. G. Pell', *Tekh. Kino i Televideniya*, 4: 79-86, June 1960.

Western developments in spark, flash and discharge lamps and in Kerr-cell, Faraday and other high-speed shutters are reviewed.—S.C.G.

New Flash Lamps (in Russian), I. S. Marshak, V. I. Vasil'ev, A. I. Mironova, V. P. Ivanov and R. G. Vdovchenko, *Uspekhi Nauch. Fotografii*, 6: 43-52, 1959.

The characteristics of a number of flash-discharge tubes now being produced in the Soviet Union are described, and an attempt is made to classify them.—S.C.G.

Physical Mechanism of the Discharge in Tubular Electronic Flashlamps and Their Loading Limits (in Russian), I. S. Marshak, *Uspekhi Nauch. Fotografii*, 6: 16-26, 1959.

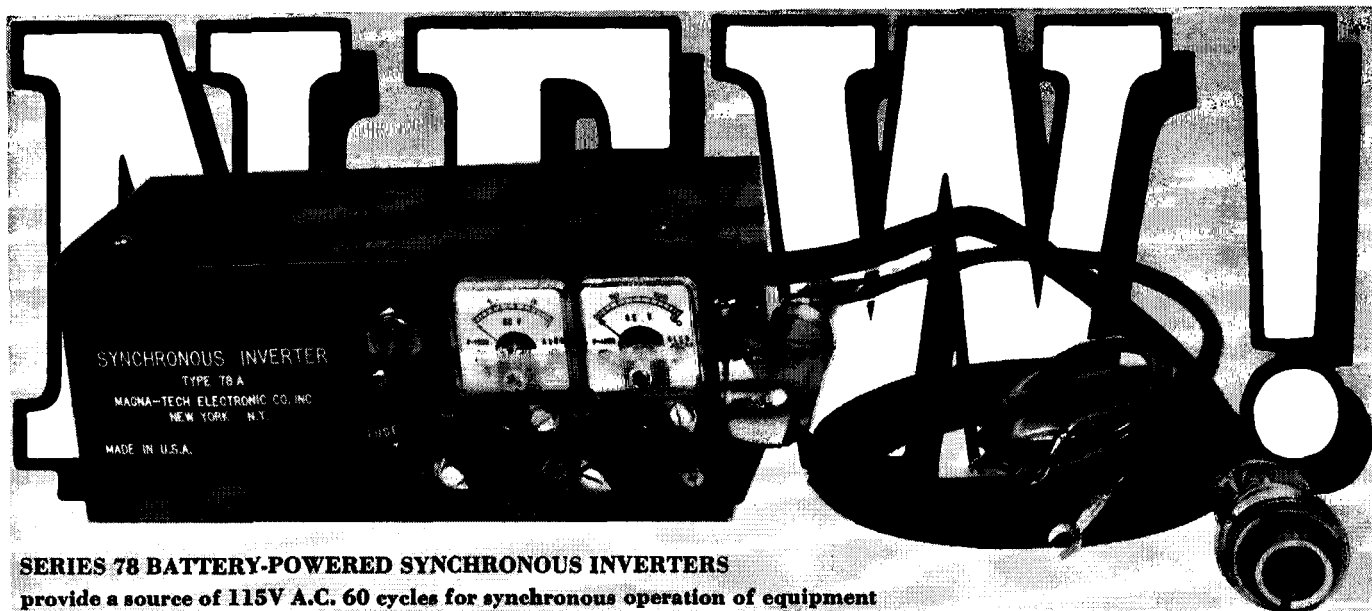
An analysis is made of the conditions during the quasistationary state of the discharge in an electronic flashtube when a large current is flowing. The theory of the striking of the discharge by the application of the small, high-frequency pulse is discussed. Formulas are worked out for the limiting loads set by the incipient destruction of the glass or quartz envelope.—S.C.G.

Study of the Brightness of a Flash-Discharge Channel (in Russian), K. S. Vul'fon and F. A. Charnaya, *Uspekhi Nauch. Fotografii*, 6: 27-30, 1959.

The variation of the maximum brightness of the discharge in an electronic flashtube filled with different gases, as the pressure and electrical parameters are varied, is studied experimentally.—S.C.G.

Spectral Characteristics of Electronic Flashtubes (in Russian), B. M. Vodovatov and M. I. Epshtein, *Uspekhi Nauch. Fotografii*, 6: 35-42, 1959.

The method of testing of a number of Soviet-produced electronic flashlamps is described. The relative spectral-energy densities of the lamps are tabulated, and, for one of the lamps, a table gives the variation of the relative spectral-energy

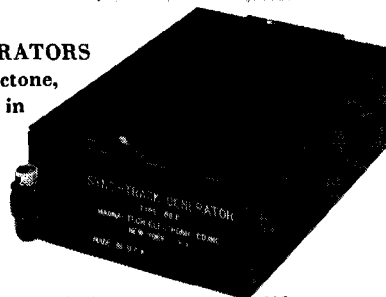


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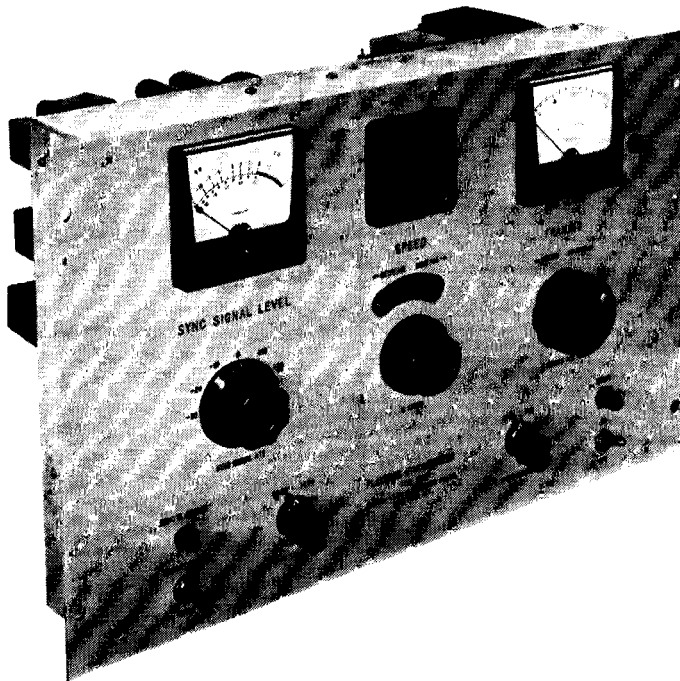
provide a source of 115V A.C. 60 cycles for synchronous operation of equipment in the field. A 10 minute take made with cameras and film recorders driven from these Inverters will be in precise lip-sync $\pm \frac{1}{4}$ frame. 50 Watt thru 500 Watt models are available for driving all cameras, such as Mitchell, Arriflex, Auricon, etc. or any film recorders. All solid state, the unit pictured above, Type 78A, 50 Watts, weight 5 pounds.

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density with different power supplies.—S.C.G.

Image Movement in Time Magnification With Image Compensation (in Russian), A. S. Dubovik, *Zhur. Nauch. i Priklad. Fotografii i Kinematografii*, 5: 209-217, No. 3, May-June 1960.

A mathematical analysis of image movement in time magnification with image compensation leads to the following conclusions: (1) The center of reflection of the scanning lens in systems with image compensation changes its position relative to the intermediate image in the time of exposure of one frame, leading to movement of the image. In choosing the general center

of reflection (scanning), it is necessary to take into account the magnitude of image motion for different parts of the working angle of the camera. (2) Image shift in depth has no influence on the photographic quality of the picture. (3) The movement of the image on exposure of a frame is proportional to the speed of the camera lens and, to a large degree, is determined by the distance of the reflecting plane of the mirror from its axis of rotation. (4) Movement of the image for a given lens speed is proportional to the size of the intermediate image (size of the mirror). The present investigation makes it possible to take image movement into account in correctly choosing an optical system for

constructing a high-speed camera with image compensation.—S.C.G. (Adapted from Author's Abstract.)

Camera RKS-1 for High-Speed Cinematography, S. M. Provornov and O. F. Grebennikov, *Instruments and Experimental Techniques* (transl. ed. of *Priboiy i Tekh. Eksper.*), 961-964, No. 6, Nov.-Dec. 1959.

A high-speed, raster rotating-mirror Soviet camera, RKS-1, designed for research cinematography at a frequency of more than 10^8 frames/sec is described. Some of the motion-picture frames are reproduced. (Authors' Abstract.)

A Light Source for a High-Speed Motion-Picture Camera (in Russian), N. N. Ogurtsova and I. V. Podmoshenskii, *Uspekhi Nauch. Fotografii*, 6: 58-61, 1959.

The light source described is a spark gap in which the spark is rendered more uniform by confining it in a channel of 2-mm diameter cut in a plate of Textolite (a resin-impregnated, laminated cloth). The power source is a bank of four capacitors and inductances. Current, voltage, light output, and spectral characteristics of the source have been recorded.—S.C.G.

Image-Converter Tubes for the Study of Ultrarapid Processes (in Russian), M. M. Butslav, *Uspekhi Nauch. Fotografii*, 6: 76-83, 1959.

Two Soviet-made impulse image-converters are described that are suitable for obtaining a series of frames of an ultrarapid event. They are the PIM-3 and the smaller PIM-4.—S.C.G.

High-Voltage Ceramic Condensers for Electronic Flash (in Russian), K. E. Medvedev, *Uspekhi Nauch. Fotografii*, 6: 75, 1959.

A Power-Supply Circuit for Electronic Flashlamps Under Conditions of Rapidly Repeated Flashing (in Russian), V. P. Ivanov, A. L. Vasserman, A. A. Bukareva and V. P. Zhil'tsov, *Uspekhi Nauch. Fotografii*, 6: 62-63, 1959.

Only a summary of the original paper is given. The general problem of the design of power-supply circuits for rapidly repeating flashlamps was discussed and individual circuits were described.—S.C.G.

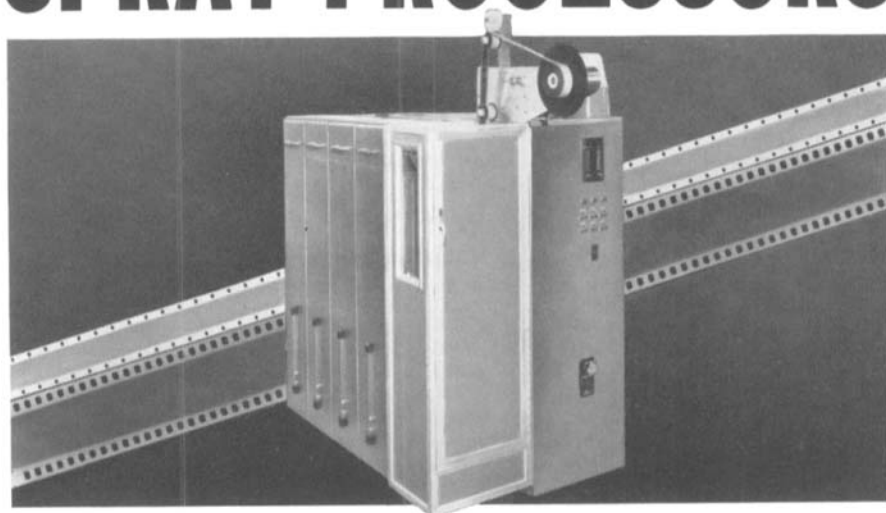
On the Use of Accumulators as a Power Supply for Flashlamps (in Russian), M. G. Feigenbaum, *Uspekhi Nauch. Fotografii*, 6: 64-67, 1959.

Two types of acid accumulator and one type of alkaline silver-zinc accumulator, both Soviet-made, were studied for use in the power pack of an electronic flashlamp, instead of the usual battery of condensers. The data obtained are tabulated.—S.C.G.

Electrolytic Condensers for Electronic Flash Equipment (in Russian), G. M. Gracheva, L. N. Zakgeim and V. F. Safonov, *Uspekhi Nauch. Fotografii*, 6: 72-74, 1959.

Methods of Practical Preparation of Optical Grids for High-Speed Photog-

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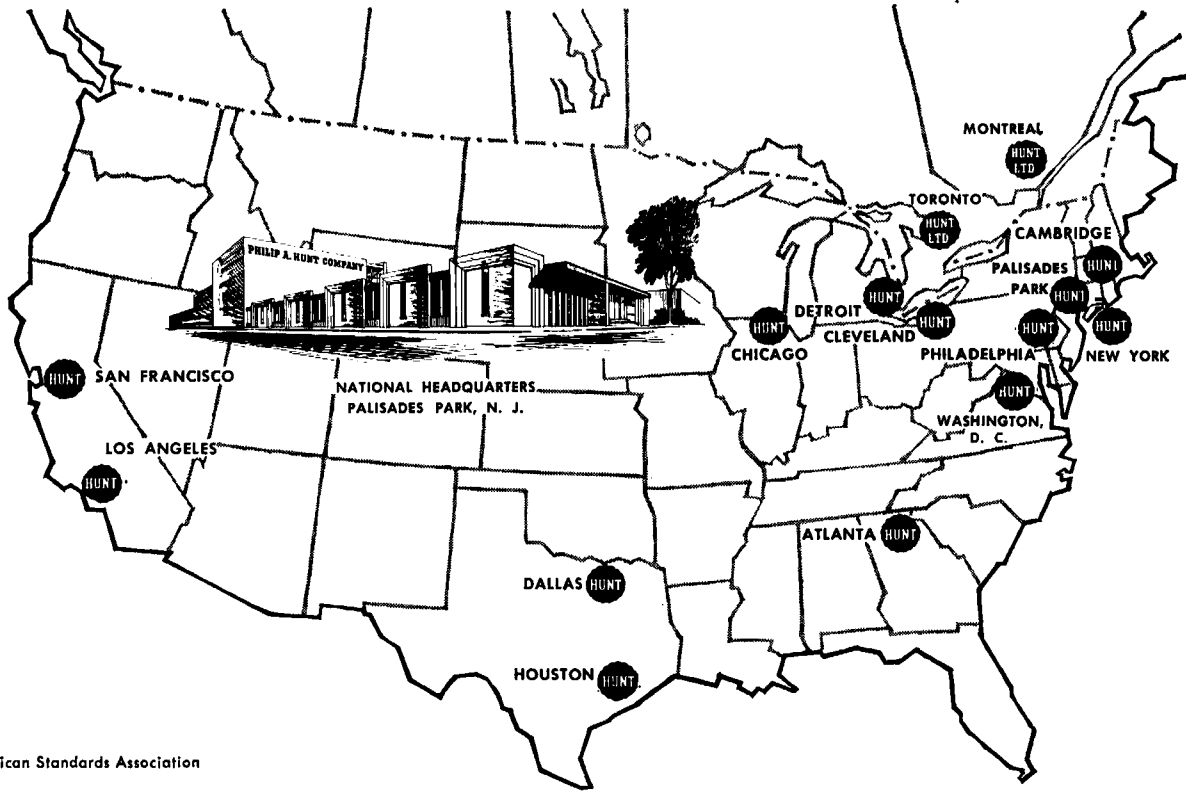
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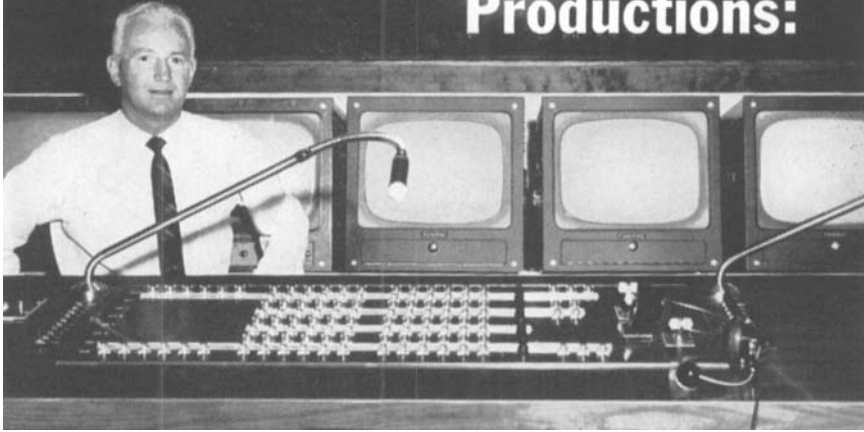
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AMPEX and
VISUAL ELECTRONICS

raphy, (in Russian), L. V. Akimkina, *Uspekhi Nauch. Fotografii*, 6: 152-154, 1959.

Optical grids decomposing an image into elements are required for a number of purposes, including high-speed cinematography and stereophotography. They may be made by mechanical methods involving casting or stamping from a metal matrix, or by photomechanical methods. A number of methods are briefly outlined. The paper is only a summary of the original lecture.—S.C.G.

A Raster Method of High-Speed Cinematography (in Russian), O. F. Grebennikov, *Uspekhi Nauch. Fotografii*, 6: 144-151, 1959.

The principles of image dissection in high-speed photography by means of a line or a point grid are outlined. The advantages of a point grid are discussed. Since 1954 a study has been made of the possibilities of using a point grid, consisting of a glass plate with an array of embossed spherical lenses, together with a system of rotating mirrors and a moving film. The necessary characteristics of such a camera required to give the maximum information content are analyzed in relation to the resolving power of the optical system and the photographic material.—S.C.G.

An Image-Converter Method of Photographing Ultrarapid Processes (in Russian), M. M. Butslav, E. K. Zavoiskii, A. G. Plakhov, G. E. Smolkin and S. D. Fanchenko, *Uspekhi Nauch. Fotografii*, 6: 84-89, 1959.

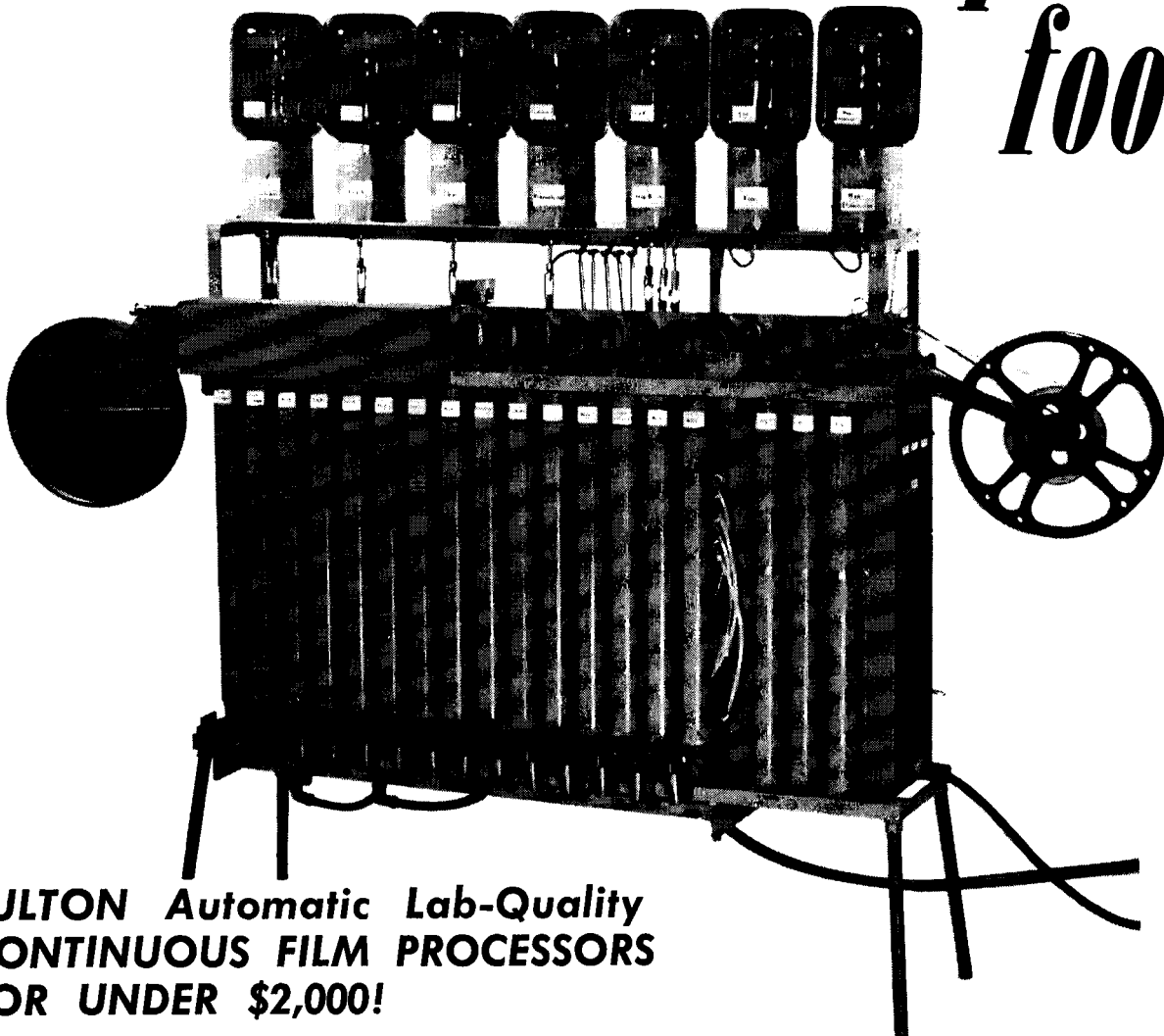
An image-converter tube is adapted for producing streak records of a small light source by introducing deflecting plates, as in the ordinary television tube. The applied deflecting voltages spread out the image into a circular arc. Time resolutions of the order of 10^{-12} sec can be obtained. Some experimental applications of such a tube are mentioned.—S.C.G.

PRINTING AND OPTICS

Study of the Change of Quality of a Photographic Image During Printing (in Russian), I. B. Blyumberg, T. M. Zyazina and G. I. Teregulov, *Tekh. Kino i Televideniya*, 4: 10-18, July 1960.

To study the photographic image during printing, a positive was obtained from an original negative with the insertion of two intermediate positives and two internegatives into the printing series. The quality of the image obtained at each stage was examined. With good contact during printing, the quality was independent of the use of diffuse or direct lighting. Poor contact was much more important when diffuse lighting was used than when the lighting was direct. During the printing series, picture sharpness did not fall as much as resolution. The graininess of a positive image obtained by printing was higher than the graininess of the negative if $\gamma_{\text{pos}} \gg 1.0$; and it was less if $\gamma_{\text{pos}} \ll 1.0$. There is a connection between the change in graininess on printing and changes in resolution and sharpness. The greater the fall in resolution and sharpness, the smaller will be the growth in graininess, and vice versa.—S.C.G.

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Properties of a Single-Element Light Amplifier Using Sintered Cadmium Selenide Photoconductive Material

The use of photoconductive sintered cadmium selenide as the control element in a light amplifier offers the possibility of improved gain and speed of response. Such a single-element light amplifier has been made and tested. The results show that moderate gains with high output luminance are possible with speeds in a range suitable for moving pictures. Very high gains are possible if slow response can be tolerated.

Measurements were made over a range of operating frequencies and for various input levels. Data on rise time, decay time, and gain for tungsten-light input are given in curve form. From these curves the

operating range and input-output light levels for useful picture reproduction can be determined.—F. H. Nicoll, *RCA Review*, 20: 658-669, Dec. 1959.

Solid-State Image Intensifier Under Dynamic Operation

This paper describes the performance of photoconductor-electroluminescent-phosphor image intensifiers under dynamic conditions of operation. Both experimental data and theory are presented. The theory is based on some simplifying assumptions which allow easy analysis and permit an insight into the importance of the various parameters. The experimental data, however, confirm the applicability of the analy-

sis. Some suggestions concerning the possible improvement of intensifier performance are made.—C. P. Hadley and R. W. Christensen, *RCA Review*, 20: 670-681, Dec. 1959.

Solid-State Optoelectronics

A discussion of the harnessing of photoelectric and luminescent phenomena is preceded by a brief classification and explanation. This is followed by a description of optoelectronic modulators and amplifiers, i.e., devices which have mixed optical and electrical signal and power access. The technology of assembling image-transmitting, image-storing, and picture-reproducing panels from optoelectronic elements is reviewed.

The functioning of various optoelectronic logic nets and computer components is treated in detail. Finally, a synthesis of panel technology and logic circuitry into novel picture-processing panels and computer systems is proposed. The similarity between the organizational structure of such parallel processing systems and that of the neutron network of vertebrate retinas is pointed out.—E. E. Loebner, *RCA Review*, 20: 715-743, Dec. 1959.

Optical Feedback Type Storage Light Intensifiers

Three designs of storage light intensifiers were evaluated by building samples. One design uses a Fotoform glass structure to support the photoconductor and electro-luminor and to provide optical isolation of cells. Another uses a transparent (glass or plastic) multiple pedestal structure to provide light paths through the photoconductor and support the active materials. The photoconductor itself provides the optical isolation. The third design uses a flat glass plate as a support, the active materials and optical isolation being built up in layer fashion. Devices of the last type worked best. Typical operation provided optical trigger of 0.1 foot-candle second, half-hour storage and 0.1 second erasure in a 12 inch square panel with 250,000 storage cells. With suitable operating conditions, half-tone pictures could be displayed for one minute or longer.—H. O. Hook, *RCA Review*, 20: 744-752, Dec. 1959

PROJECTION

The Conditions for Perception of Films in Theaters in Relation to the Future Development of New Types of Cinematography. (in Russian), V. G. Komar, *Tekh. Kino i Televideniya*, 4: 28-37, June 1960.

Study of a 35mm Motion-Picture Projector with Optical Equalization of the Discontinuous Motion of the Film (in Russian), L. G. Tarasenko, *Tekh. Kino i Televideniya*, 4: 40-47, July 1960.

Results are given of a study of one of the mechanisms of optical equalization of the discontinuous motion of the film in relation to picture quality (stability, sharpness, brightness and flicker). It is shown that this method of motion-picture projection has a number of important advantages over the existing form.—S.C.G. (Translation of Author's Abstract.)



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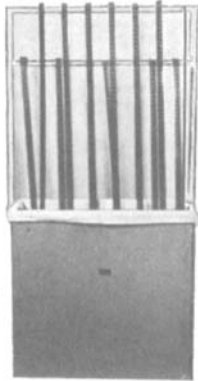
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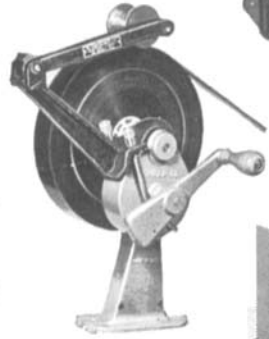
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A Universal Motion-Picture Projector (in Russian), *Tekh. Kino i Televideniya*, 4: 47-48, July 1960.

A brief description is given of the Type TKPU-1 projector, made in the Kinap factory of Odessa. It is intended for the screening of 35mm film with photographic soundtrack; 35mm film with anamorphic image, photographic soundtrack and four magnetic soundtracks; and 70mm film with six magnetic soundtracks.—S.C.G.

The Problem of Stereoscopic Motion-Picture Projection in Polarized Light (in Russian).

A method of stereoscopic motion-picture projection using polarized light and the technical means of carrying it out are described. The following problems are considered: polarizing light-filters; the screen for polarized projection; the stereo projector; polarizing spectacles; and future developments.—S.C.G.

[Translated from *Tekh. Kino i Televideniya*] A. I. Levington and V. S. Shchekochikhin. *Trudy Vsesoyuz. Nauch.-Issled. Kinofotoinst.*, pp. 108-21, No. 31, 1959.

Yellow-Flame, High-Intensity Carbons With a Current Intensity of 225 A

Results are given of an experimental investigation of the construction of a powerful lamp with yellow-flame carbons for the shooting of color films on stock balanced for a color temperature of 3300°K.

The article considers the following problems: the requirements for new carbons; the chemical composition and geometrical variables of the carbon; characteristics of high-intensity yellow-flame carbons; and the spectral characteristics of high-intensity yellow-flame carbons. (S. C. G.)—[Translated from *Tekh. Kino i Televideniya*] T. V. Derbisher, L. F. Kabanova, and N. K. Zanina. *Trudy Vsesoyuz. Nauch.-Issled. Kinofotoinst.*, pp. 26-35, No. 30, 1959.

SENSITOMETRY AND IMAGE STRUCTURE

Some Points in the Production of Sharp Screen Images on Filming Fast-Moving Subjects (in Russian), M. P. Dolukhanov, *Tekh. Kino i Televideniya*, 4: 77-78, June 1960.

The exposure time for one frame of motion-picture film required to give a sharp image of a moving object is calculated. The actual exposure time obtainable with an 8mm camera is longer than this, but the resulting lack of sharpness is not noticeable. An explanation of this phenomenon is given in terms of information theory. Although a single frame may appear unsharp, the succession of slightly different images reduces the ambiguity and an impression of sharpness is obtained.—S.C.G.

SOUND RECORDING AND REPRODUCTION

The Problem of the Quality of Stereophonic Sound in Motion-Picture Theaters (in Russian), B. F. Natarov, *Tekh. Kino i Televideniya*, 4: 45-48, June 1960.

Feedback as a Method of Correction of the Frequency Characteristics of Electromechanical Light Modulators (in Russian), Yu. G. Zarenin, *Tekh. Kino i Televideniya*, 4: 38-44, June 1960.

A Reading System "with Back Scanning" (in Russian), L. Belyaeva, *Kinomekhanik*, 42-44, Jan. 1960.

In the usual form of reading of a soundtrack in a motion-picture projector, called in the article "with forward scanning," the image of a mechanical slit is formed on the soundtrack and the light passing through is received on a photocell. In the system described, "with back scanning," an image of the soundtrack is formed on the mechanical slit and the light passing through is received on the photocell. It is claimed that, with this system, more even illumination can be obtained and adjustment is easier. It has been incorporated in the KSS-35 projector.—S.C.G.

The Number of Stereophonic Sound-Reproducing Channels in Wide-Format Cinematography (in Russian), B. F. Natarov, *Tekh. Kino i Televideniya*, 4: 49-51, July 1960.

The author describes his experiences with a five-channel stereophonic system with one soundtrack for sound effects.—S.C.G.

TELEVISION

New Measurements on the Transfer Properties of Objectives from the Standpoint of Television Techniques (in German), D. Frenzel, *Hausmitteilungen, Jos. Schneider and Co. Optische Werke*, 12: 64-72, 90-96 and 111-112, Nos. 5/6, 7/8 and 9/10, 1960.

A method of measuring the line spread of lenses is sketched in which the test

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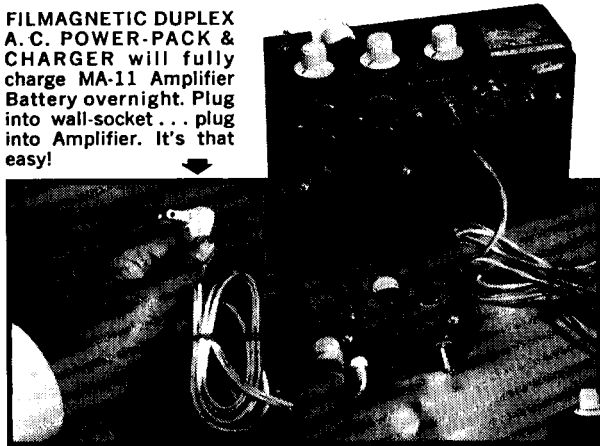
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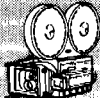
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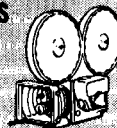
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object is rotated, and a cathode-ray oscilloscope displays the attenuation curve as a function of frequency. Graphs for several lenses are shown in which the attenuation in decibels for a line interval of 0.7 mm is plotted against field angle.—F.H.P. (Reprinted from *Rundfunktech. Mitteilungen*, 3: 235-241, 1959.)

A High-grade Industrial Television Channel with Reference to Infra-red Operation

The range and scope of the uses of television for industrial purposes are indicated to give some of the design requirements and to show broadly how they have been met

with reference to a particular television channel employing a vidicon camera tube. In addition, two special applications are described, namely the use of this channel with infra-red and ultra-violet light.—J. H. Taylor, *Jour. Brit. I.R.E.*, 20: 77-85, Jan. 1960.

The Equipment of the BBC Television Film Studios at Ealing

BBC film production facilities for the Television Service are based at the Television Film Studios, Ealing Green, London, W.5.

This monograph describes the operations which are involved and the facilities provided. Descriptions of the technical equipment and areas are included, together

with some discussion on the differences between cinema film production methods and television film operations.—N. F. Chapman, BBC Engineering Div. Monograph No. 27, Jan. 1960: BBC Publications, 35 Marylebone High St., London, W.1.

Reduction of Television Bandwidth by Frequency-Interlace

A method analogous to the N.T.S.C. colour television system is used to obtain a bandwidth reduction of a black-and-white video signal by a factor of approximately 2:1. The normal signal is split into two frequency bands, nominally zero to 1.5 mc/s and 1.5 to 3.0 mc/s. The latter is used to amplitude-modulate a sub-carrier, whose frequency is an odd multiple of half the line scanning rate. The lower sideband of the modulator output is selected and combined with the original zero-to-1.5 mc/s band, so that the spectra of the two signals interleave. The combined signal may now be sent over a channel of 1.5 mc/s nominal bandwidth. At the receiving end of the channel the composite signal is applied to a synchronous demodulator, fed also with sub-carrier of the same frequency as at the transmitter. The lower sideband of this demodulator is taken and combined with the received signal, to yield a "normal" video signal extending from zero to approximately 3 mc/s, together with an "interleaved" signal. The interleaved signal is such as to give an interference pattern on the display which in a stationary picture should optically cancel after four successive frame scans. However, the pattern is built up in such a way as to give rise to a "crawling" motion which is very noticeable at close viewing distances. Photographs of typical pictures obtained with and experimental apparatus are given, showing various interference effects produced.—E. A. Howson and D. A. Bell, *Jour. Brit. I.R.E.* 20: 127-136, Feb. 1960.

Microwave Television Mobile Relay for Outside Broadcasting

A brief account is given of the principal qualities required in mobile links. These include transmission of picture and sound without degradation of the quality and stability in time of the technical performances, and ease of operation as regards transport, installation, monitoring and maintenance. The essential causes of distortion introduced in the transmission by a microwave link are reviewed and the problem of crosstalk between the picture and the sound channels and the transmission of a colour television programme are dealt with in some detail. A short description is given of an equipment operating in the band 6400-6900 mc/s.—J. Polonsky, *Jour. Brit. I.R.E.* 20: 91-102, Feb. 1960.

The Combined Television-Radio Receiver and its Problems

The large number of frequency allocations in and around Band II compared with Bands I and III causes a serious selectivity problem in domestic combined receivers for television and f.m. sound broadcasts. The sound bandwidth of a television receiver is usually of the order of 500-1000 kc/s and since the frequency allocations of commercial radio transmitters are liable to be

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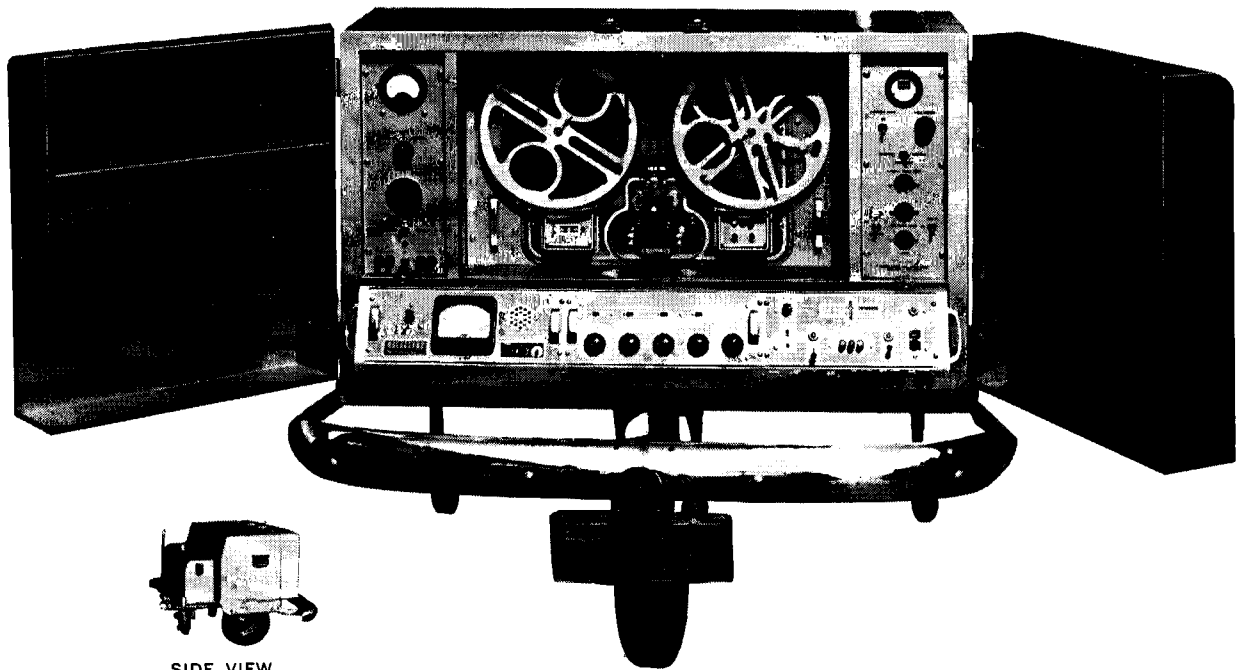
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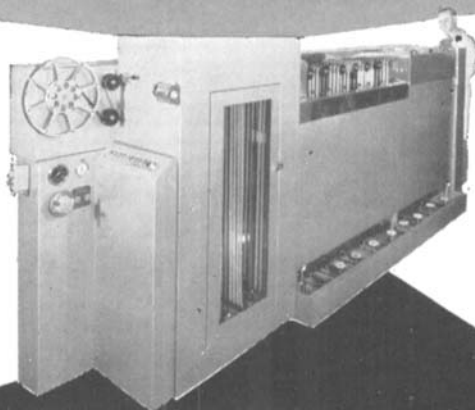
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within 500 kc/s of the BBC transmitters, interference can occur. Interference can also occur between the various BBC regional transmitters whose frequency separation is usually 400 kc/s, but may be as little as 200 kc/s. The problem and a number of different solutions are discussed in detail. The circuit details of a commercially available combined receiver are then described. The sound i.f. circuits incorporate a double superheterodyne system, and the frequency of its r.f. oscillator is stabilized in Band II by means of an inexpensive a.f.c. system. Methods are described for measuring accurately the selectivity of a Band II receiver.—R. S. Hildersley, *Jour. Brit. I.R.E.*, 20: 155-166, Feb. 1960.

Automation of Television Programme Switching

The paper outlines a complete system under which nearly all the operations in programme switching are controlled by a punched paper tape derived directly from the preparation of the programme schedule. Simplified manual control facilities are provided for non-schedule operation. The term "Programmation has been coined to describe this field.—G. E. Partington, *Jour. Brit. I.R.E.*, 20: 181-196, Mar. 1960.

Waveform Distortion in Television Links

The linear transmission performance of television links is now measured and specified in terms of their response to certain standardized test waveforms. The aim of the paper is to provide a simple non-mathematical introduction to the basic ideas connected with the measurement of waveform distortion. A number of examples of simple waveform distortions are given to illustrate the advantages of waveform measurements and their connection with the more familiar steady-state responses. The application of tolerance limits to waveform responses is then considered and an outline is given of the routine-and-acceptance-test methods of determining the rating factor of a link. Finally a brief introduction is given to the basic ideas of the correction of waveform distortion without reference to the conventional steady-state measurement and equalization techniques.—I. F. Macdiarmid, *Jour. Brit. I.R.E.*, 20: 201-216, Mar. 1960.

The Application of Closed-circuit Television in the Nuclear Industry

This paper reviews briefly the historical development of industrial television systems, and the applications of conventional equipment in the many branches of industry which depend upon nuclear processes. Special systems must be designed for use in the intense radiation fields and high ambient temperatures and pressures which occur in a nuclear reactor. The possible ambient conditions and their influences upon television camera design are discussed, with indications of the ways in which specific problems may be solved. An assessment of future trends suggests that television equipment will be called upon to operate in increasingly unfavourable environments; simultaneously, standard television systems will be used extensively for remote observation and display.—P. Barratt and I. M. Waters, *Jour. Brit. I.R.E.*, 20: 225-241, Mar. 1960.

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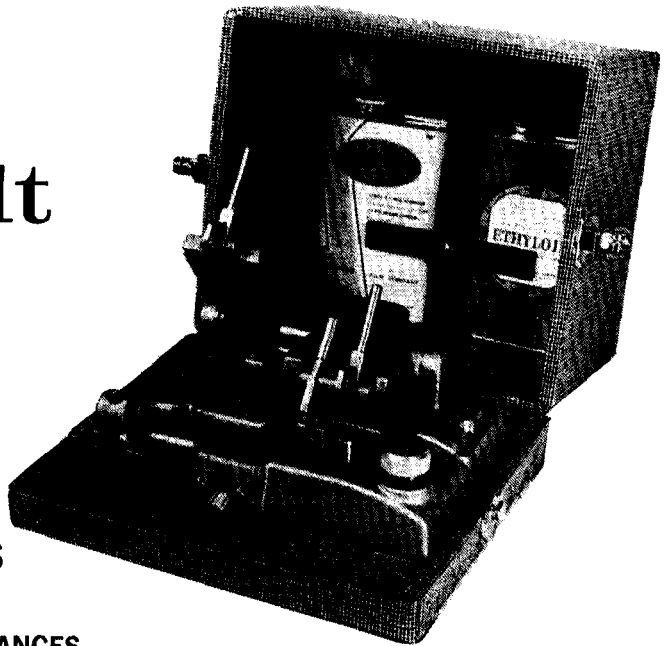
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