

MISCELLANEOUS LABORATORY EQUIPMENT

THE usefulness of the TYPE 338-L String Oscillograph described on page 93 has been further enhanced by the development of a continuous-film camera for recording any desired oscillographic phenomena. The oscillograph has enabled the user to view recurrent waveforms; the camera attachment now permits him to make a permanent record of transient, as well as recurrent, phenomena. The viewing box and the camera cannot be used simultaneously, but the trace can be transferred from one to the other in a fraction of a second.

The camera-oscillograph combination also makes an accurate high-speed chronograph. Timing may be done by a timing wave applied to the second string of a double string-holder or in terms of intervals marked on the film by a synchronous shutter driven from the 110-volt, 60-cps. power supply.

The camera equipment can easily be attached to any TYPE 338-L String Oscillograph, in no way interfering with the normal operation of the latter. There are three principal components, each of which must be ordered separately.

a) The TYPE 408 Oscillograph Camera contains the film-storage magazines and a means of driving the film or paper past an aperture for exposure, thus supplying the time axis in the resulting oscillogram.

b) The TYPE 409 Camera Shelf is the means for holding the oscillograph, the camera, and the rest of the optical system in the proper position. This unit is essential to the

proper operation of the camera with the TYPE 338-L String Oscillograph.

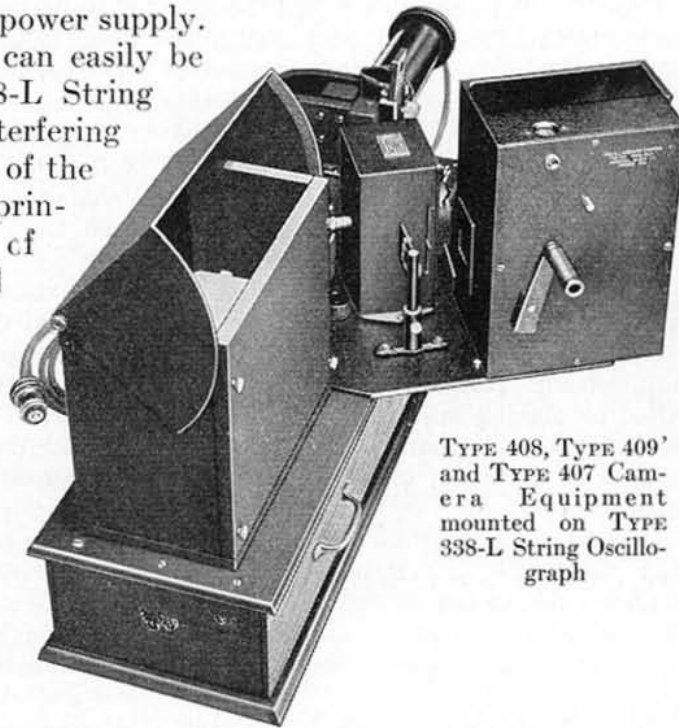
c) The TYPE 407 Synchronous Shutter is one means of timing the oscillogram. Its use is recommended but is not essential.

The prospective purchaser should order, in addition to the TYPE 338-L String Oscillograph and any extra string-holders he may require, the following:

1—TYPE 408 Oscillograph Camera	\$175.00
1—TYPE 409 Camera Shelf	30.00
At least 1 reel of TYPE 408-P1 Photographic Paper	3.25
At least 1 carton of TYPE 408-P2 Developing Powders	1.00
Total	\$209.25

We also recommend the purchase of

1—TYPE 407 Synchronous Shutter	60.00
Total	\$269.25



TYPE 408, TYPE 409'
and TYPE 407 Cam-
era Equipment
mounted on TYPE
338-L String Oscillo-
graph

TYPE 408 OSCILLOGRAPH CAMERA

THIS is a hand-driven daylight-loading camera for use with standard-perforation, 35-millimeter motion-picture film or paper. The magazines hold 100-foot reels so that exposures of any length up to that amount may be obtained. A resettable counter measures the amount that has been exposed. A maximum film speed of 30 inches per second is obtainable so that, at maximum speed, a 1000-cps. trace will have a wavelength of approximately 1/32 inch. The camera may be used with the TYPE 338-L String Oscillograph, in ordinary daylight.

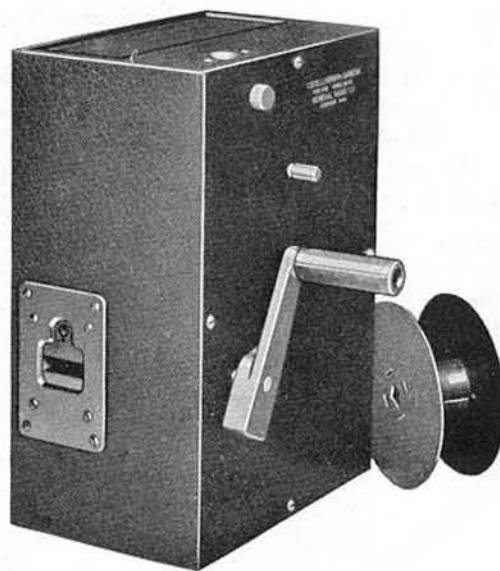
It may also be used to record traces from other types of oscillograph if suitable arrangements are made. We are prepared to modify any of these cameras for use with either vibrating mirror or cathode-ray oscillographs. Information will be supplied on request.

General Description: The camera consists of a rectangular aluminum casting with two separate compartments. One is the magazine for unexposed film, the other is the magazine for exposed film.

The film passes from the first magazine over a driving sprocket and thence through a light-tight slot into the second magazine. While on the sprocket it is momentarily exposed through a horizontal transverse slit mounted on the face of the camera. The vertical shadow image of the oscillograph string, condensed by a lens mounted on the camera shelf in order to intensify the illumination, vibrates along the slit perpendicular to the motion of the film. In this way, the trace of the vibrating string is recorded as a negative, in other words, as a white line upon a dark background.

Optical System: The film is exposed through a slit which is 15/16 inch in length (equal to the useful width of the 35-millimeter paper) and adjustable in width. No lenses are required in the camera itself.

Film Data: The use of 100-foot reels of Eastman No. 2, 35-millimeter recording paper is recommended, in fact all statements about the performance of the camera



TYPE 408

in this description are based on the use of this paper. It is as fast as ordinary film but much easier to handle, and, when developed with the Eastman x-ray developer, it produces a contrasty and very satisfactory record. See the description of the TYPE 408-P1 Photographic Paper and TYPE 408-P2 Developing Powder.

If a record less than 100 feet long is required, the camera may be unloaded in the darkroom with no loss of film. If care be used, it can be unloaded in daylight with the loss of only a few inches of the unexposed film.

Drive: The driving sprocket and the "exposed reel" are driven by a hand crank. If desired, however, provision may be made for substituting a motor drive, and information about this modification may be obtained on application to the General Radio Company.

Finish: The aluminum camera case is finished in black crackle lacquer. All other parts exposed are finished in either black or white nickel plate.

Accessories: The camera is supplied with one blank reel but no paper.

Dimensions: 6 x 4½ x 9 inches.

Weight: 10 pounds.

Type	Code Word	Price
408	ANGER	\$175.00

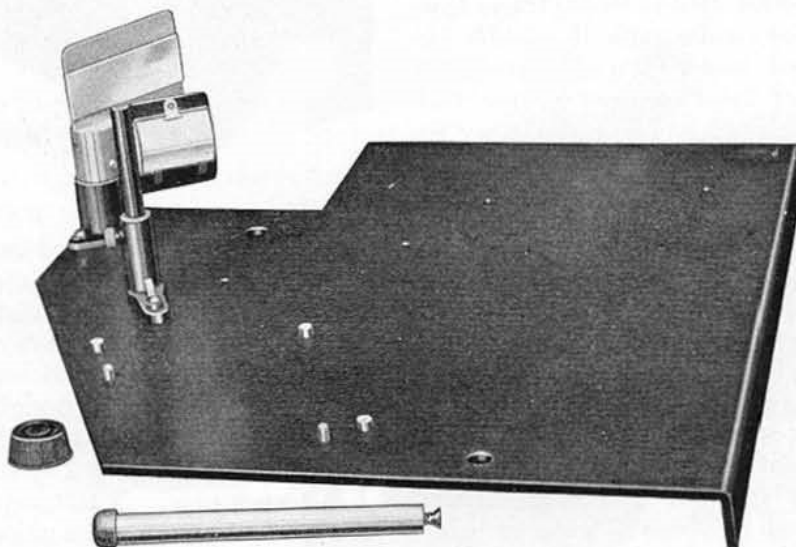
TYPE 408-P ACCESSORIES

WE recommend the use of Eastman No. 2 recording paper in the TYPE 408 Oscillograph Camera and maintain a small stock made up with perforated leaders on 100-foot reels. It can also be obtained from the Eastman Kodak Company through any of the latter's own retail stores, but we understand that it is made up to order only. A user who has need of a sufficient quantity may be able to persuade his local dealer to carry a stock.

The use of Eastman x-ray developing powders is recommended. We carry these in stock in cartons of six pairs of packages, "12-ounce size."

Type		Weight	Code Word	Price
408-P1	100-ft. reel of Eastman No. 2 paper	12 oz.	OSCILOFILM	\$3.25
408-P2	Carton of x-ray developing powders.....	13 oz.	OSCILODOPE	1.00

TYPE 409 CAMERA SHELF



TYPE 409

THE camera shelf supports the camera on the oscillograph base and keeps the optical system in alignment.

General Description: The shelf is made of aluminum and is properly drilled for aligning the several parts. It is easily attached to the oscillograph equipment under the galvanometer. As part of the shelf is supplied a two-position mirror and mounting. This operates similar in principle to a graflex camera, a turn of the wrist serving to throw the string image from the rotating mirror box into the camera and vice versa. Simultaneous visual observations and photographic records are not possible, but one may closely follow the other.

Another part of the shelf equipment con-

sists of a mounting carrying a cylindrical lens having a horizontal axis. This lens is for the same purpose as that in the rotating mirror box; that is to say, it condenses a pencil of rays into a narrow horizontal beam focused along the slit, thereby increasing the intensity of illumination many fold.

The accompanying illustrations show the arrangement of the mirror and the condensing lens.

Finish: The shelf is finished in black crackle lacquer.

Dimensions: 15 x 15 inches, over-all.

Weight: 3 pounds.

Type		Code Word	Price
409	ANNOY	\$30.00

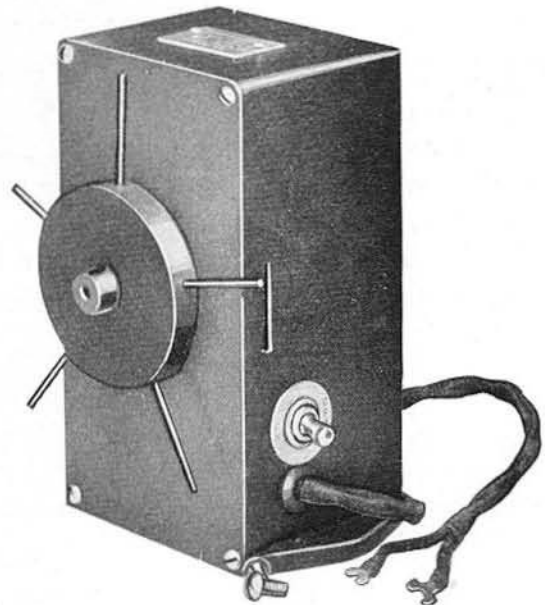
TYPE 407 SYNCHRONOUS SHUTTER

By means of this device narrow transverse time lines can be marked upon the oscillogram. These timing lines are spaced at intervals of 1/50th of a second, with additional identifying marks at every 0.1-second and at every 1-second interval.

General Description: The synchronous shutter is a manually-started synchronous motor, operating from the 60-cps. power supply. The shutter consists of a wheel of five spokes, mounted on the shaft. It is mercury-damped, and the accuracy of timing is therefore approximately equal to the accuracy with which the frequency of the power supply is maintained at 60 cps. The unit is mounted on the camera shelf, where the shutter wheel will intercept the light from the oscillograph, thereby making a white trace on the moving film or paper.

Shutter: The unit is supplied with a five-spoke wheel, but if timing lines, spaced at 0.01-second intervals are desired, the user may order a ten-spoke shutter, the TYPE 407-P1 Shutter Wheel, as additional equipment.

Power Supply: 105 to 115 volts, 60 cps. A short permanently attached cable is provided for making connections to the power-supply terminals on the TYPE 338-L String Oscillograph.



TYPE 407

Finish: The unit is finished in black crackle lacquer.

Accessories: Two machine screws for attaching the unit to holes in the TYPE 409 Camera Shelf are provided.

Dimensions: 4 x 3½ x 6 inches.

Weight: 4½ pounds.

Type	Code Word	Price
407	AMISS	\$60.00

TYPE 407-P ACCESSORIES

ATEN-SPOKE shutter wheel is available for users who wish timing lines at intervals of 0.01 second. It is easily attached to the drive shaft of the synchronous motor.

Type	Weight	Code Word	Price
407-P1 Shutter Wheel (10 spoke)	7 oz.	ASPEN	\$10.00