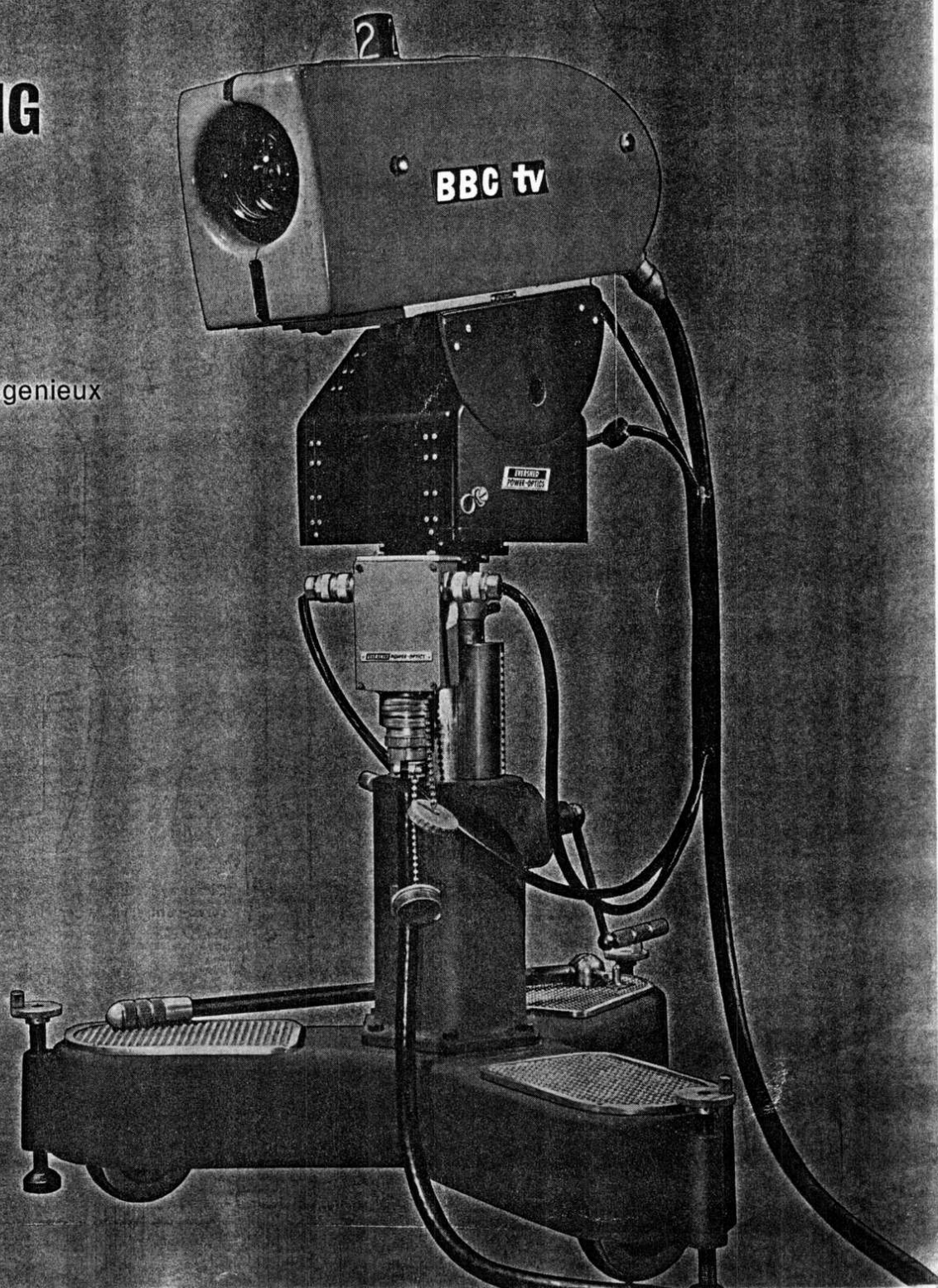


**EVERSHED**  
**POWER-OPTICS LTD**

# **EVERSHED SERVO-CONTROLLED CAMERA MOUNTING**

Featuring The  
Evershed Pan &  
Tilt Head,  
The Evershed/Angenieux  
Zoom Lens and  
Associated  
Control Systems

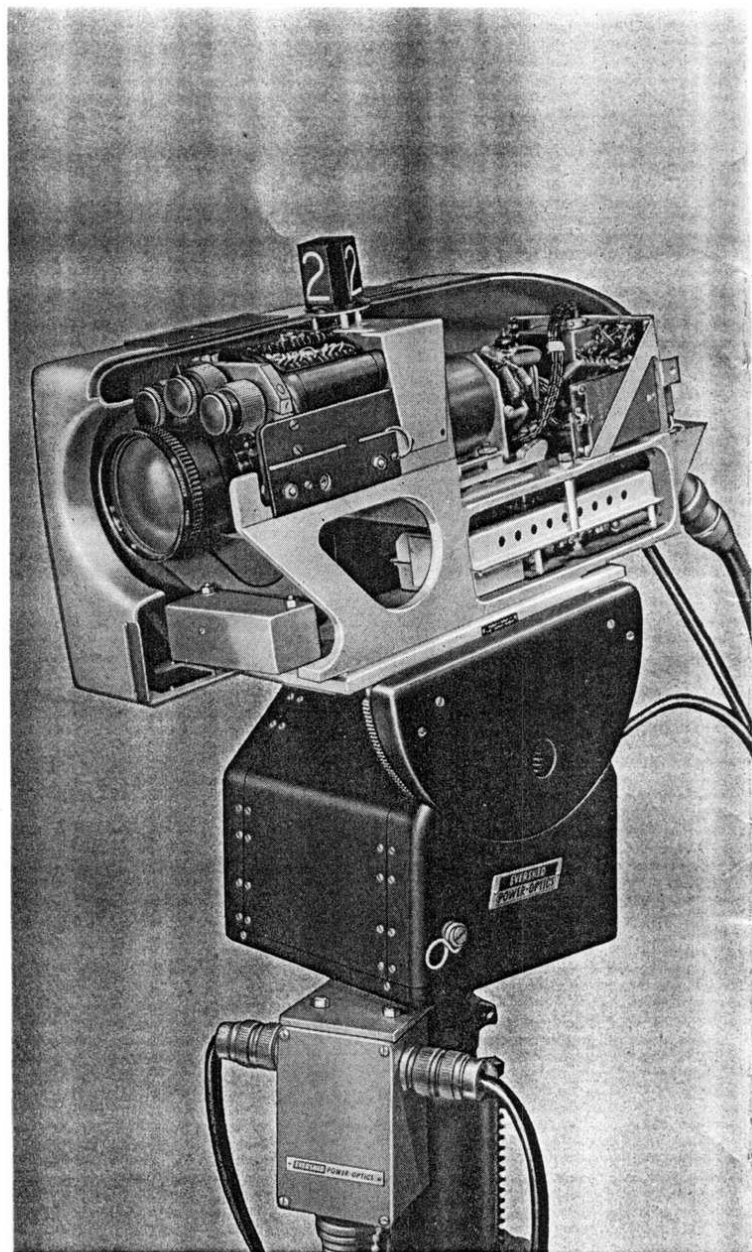
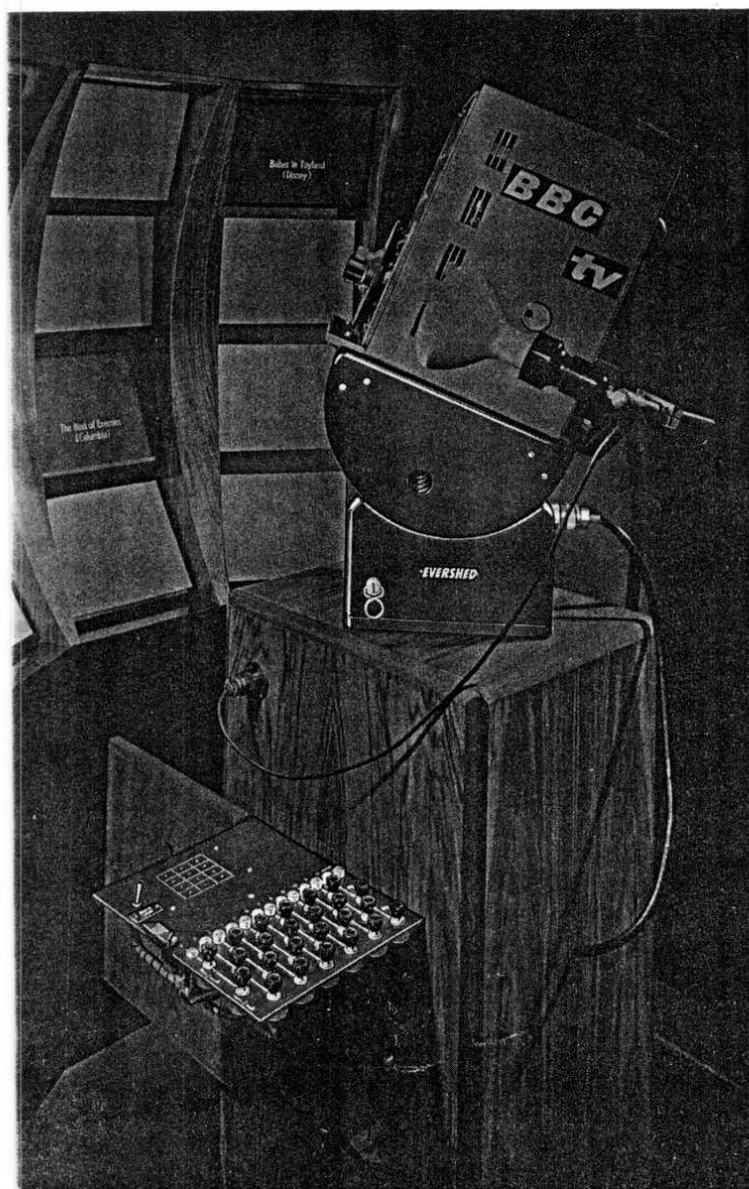


# EVERSHED SERVO-CONTROLLED CAMERA MOUNTING TYPE P.105 SERVO-CONTROLLED ZOOM LENSES AND ASSOCIATED OPERATING EQUIPMENT

Today, the accent in equipping television studios lies more than ever on increased efficiency of day-to-day operations, and at the same time keeping running costs down to the minimum. One sure way of meeting these requirements is the use of Evershed Remotely Controlled Equipment for certain applications such as Presentation, Programme Continuity, News and Interviews. For these kinds of programme it is now unnecessary to employ camera crews who would be used for short periods only and often for camera work requiring the minimum of skill. The use of Evershed equipment will not only facilitate the remote control of a single camera but a number of cameras may be controlled by one man.

All of the units in the system described in this leaflet are transistorised and therefore do not require any warming up, moreover they can be preset and will automatically assume correct orientation when switched on, without further adjustment.

The system described is entirely flexible and can be engineered to produce many different combinations of facilities. For example, local control at the camera for those periods requiring intense camera activity can be combined with remote control by the video engineers when this is more expedient.



Cut away picture of BBC camera showing the servo-controlled Angenieux 10:1 zoom lens mounted on the P.105 servo operated Pan & Tilt Head.

An adaptation of the Evershed Pan & Tilt Head to a Caption Scanner, providing random selection of 12 caption boards by means of press-button selection. Also showing the shot box for setting up the various shot positions, and the caption holder with the readily accessible boards.

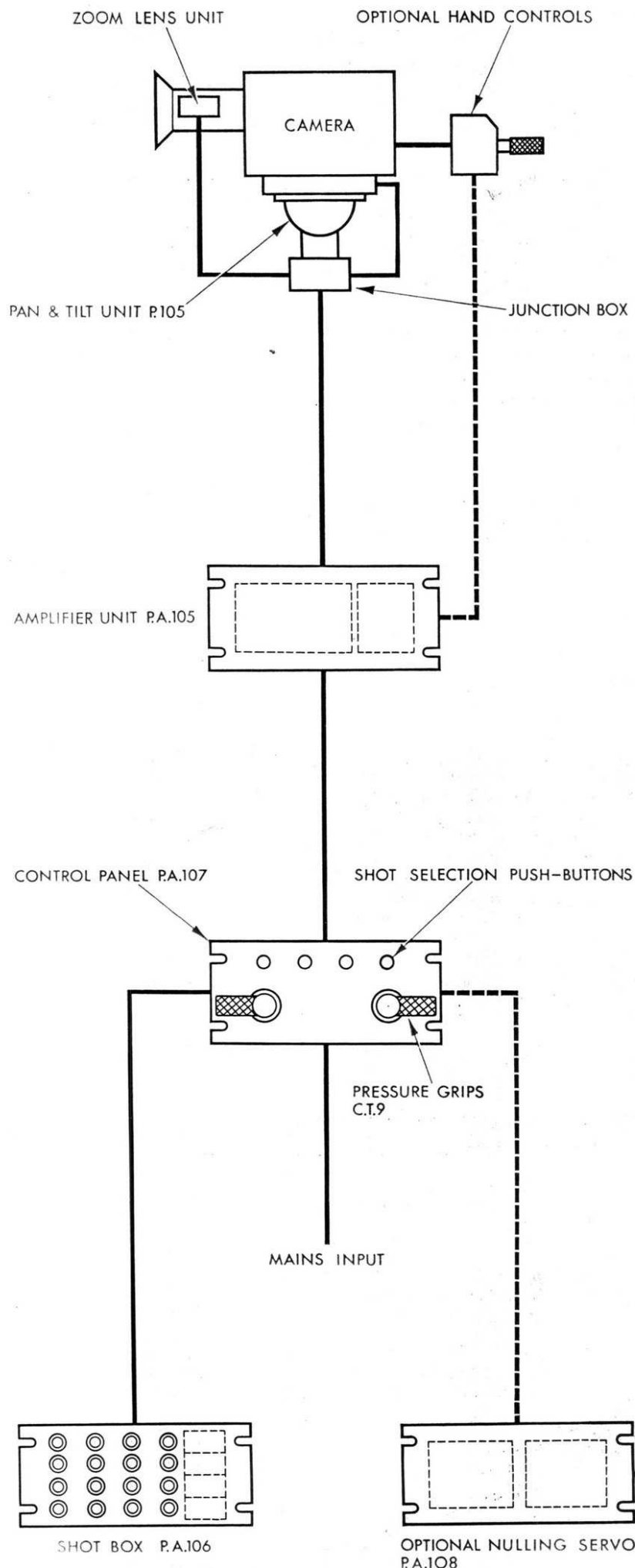
Pictures by courtesy of the British Broadcasting Corporation.

[www.tvcameramuseum.org](http://www.tvcameramuseum.org)



# SCHEMATIC DIAGRAM OF SERVO- CONTROLLED CAMERA MOUNTING

By reference to the schematic diagram, the reader will observe that various combinations of equipment can be obtained, each offering a particular range of facilities. For example, one could operate a camera fitted with a servo-controlled mounting and a servo-controlled zoom lens by local control at the camera for those programmes requiring intricate camera movement; and by remote control at those times when it is more expedient.



# THE PAN & TILT HEAD P.105

To achieve remote control of the functions of panning, tilting, zooming and focusing (iris optional) requires, in the first instance, the EVERSLED SERVO-OPERATED PAN & TILT HEAD TYPE P.105 (see fig. 1).

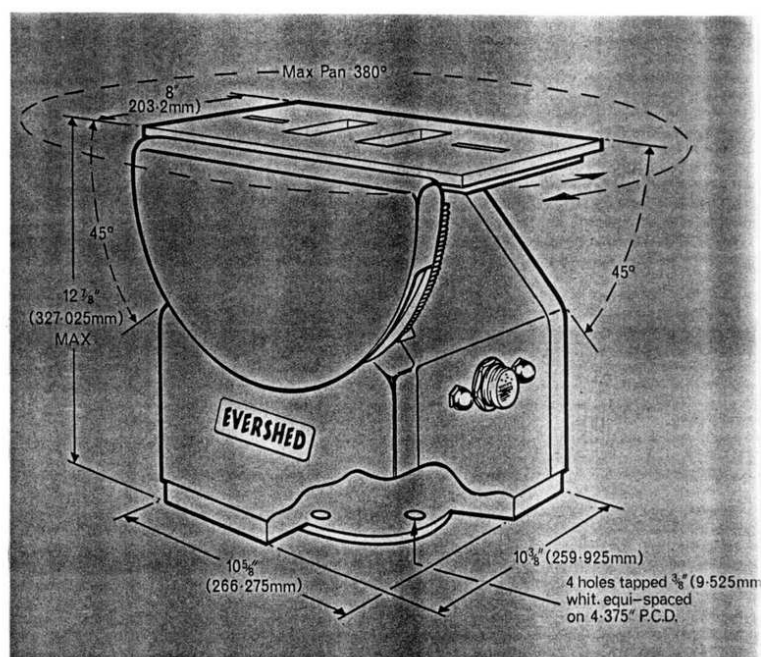
This unit, essentially a power-operated camera mounting, provides control over 360° of panning and  $\pm 45^\circ$  of tilting and accommodates a combined camera and zoom lens weight of 150 lb. The P.105 is geared to provide a maximum panning speed of 50°/sec. with a resolution of less than 15'. The maximum speed during tilting is 30°/sec. with a corresponding resolution of less than 5'. To reduce the effort required to move the head during the tilting motion, counter-balancing springs are provided of various strengths for different loads. These ensure that the camera does not run away and also that it will return to a horizontal position in the event of a power failure. Damping or feed back controls are provided to allow varying characteristics of operation to suit operational requirements. The unit is robust in construction, quiet in operation and requires no special skills or equipment to maintain its performance over long periods of service. Several units have averaged over two years continuous use before servicing.

Unlike other equipments, the P.105 and its associated lens servo drive unit are not restricted with respect to the distance over which they can be operated. From a junction box on the camera pedestal, a single 45-way cable connects the components at the camera to an amplifier panel (see fig. 2) normally mounted in a rack near the control room of the studio. Even with lengths of cable up to 3,000', no cross-talk is discernible and the servo units at the camera continue to function correctly.



The Evershed P.105 Camera Mounting.

FIG.1



## FEATURES

- ❖ Smooth, silent operation with power in reserve suitable for all combinations of cameras and lenses up to 150 lbs.
- ❖ Variable damping control for each amplifier allows variation in performance from instantaneous re-action to dead beat operation.
- ❖ Slipping clutches constantly limit maximum torque available, prevents damage occurring if camera swings into contact with other equipment.
- ❖ Interchangeable plug in amplifier with built-in preset gain control for rapid replacement and repeatable performance.
- ❖ Adjustable springs compensate for different loads, and ensure camera does not run away in event of power failure.

## SPECIFICATION

- ❖ Power supply to servo amplifiers: 115, 230 Volts, 50/60 c.p.s.
- ❖ Maximum Panning Angle: 380°.
- ❖ Maximum Panning Speed: 50° per second.
- ❖ Panning Resolution: Better than 0.25°.
- ❖ Maximum Tilt Angle: 90°.
- ❖ Maximum Tilt Speed: 30° per second.
- ❖ Tilt Resolution: Better than 0.05°.
- ❖ Weight of Pan and Tilt Head Unit: 52 lb.
- ❖ Weight of load accommodated: Up to 150 lb.

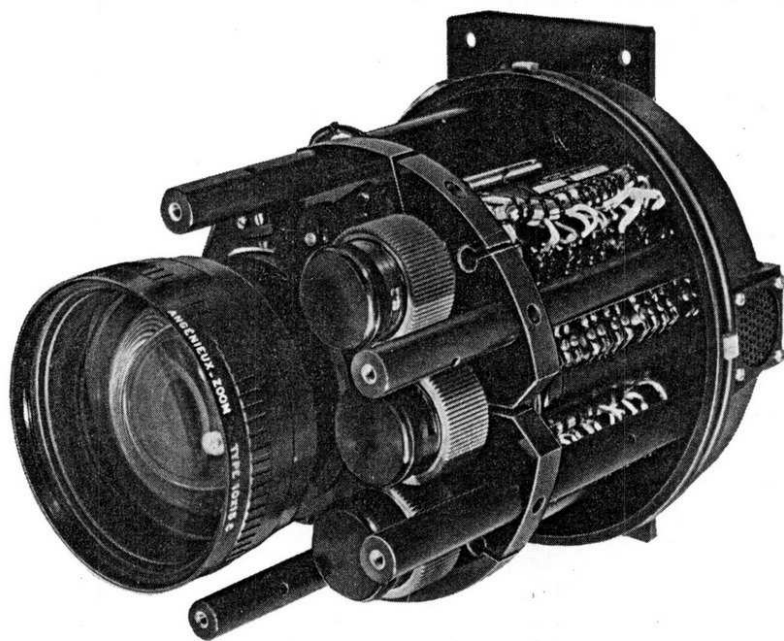
# THE ANGENIEUX/ EVERSHED TELEVISION ZOOM LENS AND DRIVE UNIT

The second major unit of the EVERSHED system for remote control, is the servo-operated ANGENIEUX/EVERSHED Television Zoom Lens. This unit, for Image Orthicon, Vidicon or Plumbicon Television Cameras, is the result of collaboration between ETS. PIERRE ANGENIEUX and EVERSHED POWER-OPTICS and is a combination of the well-known zoom lenses with 10:1 ratios or more of the former and EVERSHED servo actuators (see illustration). Each of the lenses and their respective drive units are described more fully in EPO Data Sheets 27, 29, 31/6 and 31/7. Full remote control of the functions of focusing, zooming (or changing focal length) together with optional iris control, is provided by compact, reliable servo modules which are specially suited for use with the servo-operated Pan and Tilt Head P.105.

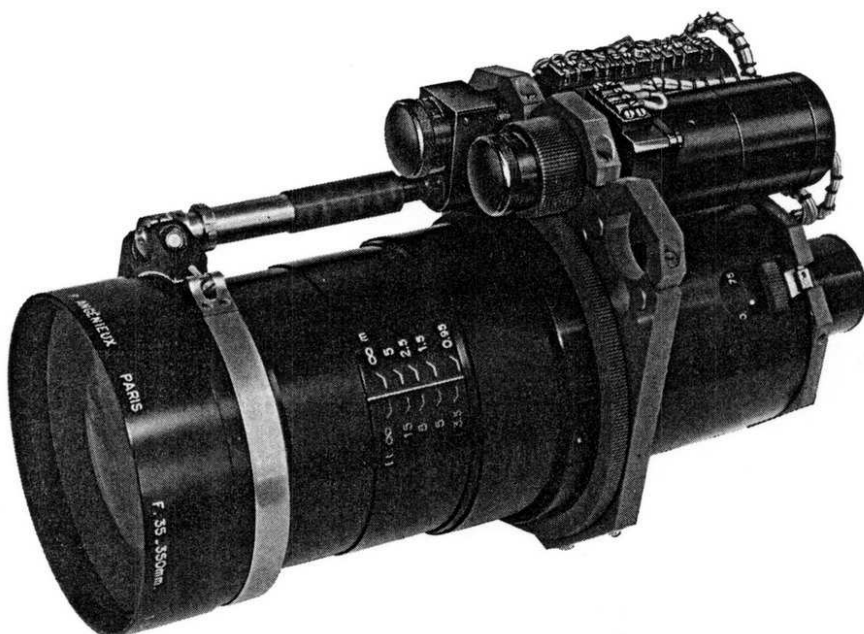
The main components within the Drive Unit are the Angenieux Lens Unit and three Servo Modules. All Servo Modules are mounted in split Tufnol Clamps and are easily detachable.

The Lens Unit is also easily detachable and is supported within the Drive Unit on Rubber Mounts for silent operation and most gears within the Drive Unit are made of Tufnol for the same reason.

Electrical Focus and Zoom stops are incorporated to eliminate any possible mechanical impact which may occur at the end of Zoom or Focus Element traverse. All connections terminate in a 30-way Cannon Plug on the left-hand side of the Drive Unit. The Unit remains cool in operation and is provided with a fully insulated metal cover.



Angenieux 10 x 15C Zoom lens for Broadcast Vidicon Cameras fitted with Evershed Servo Drive Unit for control of zoom, focus and Iris functions of the lens (covers removed)



Angenieux 10 x 35B Zoom Lens for 41" Image Orthicon TV Cameras fitted with Evershed Servo Drive Unit for control of zoom and focus functions of the lens. (covers removed)



## THE AMPLIFIER PANEL PA.105

The Amplifier Panel PA.105, (see fig. 2) the third essential unit in the EVERSLED system, is normally manufactured for standard 19" rack mounting. It carries the amplifiers necessary for each of the functions, pan, tilt, zoom and focus (iris optional). Each separate amplifier PA.69T is completely interchangeable and carries its own power supply. It is a plug-in unit which allows rapid replacement. Alternatively, in the case of zoom, focus and iris, the smaller PA.86T amplifier may be preferred. In this instance three PA.86T amplifiers are supplied from one transformer and they can be mounted with two PA.69T amplifiers for panning and tilting, thus allowing five functions to be combined in one panel (a standard 19" panel will accept only four of the PA.69T amplifiers). The front of the amplifier panel carries a hinged flap to allow inspection of the amplifier terminals, and the complete panel is wired internally to terminal blocks at the rear for ease of installation. Alternatively the amplifiers can be wired to a socket. In common with all of the units in the EVERSLED system of remote control, complete wiring diagrams are supplied with the equipment.

The P.105 head and its associated servo-operated zoom lens, together with the amplifier panel, are essential for providing the means of remote control for any installation. The actual remote control panels themselves can only be chosen after formal consideration of the kind of television programming envisaged. Whatever the requirement, the EVERSLED system allows several alternatives. Cost must also be taken into account, since there is practically no limit in the facilities that can be provided. Every EVERSLED installation is custom built in respect of control panels and enquiries are invited for alternative arrangements if the required solution is not indicated in this leaflet.

## THE SHOT BOX PA.106

A pre-selected shot is achieved at the Shot Box PA.106 (see fig. 3) by adjusting each of the coarse-fine control knobs marked Pan, Tilt, Zoom and Focus (Iris optional) for a given shot marked Shot 1, Shot 2, etc. The coarse adjustment (large knob) is stepped, and the fine adjustment to a particular value is made by the smaller knob which has 360° of movement equivalent to one large step. A shot box consists of a number of modules (see fig. 3A). Each module can carry fine stepped potentiometers together with a push-button selector for local control and an indicating light. The shot box therefore also functions as a control panel, although usually the control panel is separate from the shot box, the latter being used for setting up purposes only. Up to seven shots can be accommodated on a standard 19" panel though any number may be supplied on request. Remote control of the camera mounting and zoom lens is generally required to be manual, or programmed to give pre-selected shots, or sometimes a combination of the two.

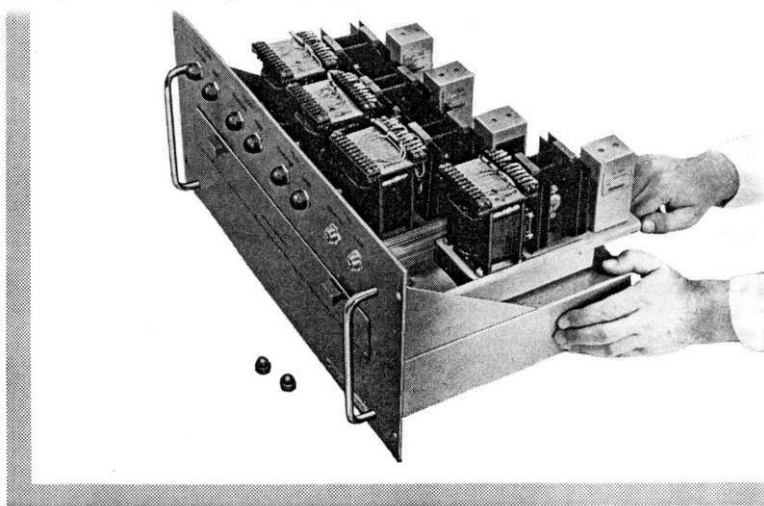


FIG. 2

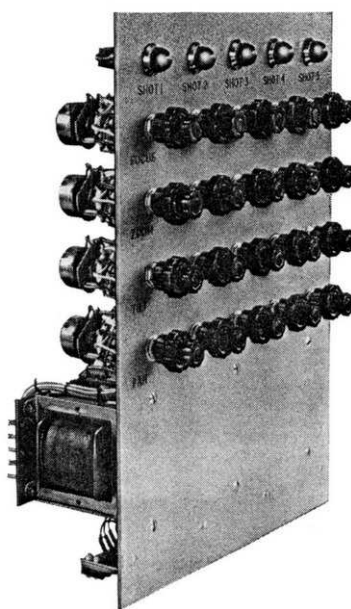
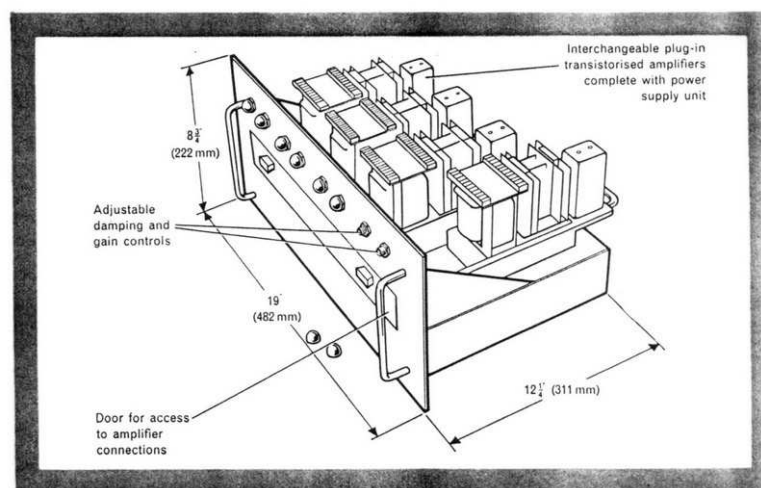


FIG. 3

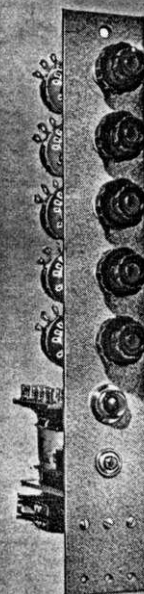
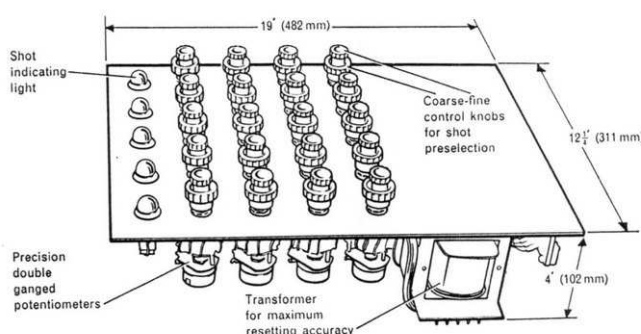


FIG. 3A



## THE CONTROL PANEL PA.107

The control panel PA107 (see fig. 4) provides the means for remote operation of the Pan and Tilt head and zoom lens and allows both preset push-button or manual operations to be carried out.

The control panel can take a variety of forms and is usually equipped with manual control handles which provide 'feel' and give the illusion that the operator is actually controlling the camera. This is essential if the manual operation is to be performed smoothly. The manual control most appropriate to this is the CT.9 (see fig. 4) which combines two functions in one unit. Two units are therefore required for four functions, generally panning and tilting, zooming and focusing. The panning (and zooming) function is controlled by a slight pressure action on the grip. The speed of panning (and zooming) is proportionate to the pressure applied and conforms to a logarithmic law for maximum smoothness of operation. The tilting (and focusing) function is controlled by rotating the grip. This is normally geared so that  $2\frac{1}{4}$  revolutions will provide  $90^\circ$  of tilting action (or from infinity to minimum focusing distance on the zoom lens). The operation of twisting appears to produce a positional control of tilt (and focus) but in fact the unit is not scaled and can be continuously rotated. The need for this is described later. For any given load, the gain of the pre-amplifier used with the pressure sensitive functions can be set to a value which produces the desired feel in the controls. The control panel carries, besides the two combined pressure grips CT.9, the shot-selection push-buttons, one group for each shot box. It is therefore possible to control a number of cameras from one control panel, each with any number of pre-selected shots. If required, meters can be built into the control panel scaled with the appropriate functions. All the circuits are protected by fuses and the panel is provided with an on/off switch and indicating lamp.

## THE NULLING SERVO PA.108

To achieve the complete integration of pre-selected shots and manual operation by means of the pressure grips, EVERSHED have provided the means for bumpless transfer from any pre-selected shot to manual control. In this way the operator can take over from a given preset shot without any change in the camera and lens positioning. After taking over manually, the next pre-selected shot can be chosen and upon transfer to automatic operation the manual controls may be then used to pick up another shot on another camera. This feature of bumpless transfer from shot box to manual operation is necessary for maximum smoothness. It is achieved by means of a nulling servo PA.108 (see fig. 5) mounted on a standard 19" panel in a rack. This unit is extremely reliable and requires no adjustment in use. In principle, it aligns the signal on the hand control with the last pre-selected shot signal and prevents any kicking back on transfer. The unit operates on the tilt and focus functions only and is not required for panning and zooming since the latter are velocity controls and without dimension. The CT.9 controls are therefore completely dimensionless and it is for this reason that a bumpless transfer can be maintained.

Sorry about the quality, a copy of a copy...can you help with a better copy?  
[TVcameramuseum.org](http://TVcameramuseum.org)

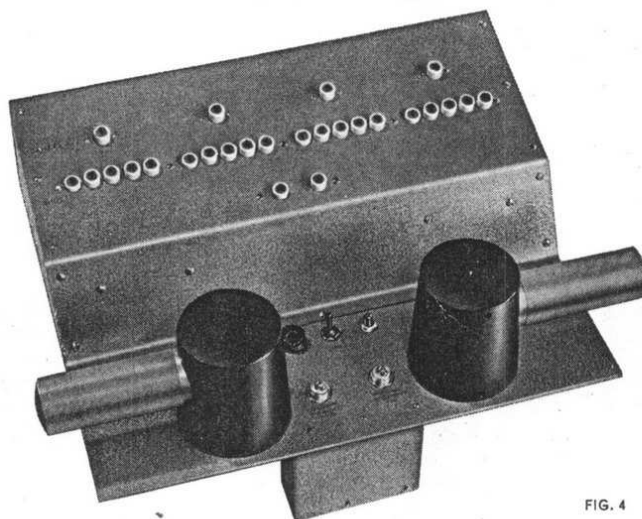


FIG. 4

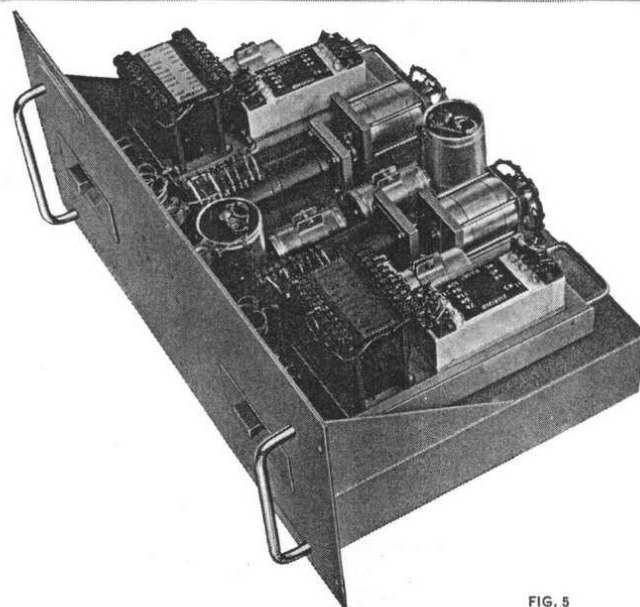
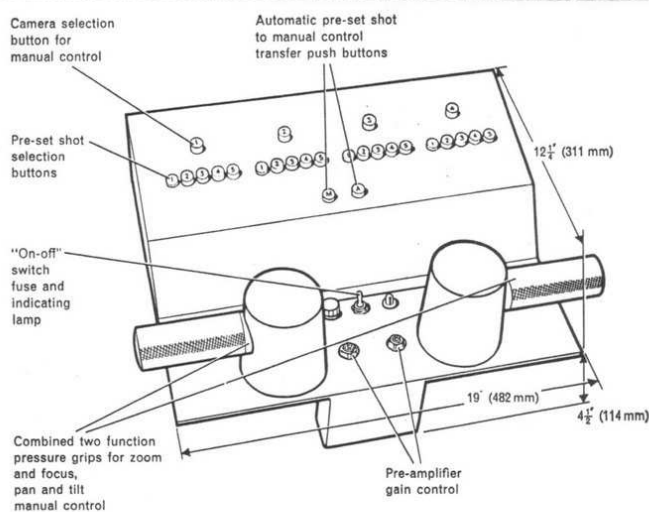


FIG. 5

