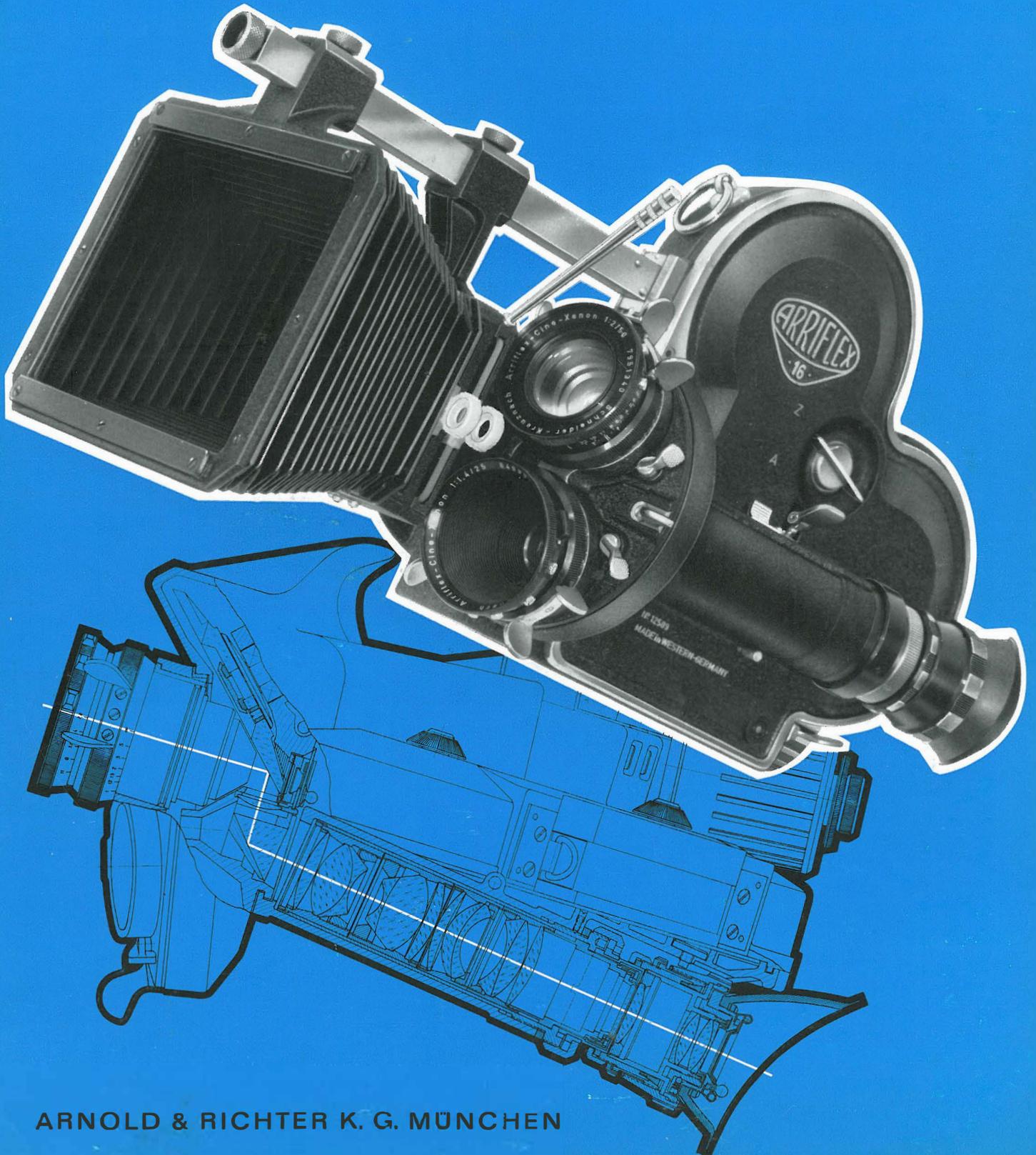


# Arriflex 16 St



Mirror Reflex Motion Picture Camera for 16 mm Film



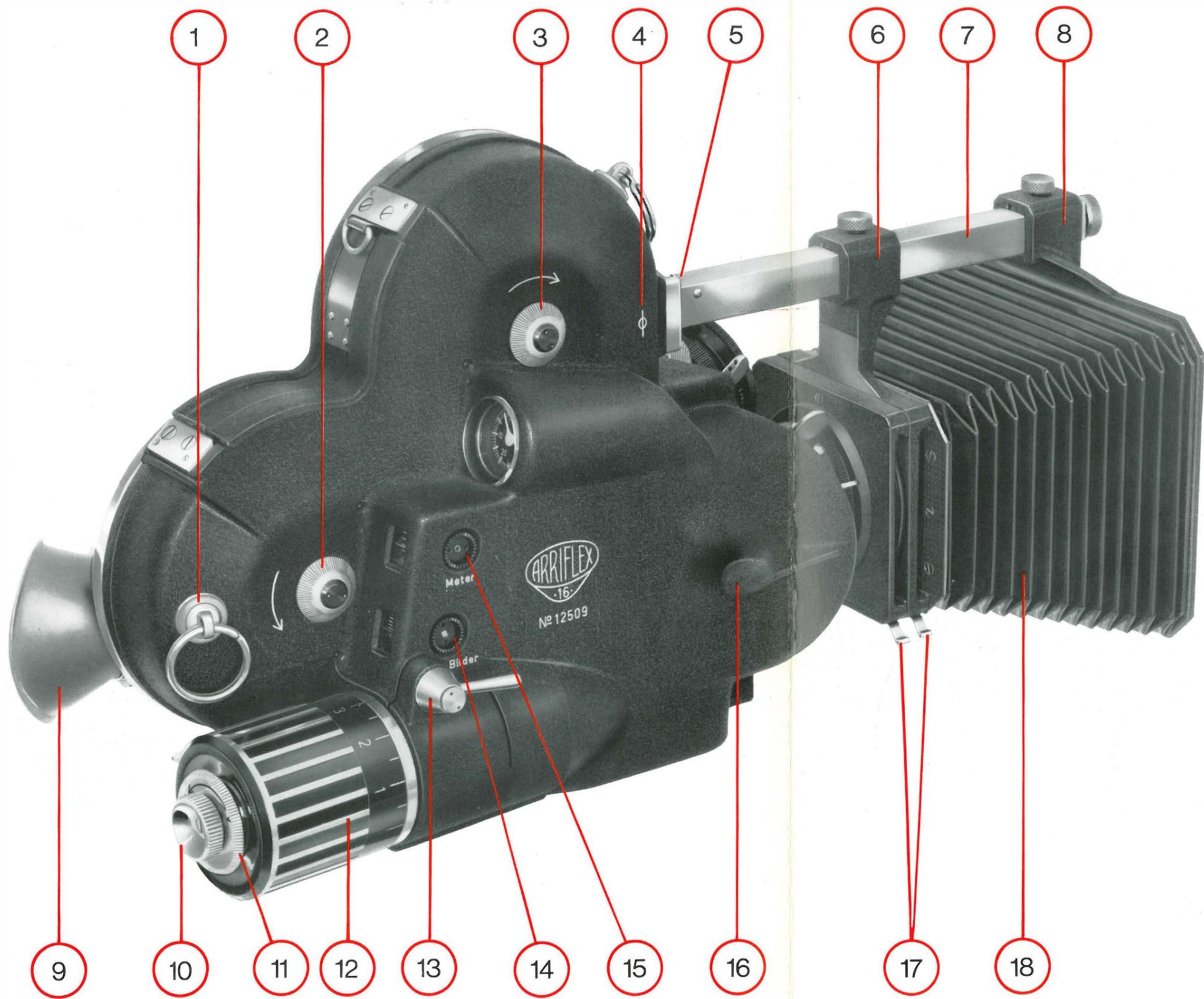
ARNOLD & RICHTER K. G. MÜNCHEN

For many decades the mirror reflex viewfinder in cine cameras seemed to be an unattainable dream. It was not until the late 1930's that ARNOLD & RICHTER, after many years of research, finally succeeded in producing and patenting the world's first mirror reflex motion picture camera. The new system was incorporated in the ARRIFLEX 35 and proved an immediate success, due to its reliability and the perfection of its design. The enthusiastic acceptance of this camera encouraged ARNOLD & RICHTER to proceed with plans for adapting this system to a 16 mm motion picture camera. Many more years of development work finally produced the ARRIFLEX 16 St (Standard).

The ARRIFLEX 16 St is a 16 mm motion picture camera with mirror reflex viewfinder, three-lens divergent turret and electric motor drive. Numerous other special features offer the film producer and cameraman, the newsreel and television reporter, the scientist and technologist, and the discriminating amateur motion picture photographer, a versatile precision tool not equalled by any other 16 mm motion picture camera.

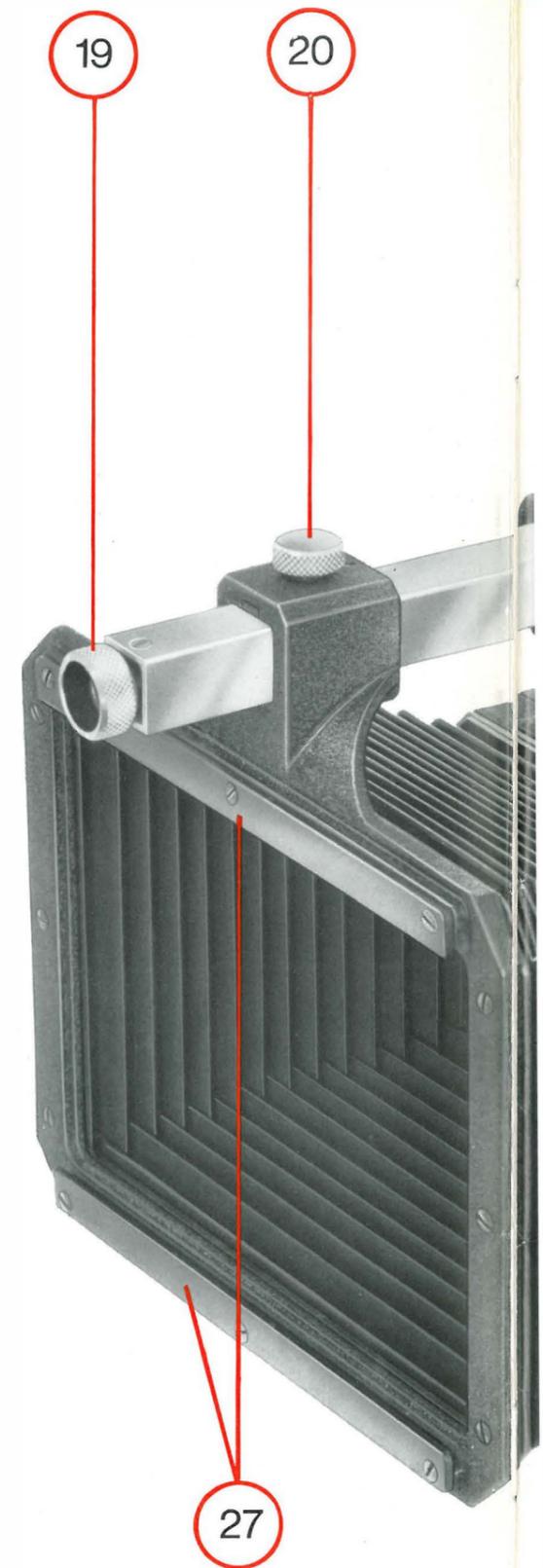
This prospectus gives full details of the design of the ARRIFLEX 16 St and surveys the numerous possibilities it has to offer. Together with its wide range of invaluable accessories, this camera represents a complete system capable of mastering any difficulty encountered, however great this may be. The accessories can at the same time in a wide range be used for the model ARRIFLEX 16 M, a related 16 mm camera of the ARRIFLEX 16 St, with built-in pilot tone generator, 200 ft, 400 ft and 1000 ft quick-change magazines.

This brochure cannot, of course, demonstrate the simplicity of operation and the reliability of the camera, but the large number of ARRIFLEX cameras in use all over the world bears ample witness to its popularity among experienced cinematographers.



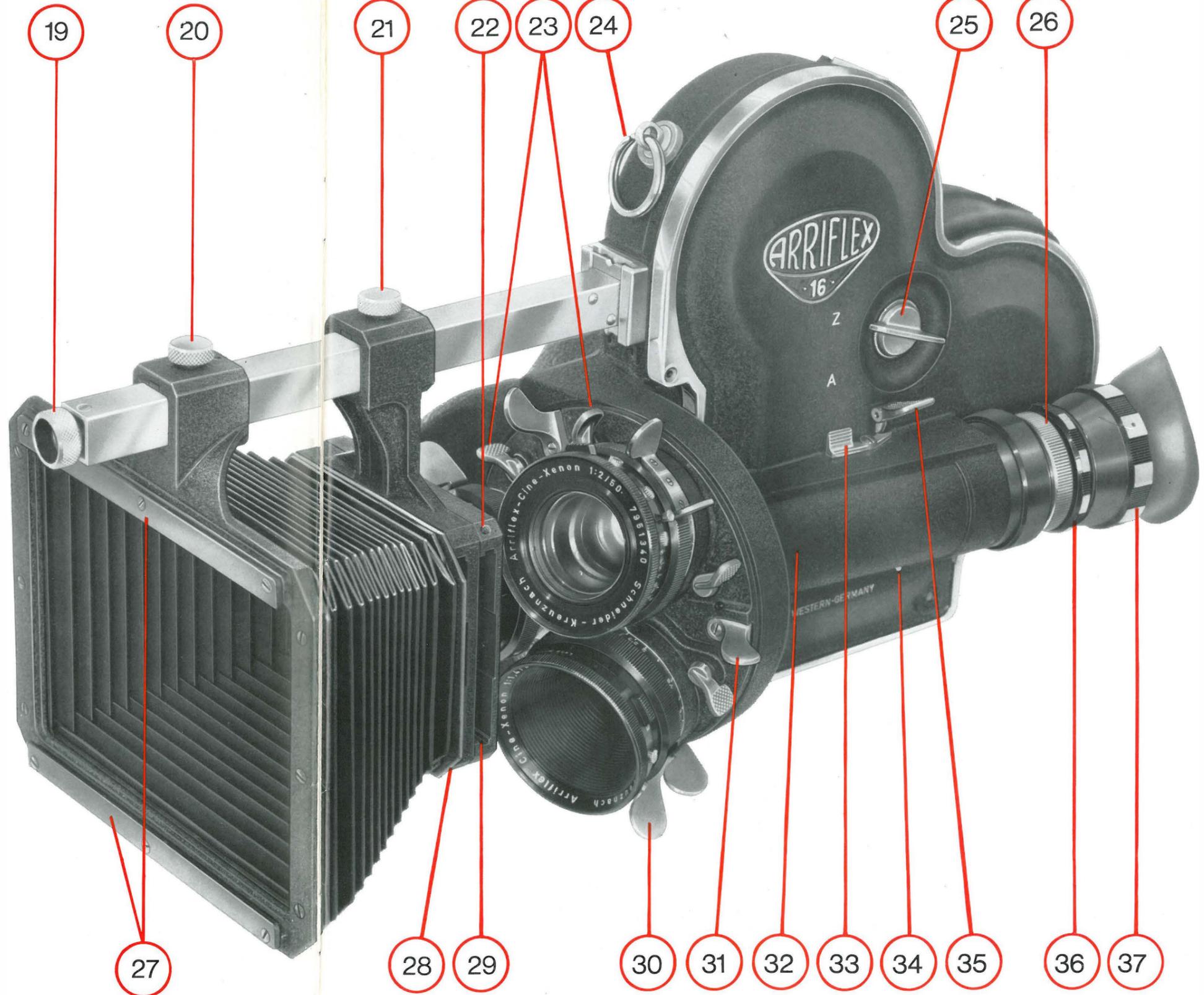
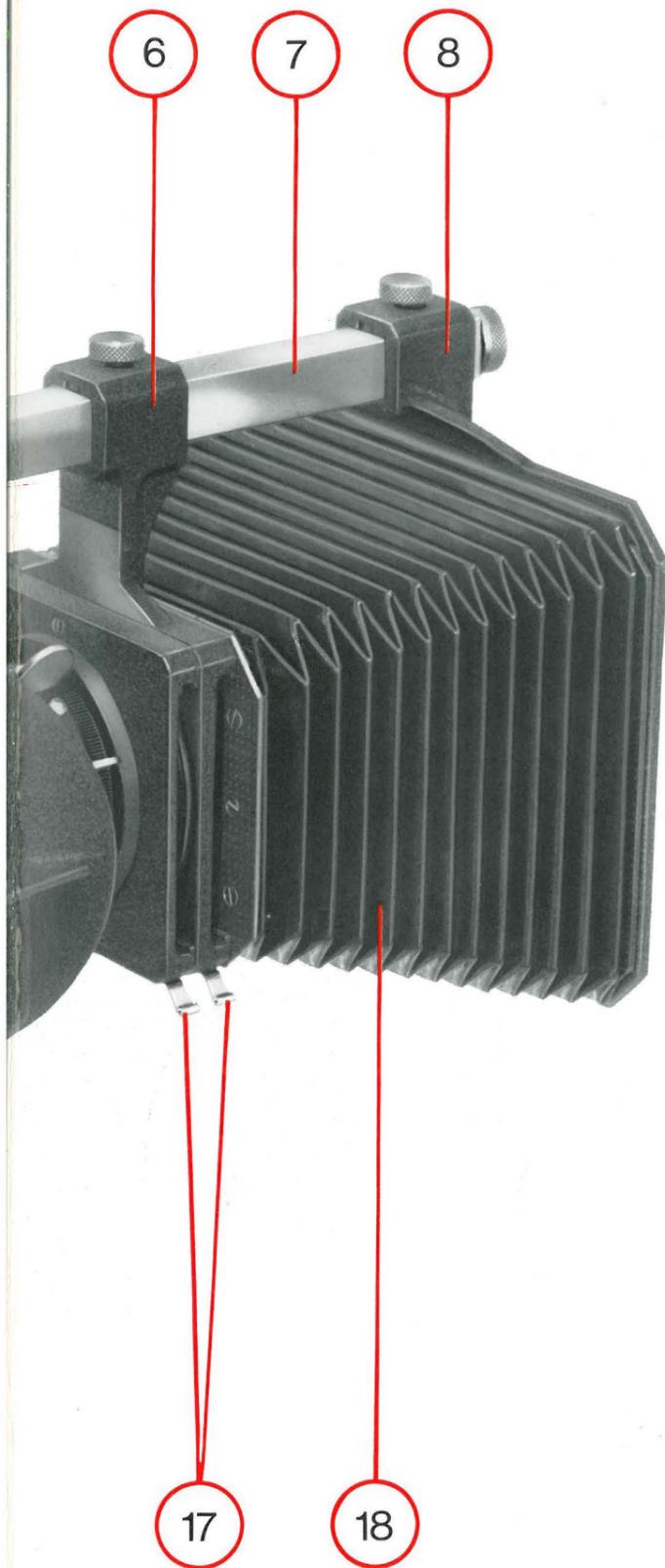
## ARRIFLEX 16 St

- 1 Eyelet for neck strap
- 2 Spindle knob for taking up film slack on take-up spool
- 3 Spindle knob for taking up film slack on feed spool
- 4 Marking of film plane
- 5 Holder for matte box beam
- 6 Back matte box adjustment
- 7 Matte box beam
- 8 Front matte box adjustment



- 9 Rubber eyecup
- 10 Inching knob for turning shutter over by hand for loading and sighting
- 11 Forward and reverse switch of motor (provided on variable speed motor only)
- 12 Rheostat to control camera speed (provided on variable speed motor only)
- 13 Locking lever for electric motor

- 14 Setting knob for frame counter
- 15 Setting knob for footage counter
- 16 Contour hand grip
- 17 Filter retaining springs
- 18 Leather bellows
- 19 Knurled locking screw of matte box beam
- 20 Screw of front matte box adjustment
- 21 Screw of back matte box adjustment

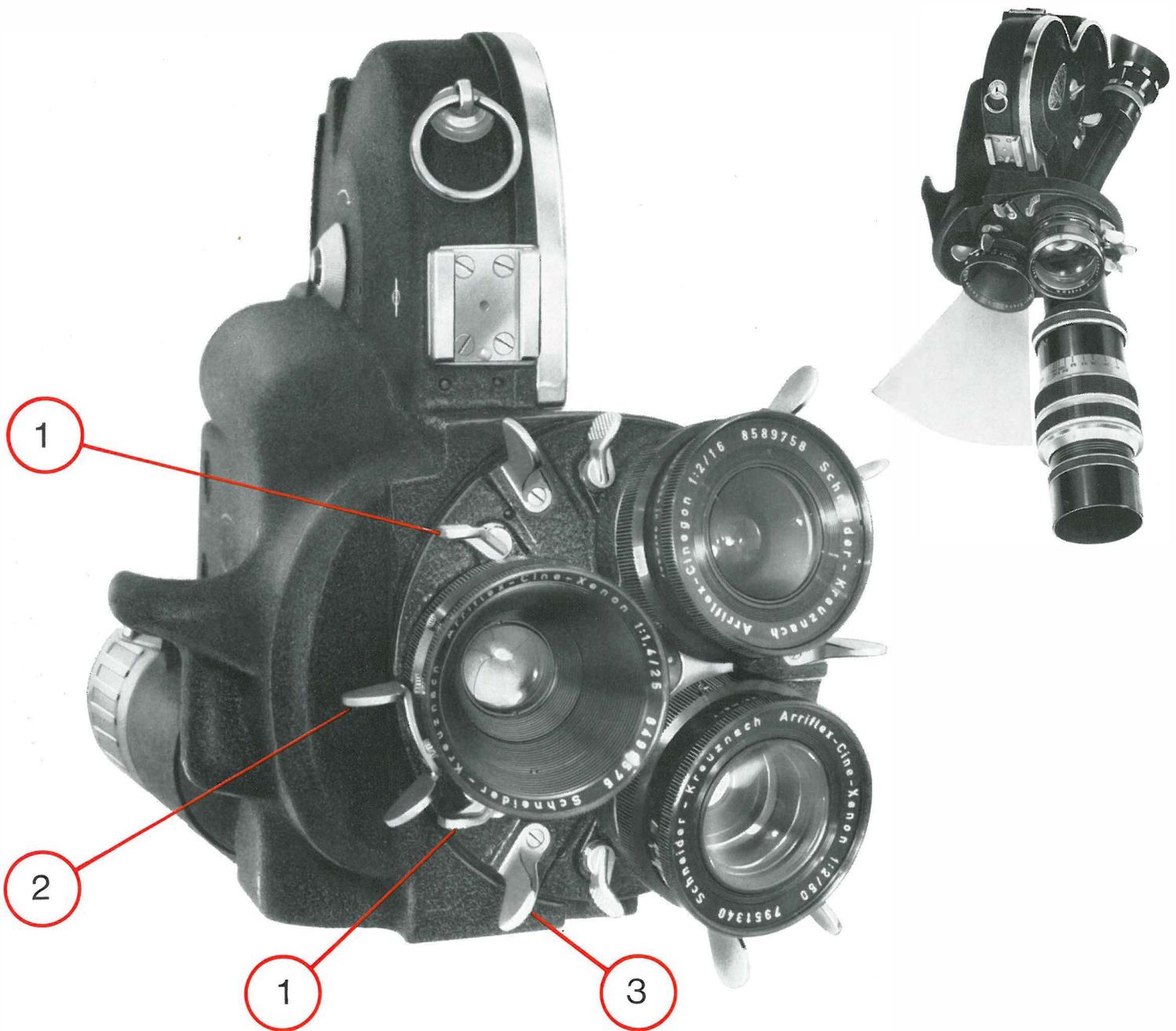


- 9 Rubber eyecup
- 10 Inching knob for turning shutter over by hand for loading and sighting
- 11 Forward and reverse switch of motor (provided on variable speed motor only)
- 12 Rheostat to control camera speed (provided on variable speed motor only)
- 13 Locking lever for electric motor

- 14 Setting knob for frame counter
- 15 Setting knob for footage counter
- 16 Contour hand grip
- 17 Filter retaining springs
- 18 Leather bellows
- 19 Knurled locking screw of matte box beam
- 20 Screw of front matte box adjustment
- 21 Screw of back matte box adjustment

- 22 Thread for rod of rotating filter stage
- 23 Lens retaining levers
- 24 Eyelet for neck strap
- 25 Latch of camera door
- 26 Viewfinder eyepiece retaining screw
- 27 Holder for special effects masks
- 28 Front filter stage
- 29 Back rotating filter stage

- 30 Focusing lever of lenses
- 31 Grips for rotating lens turret
- 32 Viewfinder
- 33 Release lever locking device
- 34 Push-button of buckle switch override mechanism
- 35 Release lever
- 36 Locking ring for diopter focusing ring
- 37 Diopter focusing ring



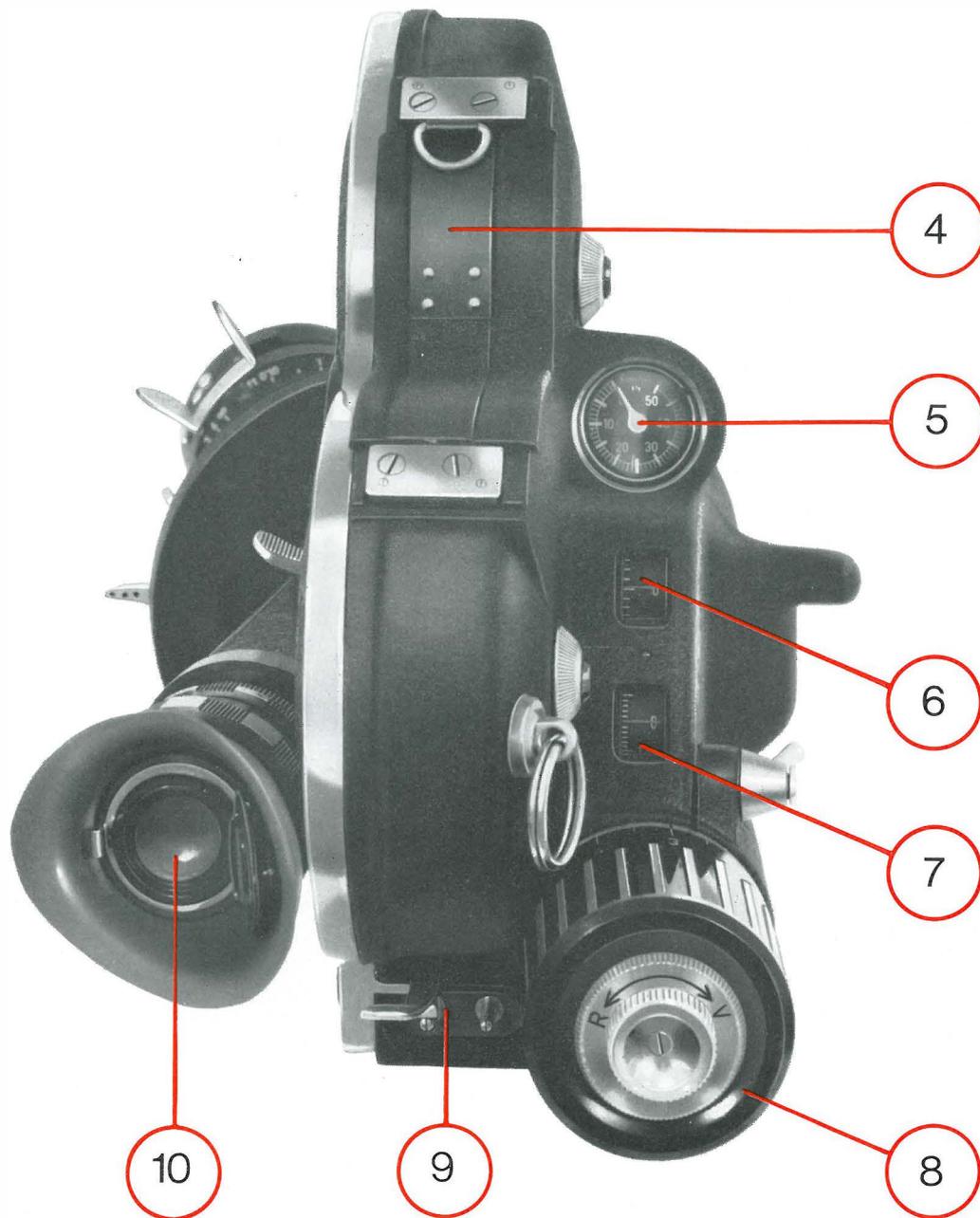
## The Divergent Three-Lens Turret

The turret of the ARRIFLEX 16St is designed to take three lenses and can be rapidly rotated so as to bring the required lens into position. The lens mounts are of the same size and type as those of the ARRIFLEX 35. The distance between the lens flange and the film plane is exactly the same in all three sockets, so that any and every one of the entire series of ARRIFLEX lenses available can be used. The shortest focal length available is 5.7 mm. There is practically no upper limit to the focal lengths that can be used.

The three-lens turret is designed so that the optical axes of its three lens sockets diverge. In this

way it is possible to use lenses with short focal lengths and wide angle of view alongside others of long focal length without physical and optical interference.

The three grips for rotating the three-lens turret until it clicks in the desired position have point marks on their reverse side as a guide for the cameraman while filming to see whether the lens with the desired focal length is in shooting position. The ARRIFLEX three-lens turret has the additional advantage that the two idle lenses can be left without lens caps since no light can pass through them onto the film.

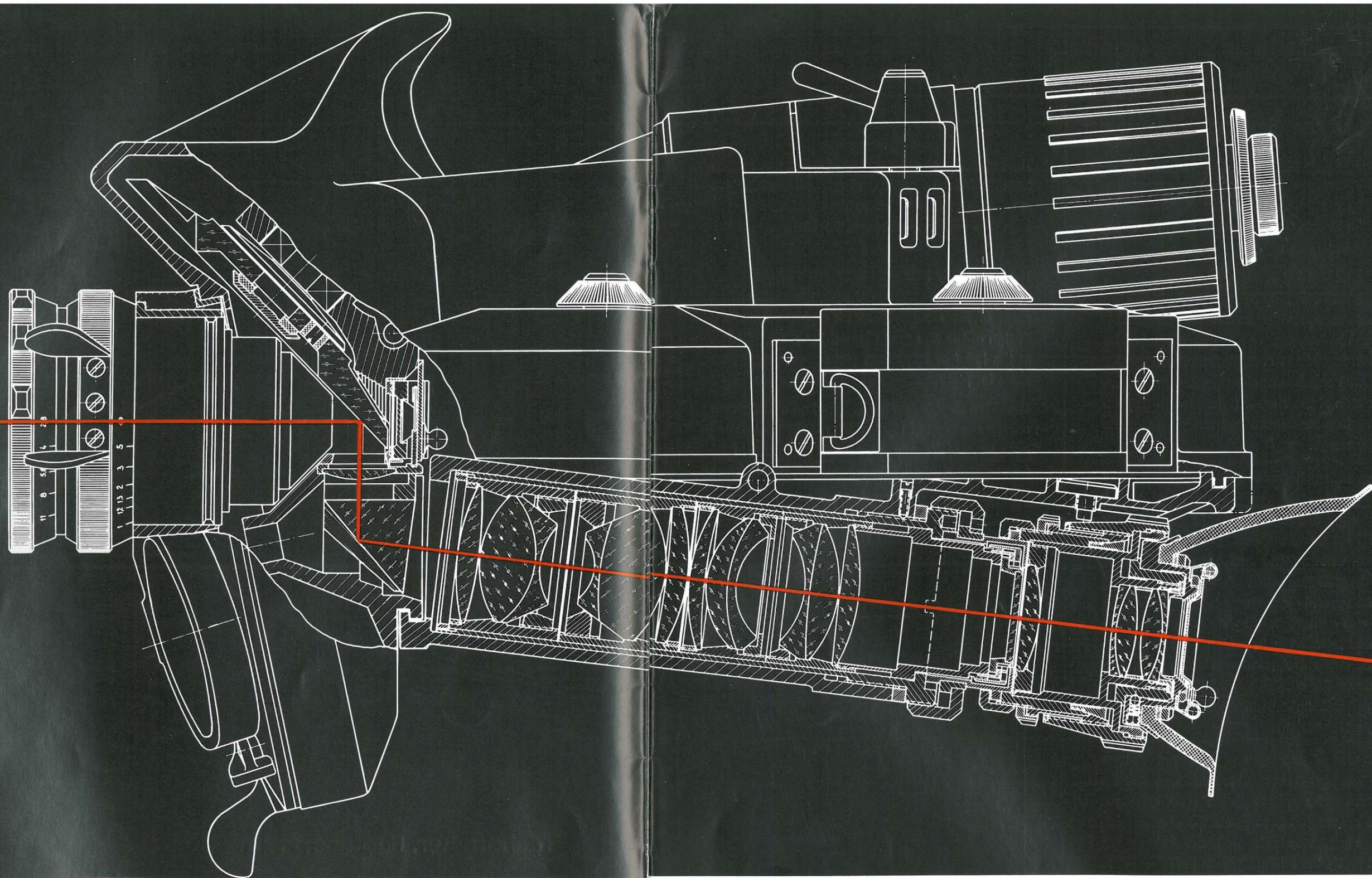


## Tachometer, Footage, Frame Counter

The tachometer visible at the back of the camera registers film speeds between 0 and 50 frames per second. The film speed is set on the cap of the motor. The normal camera speed – 24 frames per second – is indicated on the tachometer by a red mark.

The footage counter and a frame counter are also situated at the back of the camera over the motor. Both counters can be re-set to "0" by means of a knob and register the amount of film transported in both directions.

- 1 Lens retaining grips
- 2 Lens focusing lever
- 3 Grips for rotating the three-lens turret
- 4 Magazine cover plate
- 5 Tachometer for film speed
- 6 Footage counter
- 7 Frame counter
- 8 Drive motor
- 9 Socket for battery cable
- 10 Viewfinder eyepiece, 10 x magnification



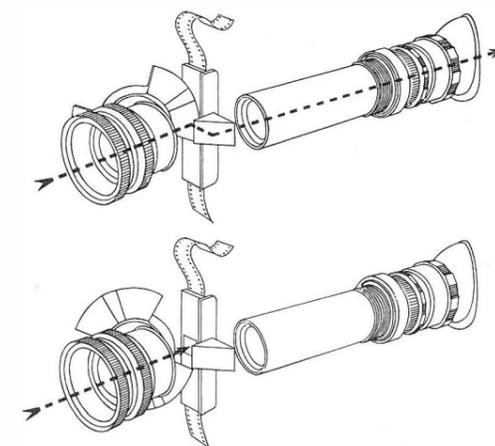
## The Mirror Reflex Shutter

The ARRI mirror reflex shutter for motion picture cameras was invented by Arnold & Richter in 1937, and was introduced in the ARRIFLEX 35. It has since become world-famous. Later, it was adapted to the dimensions and requirements of 16 mm film. While the fundamental principle of the system

remained unchanged, it was incorporated, together with numerous additional features, in the ARRIFLEX 16 St.

The rotary shutter of the ARRIFLEX 16 St takes the form of a mirror reflex shutter. It differs greatly from other reflex systems in which the light beam

entering through the lens is split by means of a partially transparent mirror. In the ARRIFLEX 16 St the beam of light is allowed to pass unhindered to the film. It is merely deflected while the film is being transported, by means of the rotating mirror shutter which is arranged at an angle of  $45^\circ$  to the



optical axis of the lens and turns at half the speed of the film movement, i. e. it makes one complete turn for every two frames. In this way all the light entering the lens is available alternately for viewing and filming.

The shutter is divided into two segments made in one piece, and carefully balanced. The surfaces of the blades are provided with mirrors of flat optical glass. The balancing of the shutter ensures smooth vibration-free running, a feature not always possible with asymmetrical or oscillating mirrors. The precision of the shutter (tolerance 2–3  $\mu$ ) ensures absolute steadiness and sharpness of the viewfinder image.

The mirror reflex shutter of the ARRIFLEX 16 St is factory-adjusted with the most modern tools and produces a parallax-free, dead-centre and clear viewfinder image on a special ground glass, irrespective of whether the camera is running or not and whether the aperture is wide open or stopped down. The ground glass image is viewed through an eyepiece with 10  $\times$  magnification which can be adapted to individual eyesight by means of a diopter adjustment. A comfortable eyecup and a hinged cover for closing the eyepiece when not in use prevent light from penetrating into the camera and fogging the film (see page 18).

The sharpness of the film and ground glass images is adjusted with greatest precision, so that the viewfinder can be used to obtain a perfect focus. This is a great advantage, since the clear magnified image in the viewfinder enables the sharpness to be controlled at all times, even in follow-focus shots. The eyepiece with its 10  $\times$  magnification presents the operator with a large and clear viewfinder image for easy sighting and framing.

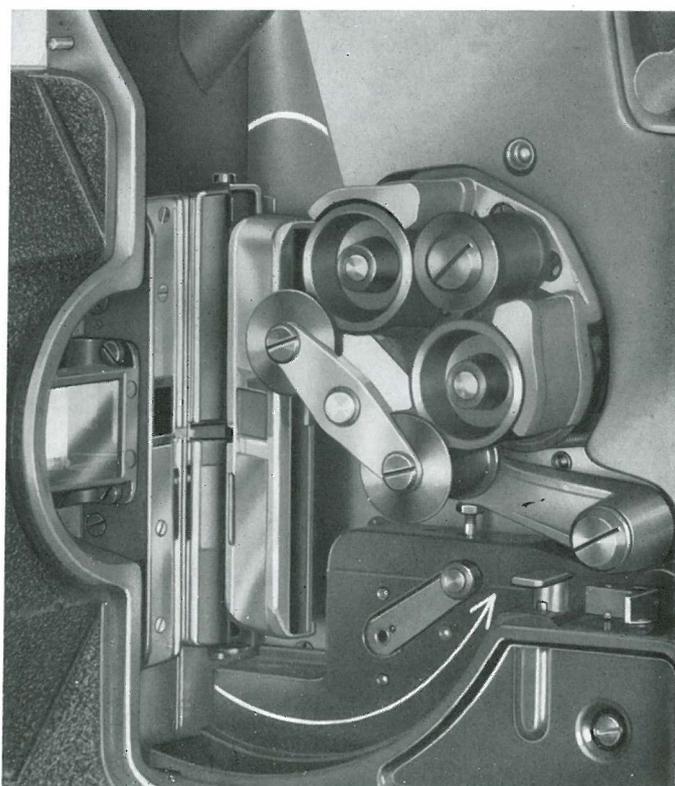
The eyepiece of the camera can be fitted with a special extension for use with the Blimp or with a special periscopic finder attachment – described in more detail on page 17 of this brochure – without affecting the adjustment of the viewfinder in any way.

The pull-down claw engages in the film perforation from the front, whereas the registration pin, which steadies the film in its vertical travel, engages from the rear and presses the film against the front plate.

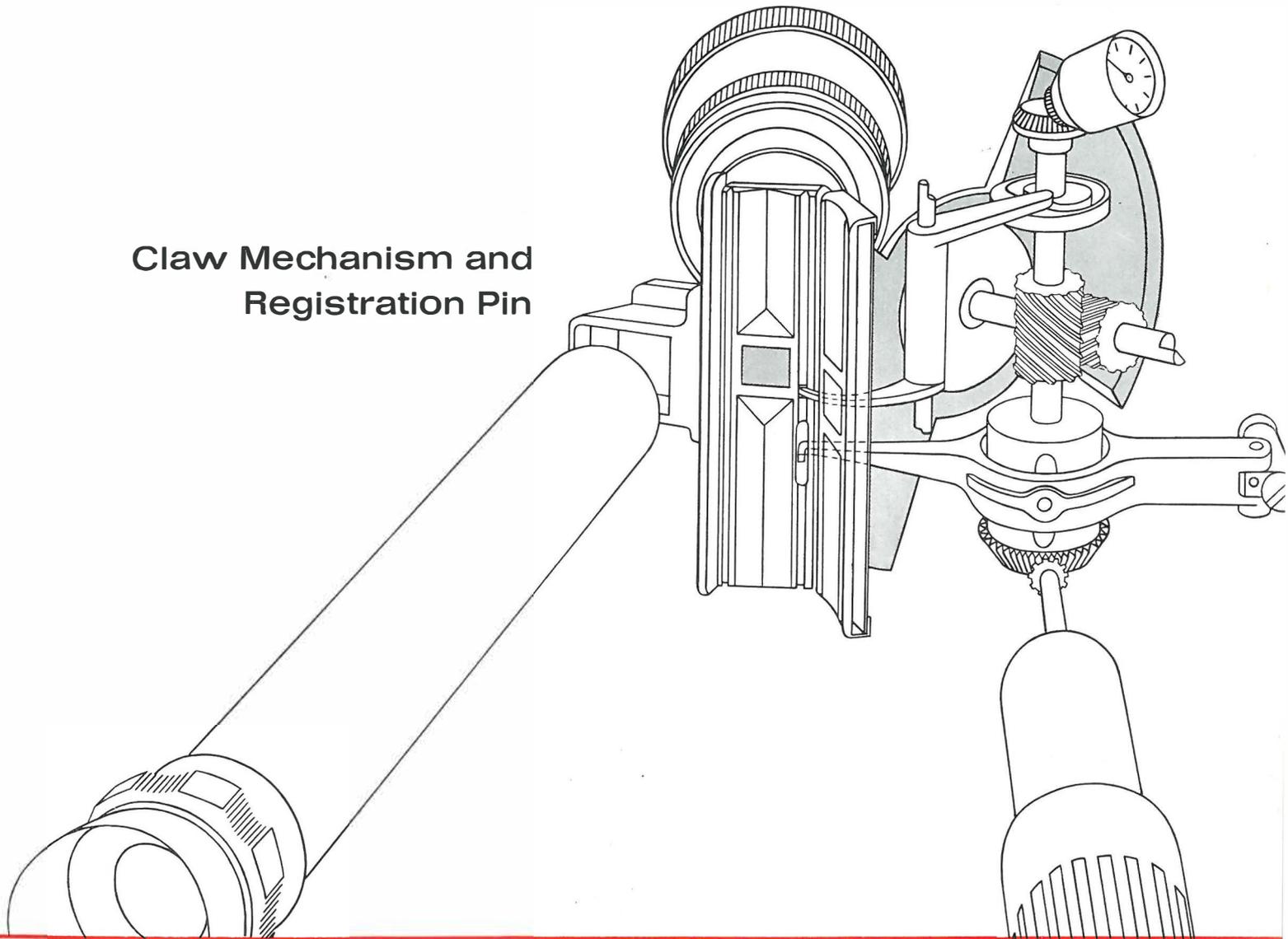
The beautifully balanced interaction of pull-down claw and registering pin, the high precision of all parts of the claw mechanism and the excellent design of the film gate place the ARRIFLEX 16 St at the head of all motion picture cameras of its class for picture steadiness and sharpness.

The drive mechanism is designed so as to give a shutter segment of 180° which results in an exposure time of  $\frac{1}{48}$  sec. at a camera speed of 24 frames per second.

All parts of the claw mechanism subject to wear and tear are made of highest-grade tool steel, hardened and specially treated, thus ensuring a long service life.



## Claw Mechanism and Registration Pin

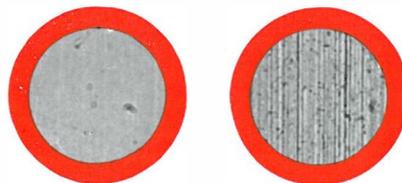


## The Film Gate

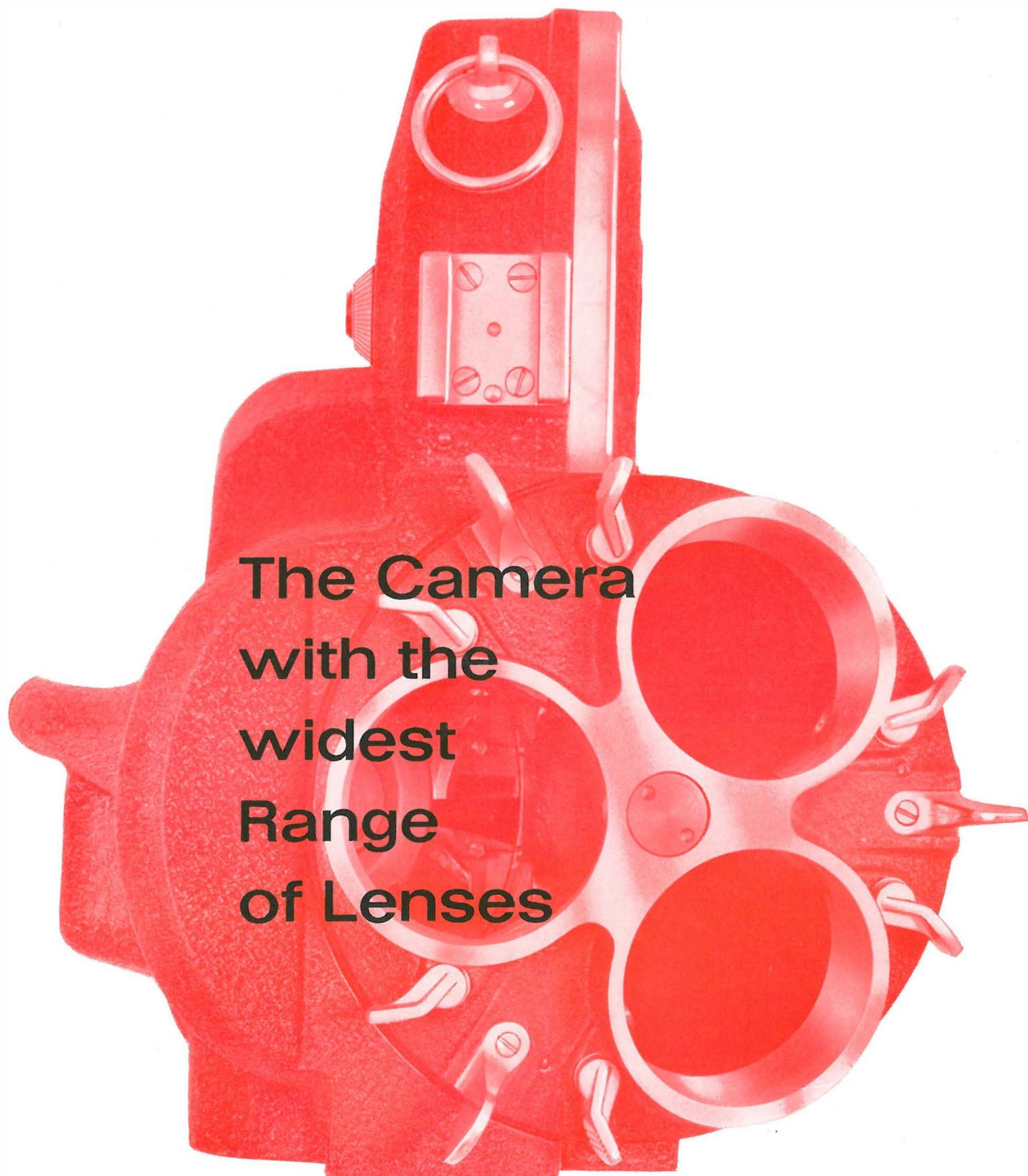
The film gate – together with the claw mechanism – is the most important part of a motion picture camera. It ensures that the film is perfectly centred and absolutely flat in the film plane. For this reason greatest care was taken in the design of the film gate for the ARRIFLEX 16 St. It consists of a front plate with aperture on the lens side and a spring loaded rear pressure pad. In addition, it is provided with a fixed side rail on the claw side and a spring-cushioned rail on the opposite side in accordance with the latest standard. All parts which come in contact with the film are made of special stainless steel, compressed under high pressure and lapped. The surfaces of the gate are plated with hard chromium and otherwise specially treated. The effect of this special treatment is clearly visible under a microscope of  $500 \times$  magnification. It contributes considerably to the elimination of emulsion deposit which could cause film scratches.

An additional advantage is that the film gate can be opened wide to facilitate threading of the film and for cleaning.

A buckle-switch stops the camera automatically when the film is at its end, and also when there is a film jam.



$500 \times$  microphotographs demonstrate the precision finish of the ARRIFLEX 16 St film gate (left), as contrasted with film gate finish of other well known 16 mm camera (right).



**The Camera  
with the  
widest  
Range  
of Lenses**

Please refer to the ARRIFLEX 16 St price list for the full range of lenses available.



### Rank Taylor Hobson

- 1 Cat. No. 1124 Kinetal T2/9 mm
- 2 Cat. No. 1125 Kinetal T2/12,5 mm
- 3 Cat. No. 1120 Kinetal T2/17,5 mm
- 4 Cat. No. 1121 Kinetal T2/25 mm
- 5 Cat. No. 1126 Kinetal T2/37,5 mm
- 6 Cat. No. 1122 Kinetal T2/50 mm
- 7 Cat. No. 1127 Kinetal T2,8/75 mm
- 8 Cat. No. 1128 Kinetal T2,8/100 mm
- 9 Cat. No. 1129 Kinetal T4/150 mm

### Schneider

- 10 Cat. No. 1115 Cinegon f 1,8/10 mm
- 11 Cat. No. 1534 Cinegon f 1,4/16 mm
- 12 Cat. No. 1117 Cine Xenon f 1,4/25 mm
- 13 Cat. No. 3100 Cine Xenon f 2/28 mm
- 14 Cat. No. 2111 Cine Xenon f 2/35 mm
- 15 Cat. No. 2112 Cine Xenon f 2/40 mm
- 16 Cat. No. 3101 Cine Xenon f 2/50 mm
- 17 Cat. No. 3102 Cine Xenon f 2/75 mm
- 18 Cat. No. 2113 Cine Xenon f 2/100 mm
- 19 Cat. No. 1424 Schneider-Variogon f 2/10—100 mm
- 20 Cat. No. 2114 Tele-Variogon f 4/80—240 mm

### Zeiss

- 21 Cat. No. 1500 Distagon f 2/8 mm
- 22 Cat. No. 2124 Distagon f 2/16 mm
- 23 Cat. No. 2126 Distagon f 2/24 mm

- 24 Cat. No. 1502 Planar f 2/25 mm
- 25 Cat. No. 3110 Planar f 2/32 mm
- 26 Cat. No. 3111 Planar f 2/50 mm
- 27 Cat. No. 3112 Planar f 2/85 mm
- 28 Cat. No. 2125 Sonnar f 4/135 mm
- 29 Cat. No. 1526 Vario-Sonnar f 2,8/10—100 mm
- 30 Cat. No. 1505 Mirotar f 4,5/500 mm

### Kinoptik

- 31 Cat. No. 1145 Tegea f 1,8/5,7 mm

### Angénieux

- 32 Cat. No. 1104 Angénieux f 1,8/5,9 mm
- 33 Cat. No. 1107 Angénieux f 0,9/25 mm
- 34 Cat. No. 1105 Angénieux f 1,1/28 mm
- 35 Cat. No. 1140 Angénieux Zoom f 2,2/17,5—70 mm
- 36 Cat. No. 1144 Retro-Zoom 16 mm for Cat. No. 1140, 12,5—50 mm
- 37 Cat. No. 1106 Angénieux Zoom f 2,2/12,5—75 mm
- 38 Cat. No. 1148 Angénieux Zoom f 2,2/9,5—95 mm
- 39 Cat. No. 1135 Angénieux Zoom f 2,2/12—120 mm
- 40 Cat. No. 1139 Angénieux Zoom f 3,5/12—240 mm

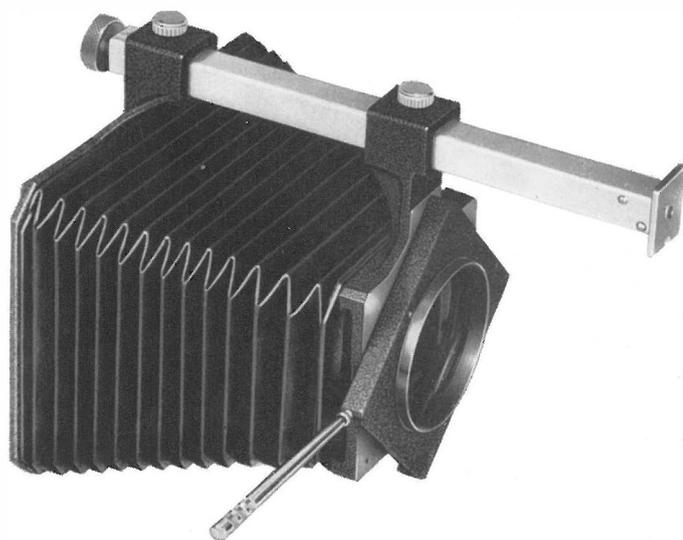
### Zoomar

- 41 Cat. No. 2160 Macro-Zoomatar f 2,8/40 mm
- 42 Cat. No. 2161 Macro-Kilar f 2,8/90 mm
- 43 Cat. No. 2164 Pan-Tele-Kilar f 4/300 mm
- 44 Cat. No. 2188 Sport-Fern-Kombi f 4/400 mm and f 5,6/600 mm

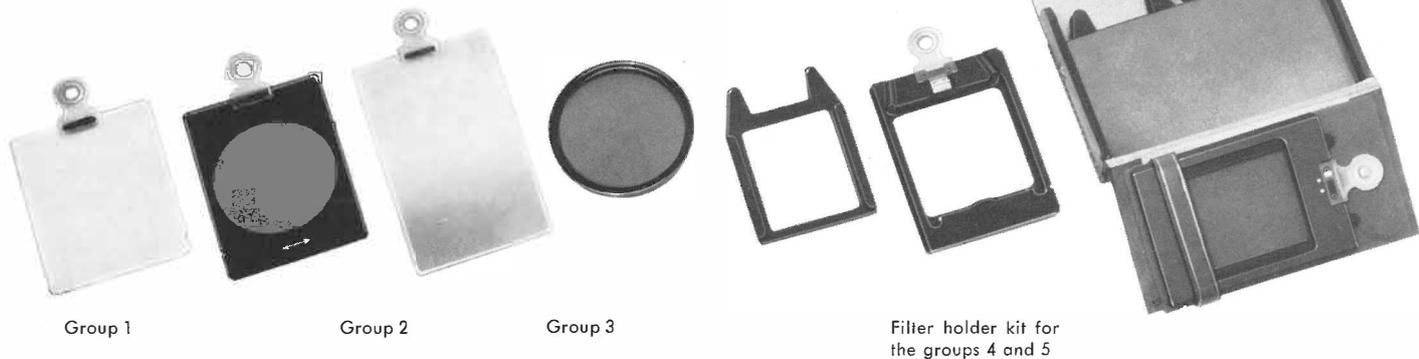
## The Matte Box

The matte box (Cat. No. 1001) is one of the most important accessories for the ARRIFLEX 16 St. It is strongly advisable to use it as a sunshade for all lenses between 16 and 75 mm focal length, in order to obtain maximum picture quality. Even with lenses of short focal length, which offer a certain degree of protection from stray light because of the deep setting of the front element, it is still advisable to use the matte box for extra protection.

The back of the matte box features two stages for the insertion of  $60 \times 75 \times 3$  mm and  $60 \times 100 \times 3$  mm filters or gelatine filter holders for  $50 \times 50 \times 3$  mm glass filters or gelatine filters. One of these stages can be rotated and is designed for use with graduated or polarizing filters. It is also threaded for the attachment of M 58  $\times$  0.75 screw-in-filters. The front of the matte box accepts slide-in masks for special effects.



### Filters for the matte box



Group 1

Group 2

Group 3

Filter holder kit for the groups 4 and 5

**Group 1:  $60 \times 75 \times 3$  mm (original ARRI filter), made from selected, dyed in the mass optical filter glass, for black-and-white film**

light yellow, medium yellow, orange-yellow, orange-red, green, ultraviolet (haze)

**Solid optical glass filters, for colour correction with colour film**  
R 12, R 6, R 3, R 1.5 (Skylight), ultraviolet (haze),  
B 12, B 6, B 3, B 1.5

**Solid optical glass filters, neutral density, for black-and-white and colour film**

LW 1 (change in light value 1)  
LW 2 (change in light value 2)      1 light value =  
LW 3 (change in light value 3)      1 f-stop  
LW 4 (change in light value 4)

**Polarizing filter, cemented, neutral**

**Group 2:  $60 \times 100 \times 3$  mm (original ARRI graduated filter), made from selected, dyed in the mass optical filter glass**  
Graduated: red - yellow - colourless for black-and-white film (Cat. No. 1191)

Graduated: grey - colourless for colour film (Cat. No. 1199)

**Group 3: Round screw-in filter with thread M 58  $\times$  0.75, for attachment to rear of matte box**

Available on request in special cases:  
Colour correction filters, neutral density filters, polarizing filters, ultraviolet filters

**Group 4:  $2 \times 2$  inch ( $50 \times 50$  mm) for use with filter holder (Cat. No. 1193)**

Commercial, cemented gelatine filters for black-and-white or colour film (these filters are supplied partly by film manufacturers).

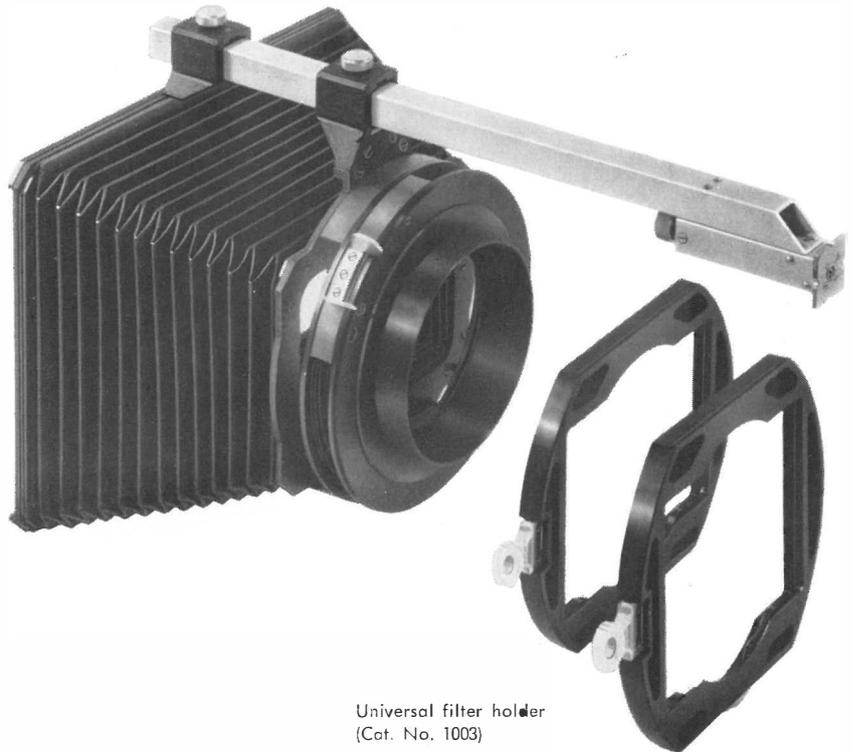
**Group 5: Gelatine filters  $2 \times 2$  inch ( $50 \times 50$  mm) for use with filter holder kit (Cat. No. 1195)**

Commercial **gelatine filters for black-and-white or colour film** in the colour range offered by film manufacturers. This size of filter can also be cut from larger sheets of gelatine foil.

For the filters listed under groups 4 and 5 we supply a filter holder kit (Cat. No. 1195) consisting of 5 holders for gelatine filters, 1 frame for these holders or  $2 \times 2$  inch cemented gelatine filters and 1 leather case (see illustration). The parts are also available separately. Due to their small size, the filters of the groups 4 and 5 can only be used for certain lenses.

All neutral indicated filters are equally suitable for black-and-white and colour film.

# The Universal Matte Box



Universal filter holder  
(Cat. No. 1003)

Detailed information about the new improved Universal matte box (Cat. No. 1002) is found in our Technical Information No. G 10 104, dated 1. August 1968. This matte box is also indispensable when operating with lenses of longer and shorter focal length where the matte box described on page 14 is not sufficient in respect of light protection and filter size. The Universal matte box is of the same construction as the latter, however, the filters of the groups 6—9 men-

tioned below are inserted in the Universal filter holder (Cat. No. 1003) two of which are supplied with the matte box ex factory. The large 4 inch Wratten filter can be inserted in the filter slit without filter holder in which case the filter slit is covered by additional light protection. Exchangeable adapter rings center the Universal matte box at the front lens mount of the respective lens.

## Filters for the Universal matte box

**Group 6: 75×75 mm (original ARRI filter – also ARRIFLEX 35), made from selected dyed in the mass optical filter glass for black-and-white film**

light yellow, medium yellow, orange-yellow, orange-red, green, ultraviolet (haze)

**Solid optical glass filters, for colour correction with colour film**

R 12, R 6, R 3, R 1.5 (Skylight), ultraviolet (haze), B 12, B 6, B 3, B 1.5

**Solid optical glass filters, neutral density, for black-and-white and colour film**

LW 1 (change in light value 1)  
LW 2 (change in light value 2)     1 light value =  
LW 3 (change in light value 3)     1 f-stop  
LW 4 (change in light value 4)

**Group 7: Kodak Wratten filter 3×3 inch**

**Group 8: 75×100 mm (original ARRI graduated filter – also ARRIFLEX 35) made from selected optical filter glass for black-and-white film:**

Graduated: red – yellow – colourless  
Graduated: yellow – light yellow – colourless

**for colour film:**

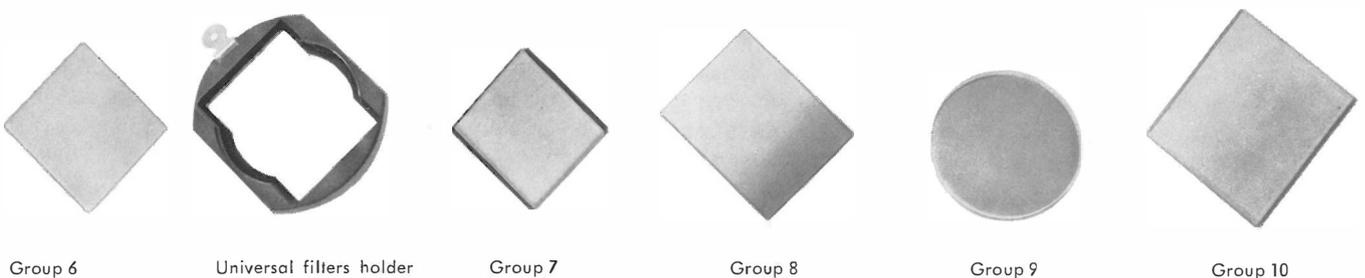
Graduated: grey – colourless

**Group 9: ARRI polarizing filter, round, diameter 94 mm**

Special design for Universal matte box

**Group 10: Large, square 4 inch Wratten filter (up to a max. thickness of 10 mm) (these filters are used without filter holder)**

**Note! The filters for the matte box (group 1–5) and the filters for the Universal matte box (6 - 10) cannot be interchanged.**



Group 6

Universal filters holder

Group 7

Group 8

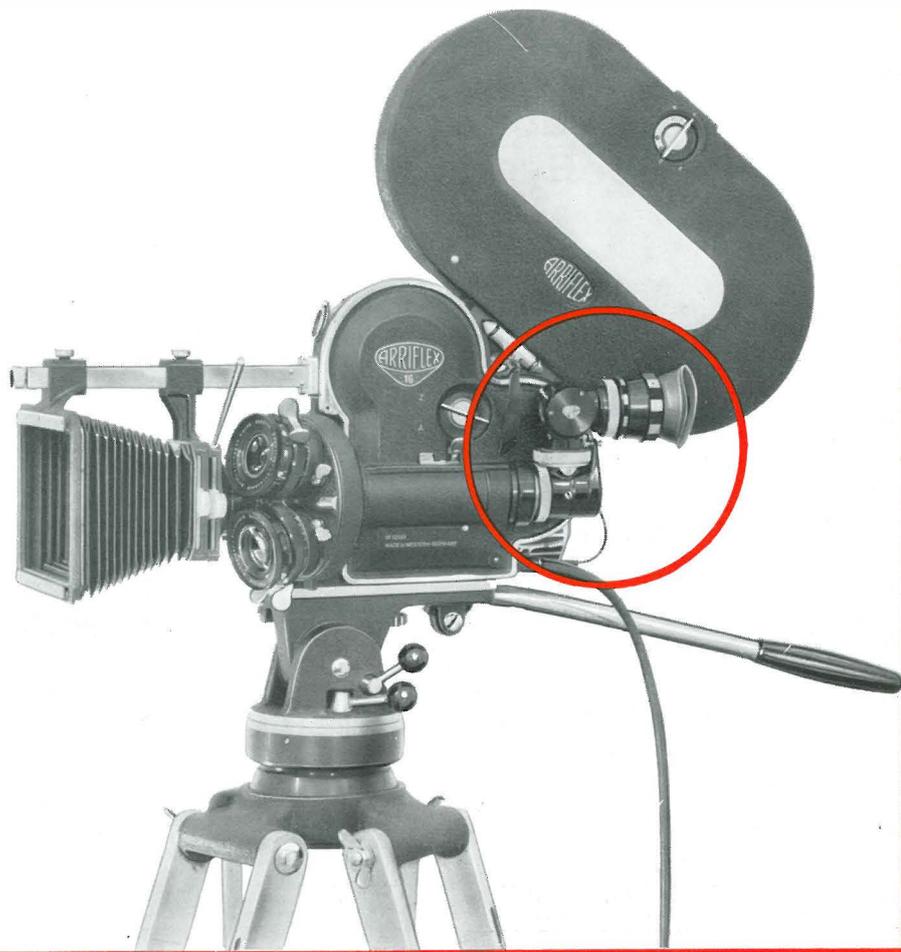
Group 9

Group 10



A camera team films the eruption of a volcano in Costa Rica with the ARRIFLEX 16 St.

## The Periscopic Finder Attachment



The ARRIFLEX 16 St with 400 ft (120 m) magazine in position and eyepiece extended by means of the periscopic finder attachment.



Position of the viewfinder when filming with an obstacle directly behind the camera.

Worm's-eye-view shots can be made quite simply with the viewfinder in this position.

In this way the ARRIFLEX 16 St can be used to film over the top of obstacles.

This is the position of the periscopic finder attachment for viewing with the left eye when the 400 ft (120 m) magazine is in position.

A rotating and swivel-mounted periscopic finder attachment (Cat. No. 1150) is available to supplement the standard eyepiece of the ARRIFLEX 16 St. It consists of a system of lenses and prisms, the mounting of which can be swivelled and rotated to any desired position. The cameraman is thus able to view from any angle.

The periscopic finder attachment was chiefly intended for use with the 400 ft (120 m) magazine, the relatively large dimensions of which frequently make it difficult to sight through the

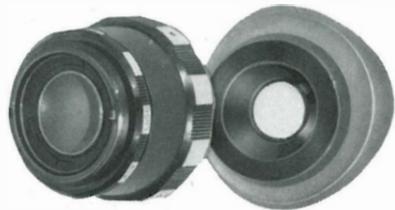
normal eyepiece. It is also a boon for „left-eyed“ cameramen. However, it is just as good for shots from a worm's-eye-view, over the top of obstacles, for vertical or oblique shots, or for filming through a microscope. In all these cases the viewfinder can be readily adapted to existing situations, and the advantages of the mirror reflex system remain unimpaired.

A special model of the periscopic finder attachment can be supplied for ARRIFLEX 16 St cameras used for X-ray cinematography.

## Interchangeable Viewfinder Eyepieces



Standard viewfinder eyepiece with hinged lens cover



Viewfinder eyepiece, rubber eyecup removed



Automatic viewfinder eyepiece  
(for demonstration purposes shown half opened)

Two different ARRIFLEX viewfinder eyepieces are available:

1. The viewfinder eyepiece in the standard design as in Cat. No. 2008 can be light-sealed by means of a hinged lens cover when the camera is not in use and thereby prevents possible light entering through the viewfinder lens into the camera interior.

It is delivered as a part of the standard equipment for the ARRIFLEX 16 St.

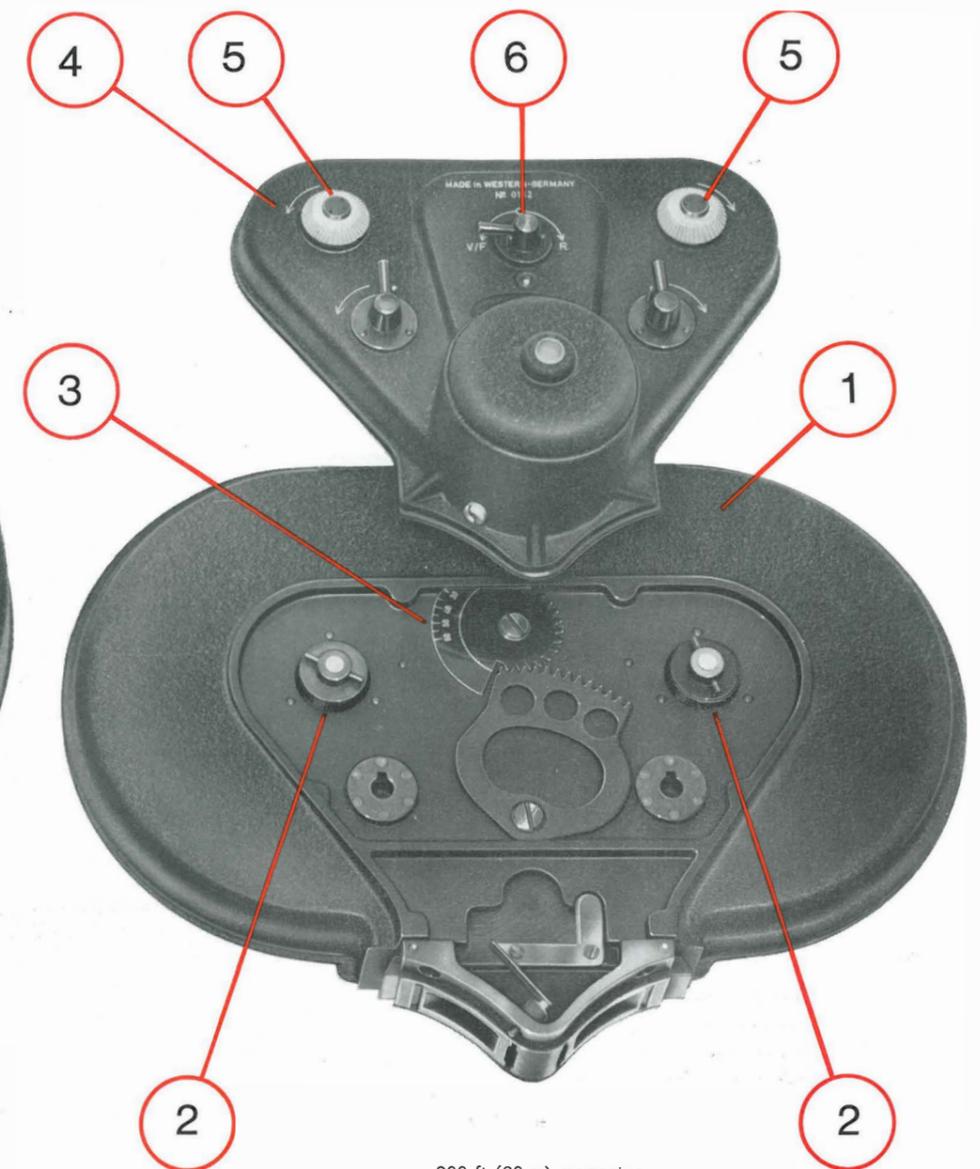
2. The viewfinder eyepiece Cat. No. 2009 is provided with an automatic closure mechanism. This opens when the eye is pressed against the eyecup and closes automatically when it is removed. In addition, it is possible to fix the mechanism at its open position.

Both can be adjusted to the individual eye by means of a diopter adjustment. The hinged lens cover or the automatic closure mechanism protect the film against undesired light entering through the viewfinder. The eyecup is mounted so that it may be turned and can be removed from the eyepiece. The mounting of the eyecup is provided with a centered recess for a correction lens for the eye of the respective cameraman. (For cases where the diopter adjustment does not suffice or to compensate for astigmatic eye deficiencies.) See also our Technical Information E 01 101.

## 200 ft (60 m) and 400 ft (120 m) Magazines



400 ft (120 m) magazine  
for ARRIFLEX 16 St

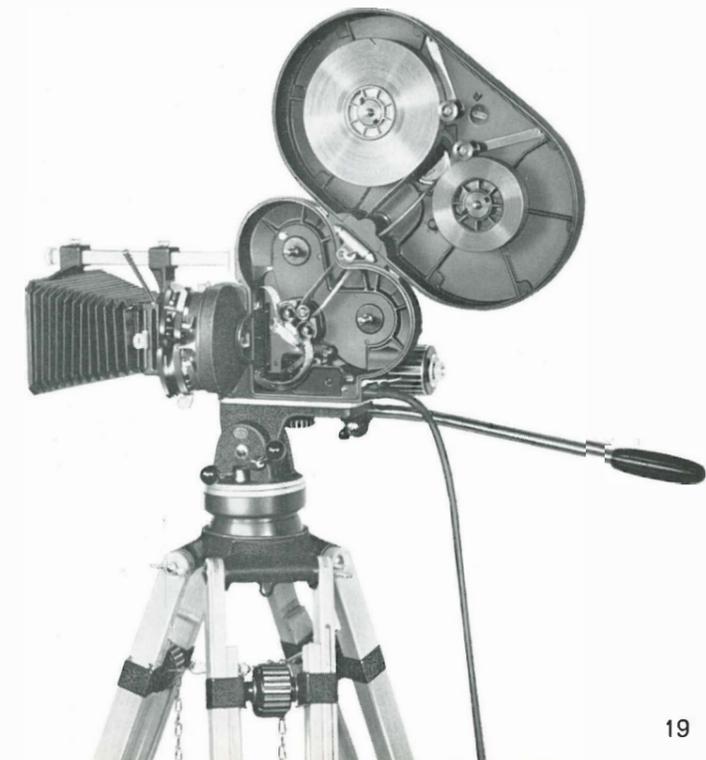


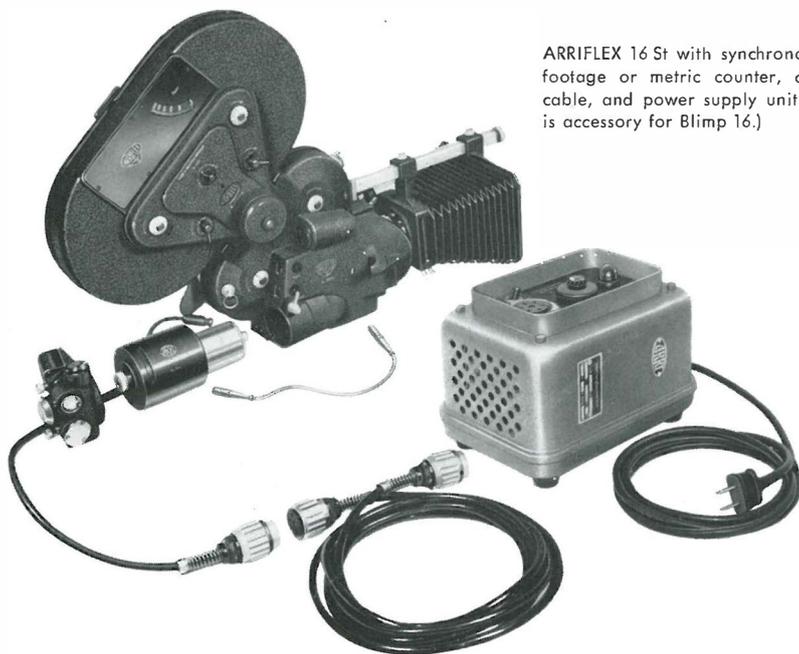
200 ft (60 m) magazine  
for ARRIFLEX 16 St

The camera housing of the ARRIFLEX 16 St is designed to accept 50 ft (15 m) or 100 ft (30 m) daylight-loading spools. However, an auxiliary magazine (Cat. No. 1170) enables filmloads of 400 ft (120 m) to be used. This magazine is equipped with its own torque motor (Cat. No. 1171) which can be installed and removed quite simply. The same motor can thus be used for any number of magazines. The advantage of a separate motor for the auxiliary magazine lies in the fact that the camera drive always operates at an even load, irrespective of the amount of film wound on the spool thus guaranteeing the maximum degree of smoothness in running. The magazine torque motor - like the camera motor - is designed for operation on 8 Volts DC and is equipped with a switch for forward or reverse drive. The amount of film in the magazine is indicated by a counter

which can be supplied in feet or metres as required. It is possible to use 200 ft (60 m) daylight loading film as well with this magazine, in addition to usual 400 ft (120 m) darkroom loads. In this case the two core holders must be removed. In addition to the above, a 200 ft (60 m) magazine is available (Cat. No. 1172). This magazine accepts 200 ft (60 m) darkroom loading rolls. It has its own torque motor (Cat. No. 1173).

- 1 Magazine body
- 2 Spindles
- 3 Counter, in feet or metres
- 4 Torque motor for 200 ft (60 m) magazine (Cat. No. 1173)
- 5 Knurled screws for taking up film slack
- 6 Forward/reverse switch for take-up motor





ARRIFLEX 16 St with synchronous motor, footage or metric counter, connecting cable, and power supply unit. (Counter is accessory for Blimp 16.)



Variable speed motor  
(Cat. No. 1160)



Governor controlled motor  
(Cat. No. 1161)



Single frame mechanism  
(Cat. No. 1220)

## Motors for the ARRIFLEX 16 St

The various types of motors available for the ARRIFLEX 16 St are readily interchangeable and no tools whatsoever are required. The following motors are offered for the ARRIFLEX 16 St:

**Variable speed motor** (Cat. No. 1160) for 8 V battery operation with built-in rheostat for regulation of camera speed between 4 and 48 frames per second. It is specially designed to come to speed quickly. This manually regulated motor is usually operated from one of the batteries shown on opposite page, or in certain cases by a suitable power supply unit (Cat. No. 1214). Up to speeds of about 24 frames per second this motor can also be run from a 6 V car battery. A knurled disk situated behind the rheostat cap enables the motor to be switched to "forward" or "reverse". A knurled knob behind this disk is for turning the camera mechanism by hand for loading and to place the mirror reflex shutter in viewing position when camera is not running.

**Governor controlled motor** for 8 V battery operation with fixed camera speed of 24 (Cat. No. 1161) or 25 frames per second (Cat. No. 1162). This speed is automatically maintained and cannot be changed. The speed required should be stated when placing an order. Other speeds can be adjusted on request. This motor is designed for forward drive only, and a knurled knob for turning the camera mechanism by hand is also provided.

**Synchronous motor with power supply unit** for connection to voltages between 110 and 250 V AC, 50 or 60 cycles, single-phase. This motor can be supplied in three models: 50 c. p. s. for 24 frames per second (Cat. No. 1163), 50 c. p. s. for 25 frames per second (Cat. No. 1164), 60 c. p. s. for 24 frames per second (USA) (Cat. No. 1165).

The frequency of the mains supply and the desired speed should be stated when placing order. Motors for other speeds and mains frequencies can be supplied on request. The power supply unit is furnished with motor. This unit serves to transform the mains voltage to the operating voltage required for the three-phase synchronous motor which has been designed for 42 V for safety reasons. It also provides the auxiliary phase for the synchronous motor and the 8 V DC required for the magazine torque motor. A relay circuit in the power supply unit makes it possible to switch the camera on and off at the usual single-pole release lever. The power supply unit also contains a magnetic direct-current brake which acts on the synchronous motor. It is also equipped with a change-over switch for forward and reverse drive. The synchronous motor enables the ARRIFLEX 16 St to be perfectly synchronized with other motion picture and sound recording apparatus. A mechanical phase-adjustment device (Cat. No. 1168) or a polarized synchronous motor for kinescope recording are also available.

## The Single Frame Mechanism

A single frame mechanism for taking single frames can also be supplied as an accessory for the ARRIFLEX 16 St. The above illustration shows this device which is inserted between camera and motor. The device can be operated by means of a manual release or - if the process is to be controlled automatically - by means of an intervalometer. A 4-digit frame counter is built into the device. A remote frame counter can

also be supplied. The single frame mechanism can be set to exposure times of  $\frac{1}{10}$ ,  $\frac{3}{10}$  and  $\frac{9}{10}$  of a second by changing some of the gears. Special models for other exposure times can be supplied on request. Minimum exposure time is  $\frac{1}{10}$  of a second. Details of the single frame mechanism in conjunction with time lapse and animation equipment can be found on page 25.

## Batteries for the ARRIFLEX 16 St



Cat. No. 1210



Cat. No. 1211



Cat. No. 2270

### Special 8 V Wet Cell Lead Batteries

#### 1. ARRI Light-Weight Battery, Type "Permanent"

8 V, 3.5 Ah (Cat. No. 1210). Weight with carrying case and shoulder strap only approx. 2,5 lbs. A full charge will suffice for 2000 (1830 \*) ft of film.

#### 2. ARRI Special Wet Cell Lead Battery, Type „Permanent“

as above, however 8 V, 7,5 Ah. Weight with carrying case and shoulder strap approx. 4,4 lbs (Cat. No. 1235).

#### 3. ARRI Special Wet Cell Lead Battery

8 V, 7,5 Ah (Cat. No. 1211) will – at normal temperatures and if fully charged – suffice for the exposure of approx. 4500 (4170 \*) ft of film. Weight with carrying case and shoulder strap approx. 4,4 lbs. A protecting case (Cat. No. 1212) for this battery is also available.

The batteries must be filled with a dilute solution of sulphuric acid, 1.28 spec. gravity. This is readily obtainable everywhere. For charging the above batteries the **ARRI Universal battery charger** (Cat. No. 2270) with selector switch for all standard voltages between 110 and 240 V, 50/60 cycles, is available. A built-in ammeter serves to check the charging current. The charger is, furthermore, provided with a voltage selector and a switch for the charging current from 0.3 to 0.5 A, and has secondarily an automatic cut-out. The elements are recessed for protection against damage. The ARRI Universal battery charger is very handy due to its small size. It is tropic resistant and can also be used for charging the wet cell lead batteries of the ARRIFLEX 35.



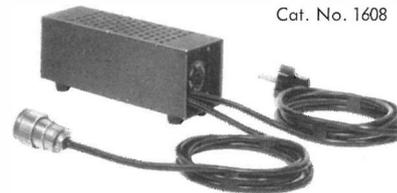
Cat. No. 1232



Cat. No. 1230



Cat. No. 1231



Cat. No. 1608

### ARRI 8 V Dryfit Batteries

#### 1. Type D 8/2.6 S (Cat. No. 1232)

8 V, 2.6 Ah. Weight including carrying case and strap only approx. 2 lbs. This battery can also be mounted on the self-supporting ARRI shoulder brace (see page 23).

#### 2. Type D 8/2.6 (Cat. No. 1230)

8 V, 2.6 Ah. Weight including carrying case and strap approx. 3 lbs.

#### 3. Type D 8/5.2 (Cat. No. 1231)

8 V, 5.2 Ah. Weight including carrying case and strap approx. 4.5 lbs.

Even under extreme conditions ARRI dryfit batteries have a high capacity since internal resistance and voltage drop are small. At temperatures of  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) they still have 65% of the nominal battery capacity. Besides the recharge which can be carried out in any desired position, ARRI dryfit batteries require no special maintenance. The service life and the possible number of charging cycles of the battery are dependent on the utilization of a suitable charging device which either switches the charging current automatically off

when the battery is fully charged, or reduces current to a trickle-charge rate to prevent gassing.

**The Special ARRI Charger for ARRI Dryfit Batteries** (Cat. No. 1608) charges the battery automatically with the required charging current voltage. The respective charging current and voltage values are automatically set for all ARRI dryfit batteries by means of the 12-pole special plug which simplifies the use of the charger substantially. The ARRI special charger for ARRI dryfit batteries can be switched for operation from mains voltages from 110 and 250 V, 50/60 cycles. It is handy, tropic-resistant and can also be used for charging any dryfit batteries in the ARRIFLEX program.

### 8 V ARRI Nickel-Cadmium Batteries

1. Type NC 8/4 (Cat. No. 1269) 8 V, 4 Ah. The weight of this battery including carrying case and shoulder strap is approx. 3 lbs.

**This power supply unit** (transformer/rectifier, Cat. No. 1214) is available for operating the DC camera motors from the mains.



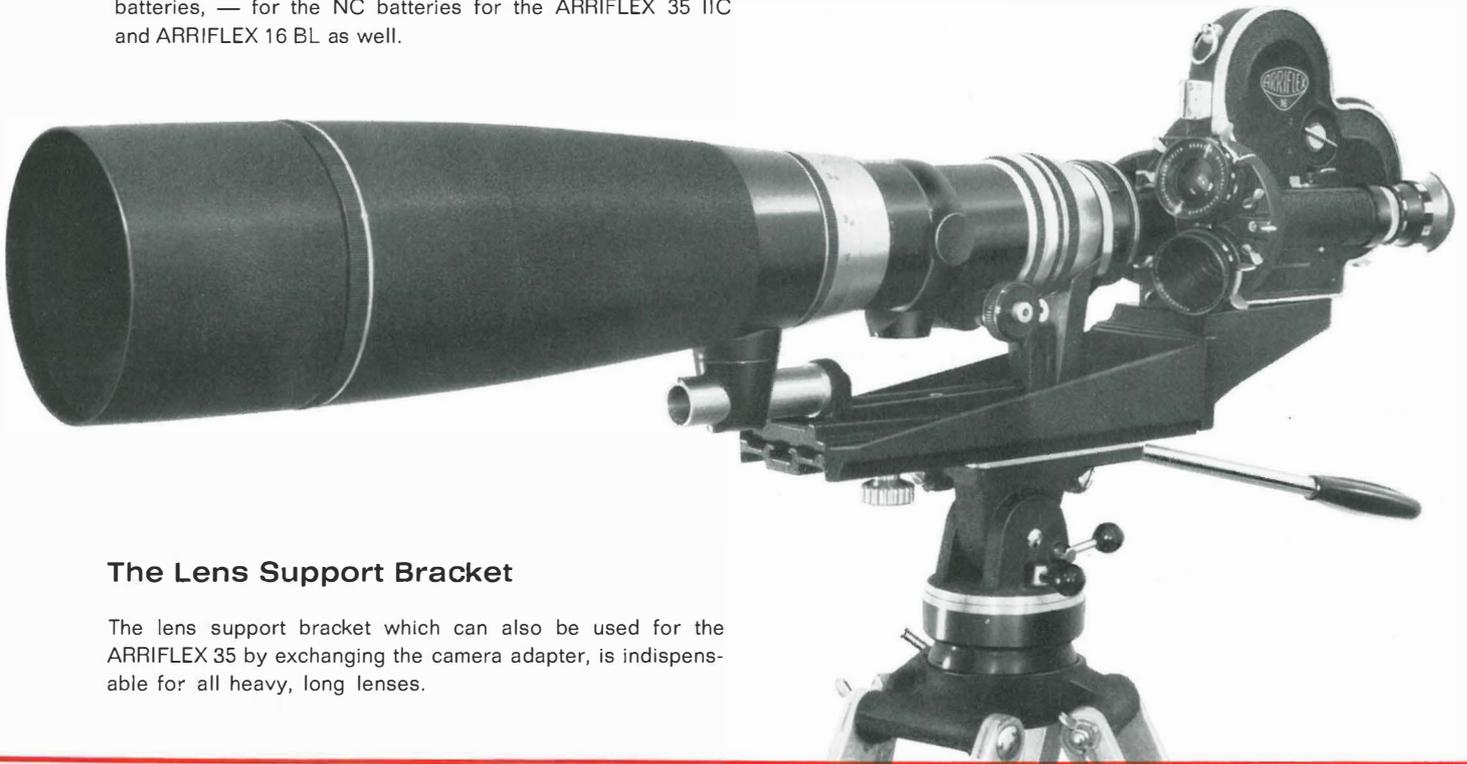
(\* The bracketed figures refer to the use of 200 ft and 400 ft magazines.)

2. Type NC 8/6 (Cat. No. 1270) 8 V, 6 Ah. The weight of this battery including carrying case and shoulder strap is approx. 4,4 lbs.

The nickel-cadmium batteries are extremely robust and insensitive to stress or full discharge. They can be stored in a discharged state without hesitation.

#### The ARRI Charger for Nickel-Cadmium Batteries

Type NCL 0,6 is suitable for charging all nickel-cadmium batteries, — for the NC batteries for the ARRIFLEX 35 IIC and ARRIFLEX 16 BL as well.



#### The Lens Support Bracket

The lens support bracket which can also be used for the ARRIFLEX 35 by exchanging the camera adapter, is indispensable for all heavy, long lenses.

#### Carrying and Storage Cases

Sturdy cases suitable for use in all climates are available for the safe transport and storage of the ARRIFLEX 16 St and its accessories. Cases are covered with hammered aluminium which reflects the heat of the sun. A patented rim ensures that the case is hermetically sealed against dust and moisture. The case measuring 15×9×8" (Cat. No. 1201) is designed to take

the camera complete with lenses, matte box, daylight loading spools and small accessories. A larger case measuring 24×16×8½" (Cat. No. 1203) is available for the camera with 400 ft magazine attached and two additional 400 ft magazines. Another case measuring 10×10½×14½" (not illustrated) which is available with aluminium cover (Cat. No. 1204), is designed to take four 400 ft magazines (without torque motor and camera).



Cat. No. 1203



Cat. No. 1201



Cat. No. 2300



Cat. No. 1157



## Tripods

From the simple shoulder pod to the heavy-duty friction tripod, the emphasis in the ARRI tripod programme is on versatility.

A screw-on pistol grip handle with built-in release (Cat. No. 1151) is available for the cameraman who is accustomed to the hand grip of the ARRIFLEX 35 or prefers this type of operation.

For extra support and steadiness, however, the ARRI shoulder pod is to be recommended (Cat. No. 2300). This can be used together with the pistol grip handle and can also be used for the ARRIFLEX 35.

Even more operating convenience offers the new ARRI shoulder brace, an ideal shoulder pod/chest support combination (Cat. No. 1157). It is fully adjustable to suit the cameraman's size and to find the most suitable position of the camera. Being collapsible, it can be folded up to minimum size for transport. An ARRI dryfit battery (Cat. No. 1232) can be mounted on the shoulder plate to counterbalance the weight of the camera. An extra short cable connects battery to camera.

Being made of seasoned wood, the ARRI special tripods are unusually light and sturdy. They can be supplied with pan and tilt friction or gyro heads as required. The gyro heads have a particularly fine pan action and can be ordered as an accessory

(Cat. No. 1402) including adapter for use in place of the pan and tilt friction head.

The special tripod for the ARRIFLEX 16 St (Cat. No. 1400) is equipped with a pan and tilt head, control handle, two locks and a spirit level. It can be extended from 44" to 70". The special gyro tripod is equipped in the same way (Cat. No. 1401), except that it has a gyro head in place of the friction head. The special gyro tripod can also be extended from 44" to 70". The adapter is not required for this tripod. The same models can also be supplied as baby tripods with an extension from 26" to 32". The baby tripod (Cat. No. 1404) is also available without head (legs only, Cat. No. 1405).

Further, the programme includes an ARRI ground tripod, metal legs only (Cat. No. 1410), which can be attached to the bowl of the special tripod. They are ideally suited for low-angle shots, for filming flowers, plants, animals, etc.

An even lower camera position — 5" from the ground is possible with the use of the ground plate (Cat. No. 2314).

The ARRI tripod programme also includes a medium and a heavy-duty friction tripod (Cat. Nos. 1415 and 2310). They are intended for use with the Blimp 16 and can be extended from 44" to 68". These tripods can also be used with the ARRIFLEX 35 and Blimps 120 and 120 S (not illustrated).



Ground tripod legs  
Cat. No. 1410



Cat. No. 1400



Cat. No. 1401



Cat. No. 1404



Cat. No. 1402



Adapter

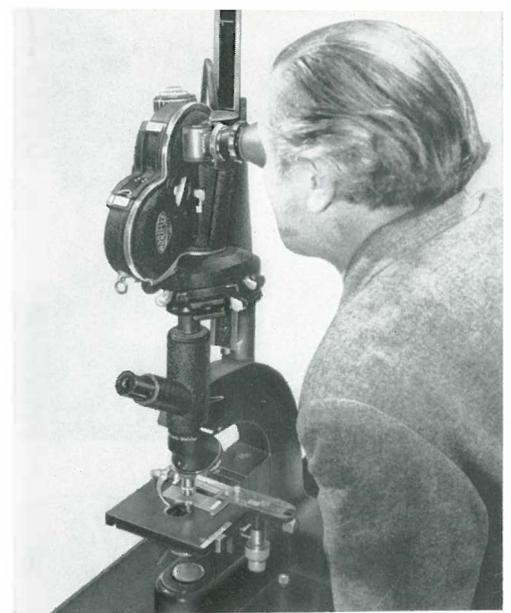


Cat. No. 1151

## Cine Micrography with the ARRIFLEX 16 St

The opposite illustration shows the ARRIFLEX 16 St combined with a microscope for cine micrography. The ARRIFLEX 16 St can be used in conjunction with any microscope with vertical eyepiece, but must under no condition be in contact with it. Intermediate lenses are not required as the mirror reflex system of the ARRIFLEX 16 St permits all microscopic processes to be followed clearly and accurately.

As there are many different types of microscopes and innumerable applications we cannot go into detail in this brochure. Further details are available on request.



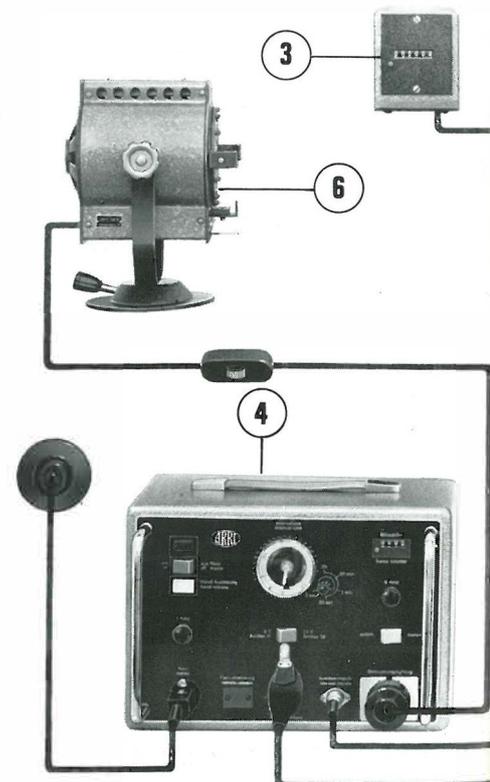
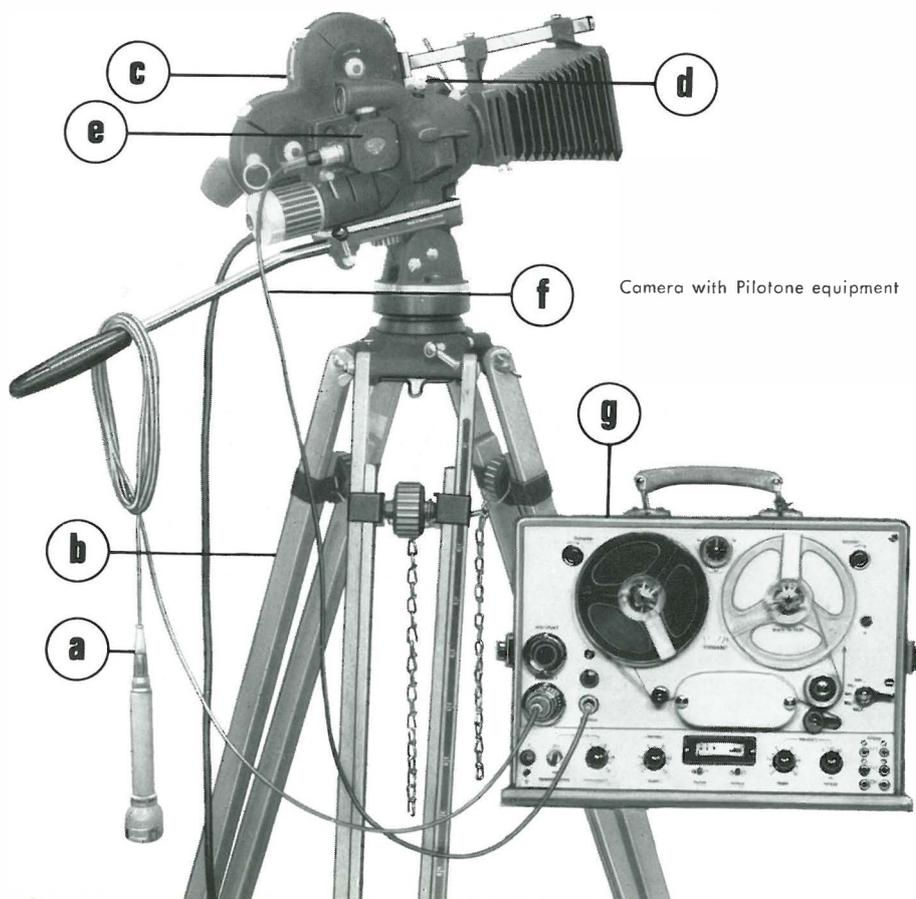
## The Pilotone System

With the aid of the Pilotone system,  $\frac{1}{4}$ " magnetic recording tape (unperforated) can be used for lip-synchronized picture and sound recording. Synchronization of the film and tape is achieved by means of a pilot tone frequency generated by a small alternating current generator attached to the camera. This pilot tone frequency is recorded on the tape along with the sound. The sound track must later be transferred to perforated tape using either the direct or indirect method. In some systems the pilot tone frequency is amplified and then used to control the motor of the perforated tape recording apparatus, in order to produce a sound track that can be played in synchronization with the film.

The Pilotone recording system therefore requires a minimum

of apparatus which can readily be transported with the camera. A very small pilot tone generator is attached to the ARRIFLEX 16 St and does not interfere with the operation of the camera in any way. It may also contain a clap-stick device which makes a light mark on the film and cuts in the pilot tone frequency as soon as the motor has reached the full speed. The commencement of the pilot tone frequency and the end of the light mark on the film can then be used as start marks. A manually operated scene start and cueing device can also be incorporated.

The cameraman films in conventional manner. The normal 8 V battery which can be carried in a leather case attached to one's belt or on a strap, provides the necessary power supply



for the camera. The sound man uses the tape recorder which is scarcely larger than a briefcase and contains its own power supply unit. For synchronous work the ARRIFLEX 16 St must be connected to the tape recorder by means of the pilot cable. Both operators can also make recordings and film shots independent of one another if required.

- a Microphone
- b ARRI special tripod
- c ARRIFLEX 16 St
- d Control lamp of start marking device
- e Pilot tone generator
- f Pilot cable
- g Maihak tape recorder

## Time Lapse and Animation Equipment

In order to be able to use the ARRIFLEX 16 St for time lapse and animation filming in all its variations, the following special accessories have been designed:

- 1 **Single frame mechanism** (Cat. No. 1220)
- 2 **Auxiliary shutter** to prevent fogging during long intervals between exposures (Cat. No. 1221)
- 3 **Frame counter** for remote metering, registering forward and reverse (Cat. No. 1225)
- 4 **Intervalometer** for automatic control of camera, adjustable to intervals between 4 seconds and 3 hours (Cat. No. 1222), serves also as power supply unit for DC camera motor
- 5 **Electronic flashgun** with power supply (not ARRI product)
- 6 **ARRI film spotlight**
- 7 **Fading device** with polarizing filters (not shown) (Cat. No. 1223)
- 8 **Power supply unit** for DC camera motor (not shown) (Cat. No. 1214)
- 9 **Single frame hand crank** to transport film by 1 frame per rotation (Cat. No. 1224) (not shown)

## X-Ray Cinematography with the ARRIFLEX 16 St

Mirror reflex viewer and electric motor drive make the ARRIFLEX 16 St, and the ARRIFLEX 35, specially suitable for cine radiography in conjunction with image intensifiers. For more details please contact the manufacturers of X-ray equipment, or write direct to us.

## ARRIVOX-TANDBERG Magnetic Tape Recorder for Synchronous Sound Recording

The ARRIVOX-TANDBERG portable battery-operated tape recorder is the result of a joint development in which both ARNOLD & RICHTER and TANDBERGS RADIOFABRIKK combined their experience in the application and design of professional tape recorders for synchronous operation with motion picture cameras. The ARRIVOX-TANDBERG recorder takes into consideration the special requirements of synchronous operation in connection with the ARRIFLEX cameras and functions with dry cells, accumulators, or with external supplies. Other motion picture cameras equipped with Pilotone generator can of course also be used in conjunction with the ARRIVOX-TANDBERG recorder.

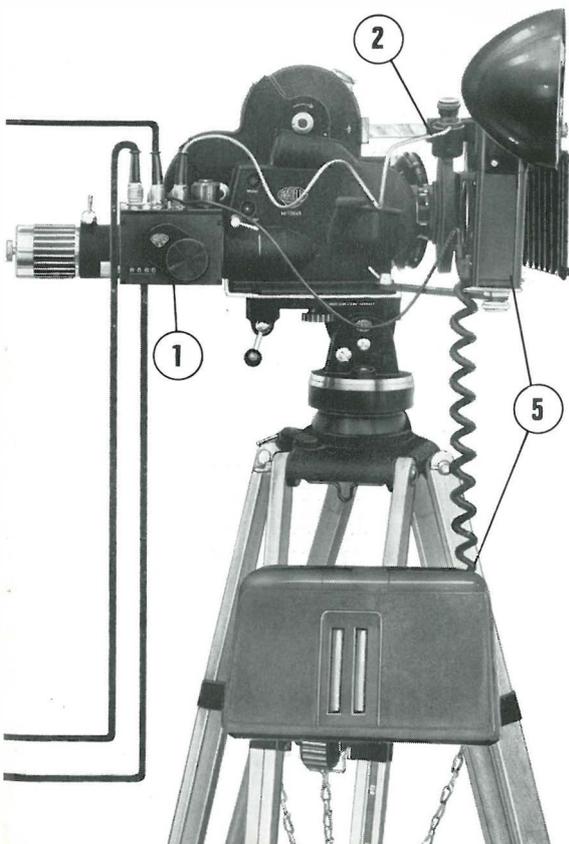
Due to the use of the latest technologies, excellent performance data have been combined with utmost reliability.

All controls and connections are situated on the front plate, which allows for easy operation of the ARRIVOX-TANDBERG tape recorder.

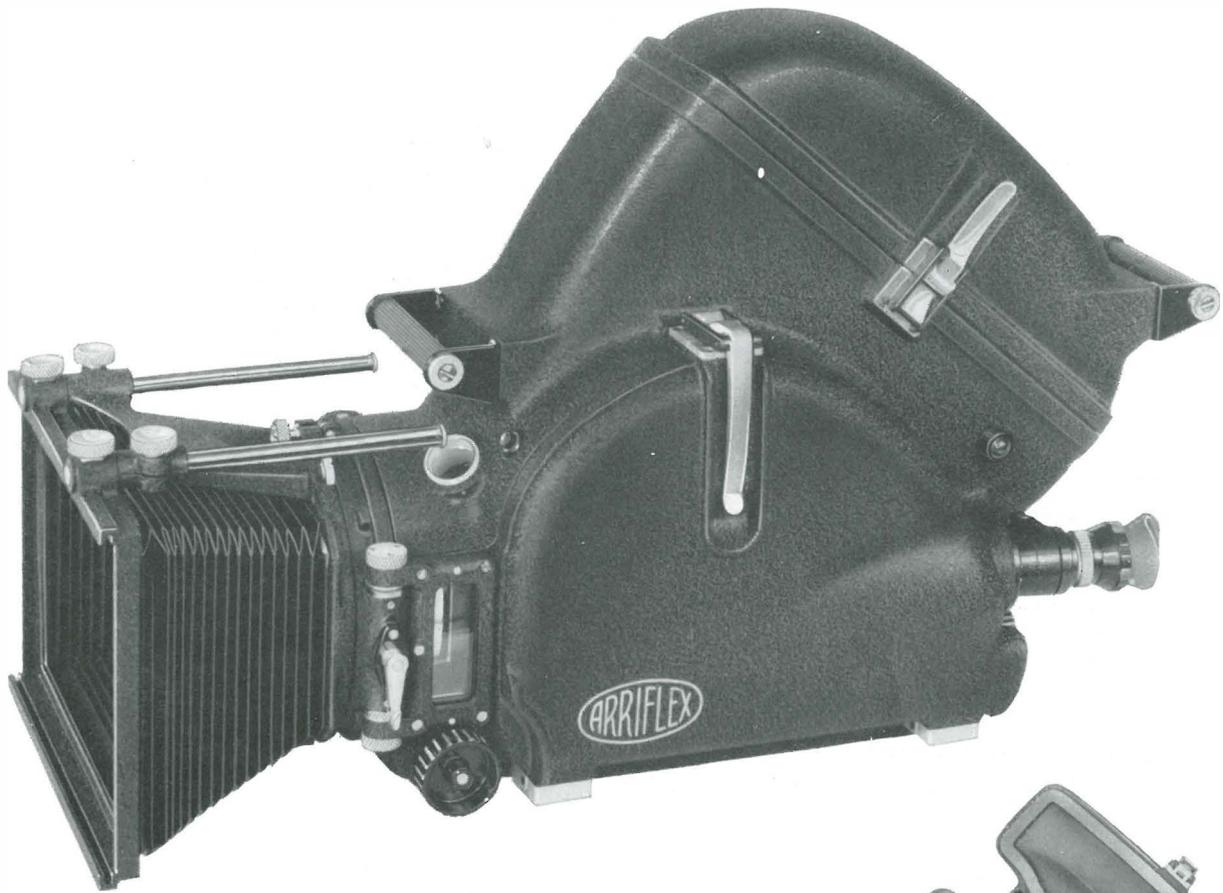
Servicing is simplified due to the arrangement of the electronic circuits on plug-in boards.

The ARRIVOX-TANDBERG recorder is available with either CCIR or NAB equalization.

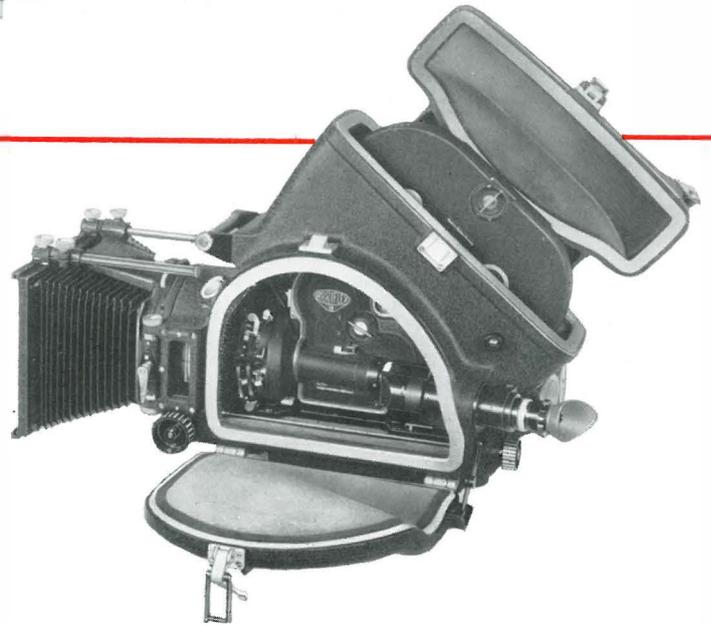
Time lapse and animation equipment



ARRIVOX-TANDBERG



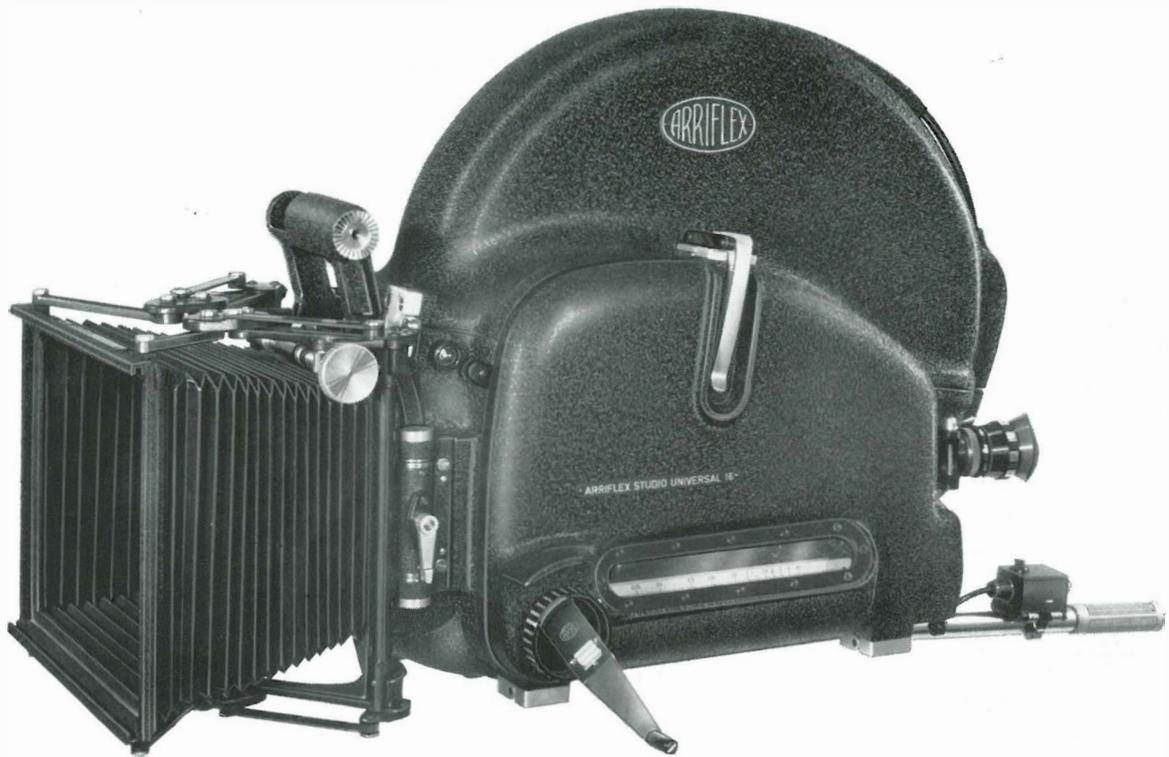
## The Blimp 16, a Sound-Proof Housing for the ARRIFLEX 16 St



contains the running noise of the camera. It is indispensable for high-quality synchronous sound recording. Due to the efficiency of its sound-absorbent lining, which consists of 10 layers of different materials, and its practical design, the ARRI Blimp 16 fulfills its purpose in an exemplary fashion. It converts the ARRIFLEX 16 St into a full-fledged studio camera. The most important features of the Blimp 16 are:

**Light weight:** The total weight of the camera, complete with Blimp 16, auxiliary magazine etc. is approximately 70 lbs. The mirror reflex system of the ARRIFLEX 16 St functions also with the blimp. Generously proportioned hinged covers with knee-action locks facilitate operation of the camera in-

side and enable operator to change magazines or thread film without difficulty. The camera can be installed and removed quickly and without tools. All standard ARRIFLEX 16 St cameras with serial number higher than 5900 can be installed in the Blimp 16. The lens is focused from outside by means of large knobs. Each lens is provided with a specially calibrated focusing scale which can easily be read through a large window in the housing. The synchronous motor is used to drive the camera when used with the blimp. A red pilot lamp lights up when the camera is running. A filter stage for glass filters measuring 3×3" (75×75 mm) and a large adjustable matte box are further advantages of the Blimp 16.

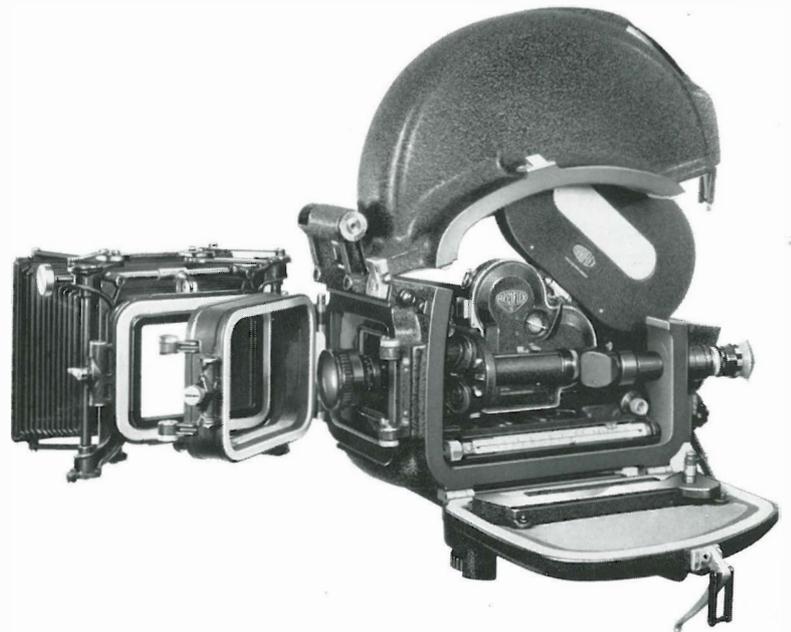


## Studio Universal Blimp 16

The Studio Universal Blimp 16 can be used for either the ARRIFLEX 16 St or 16 M with a governor controlled or a synchronous motor in conjunction with 200' or 400' magazines. The Universal Blimp 16 is available in different versions with suitable electrical installation according to camera and motor type.

Focus and diaphragm adjustments respectively zoom control, are carried out over a sound insulated, external mechanism, and can be read off a triangular scale bracket with focus and f-stop values for three lenses. The construction of the front window enables lenses with a great variety of sizes and focal lengths (8 to 85 mm) to be used; with the installation of an adapter to extend the front window, zoom lenses can also be used. The drivers which transfer the rotary movement from the focus and diaphragm setting head to the lens in shooting position, are interchangeable.

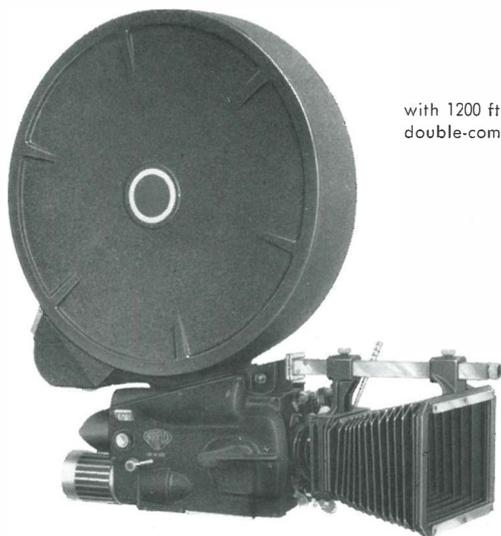
In open position (the upper half of the Blimp can be tipped up), the Blimp enables easy access to the camera and magazine without hindrance due to housing parts between the upper part and the side door. The loading of the camera, on the whole the assembly of the entire unit, is hereby made much easier. The base plate of the Blimp is suitable for all types of locking wedges. With the help of three  $\frac{3}{8}$ " tripod threads posi-



tioned lengthwise, a weight counterbalance can be maintained when using different Blimp parts.

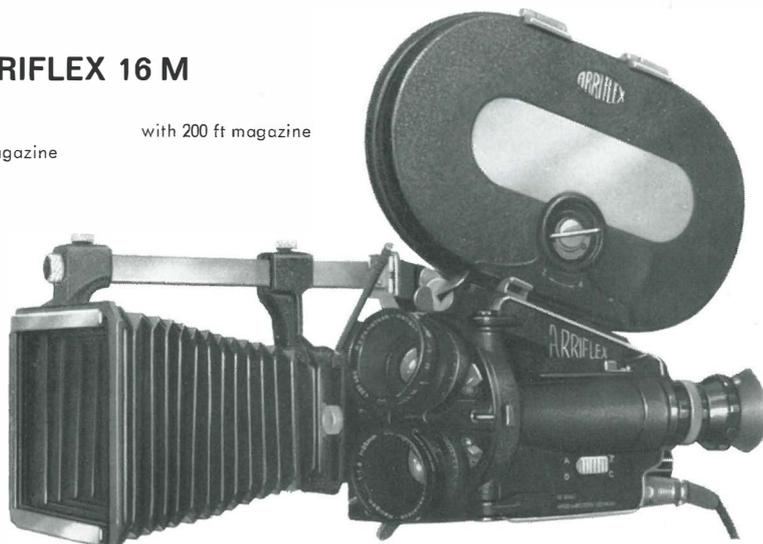
By means of a knob, the cameraman himself can adjust the bellows matte box, which is also effective for short focal lengths. The Blimp is easily transportable; the anterior carrying handle serves at the same time as a holder for the ARRIFLEX Halogen Indirect Camera Light (Cat. No. 5049).

## Further 16 mm ARRIFLEX Motion Picture Cameras:



with 1200 ft  
double-compartment magazine

### ARRIFLEX 16 M



with 200 ft magazine

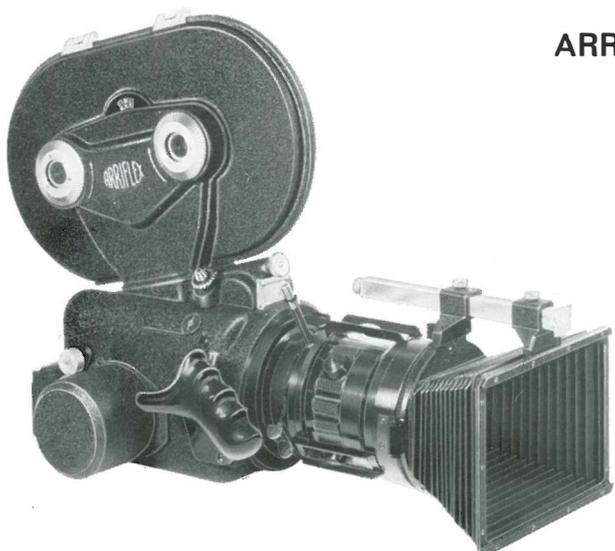
The **ARRIFLEX 16 M**, also a 16 mm mirror reflex motion picture camera with electric drive, offers extended shooting possibilities by means of quick-change magazines with built-in forward and reverse drive for 200 ft, 400 ft (both magazines also for daylight spools) or 1200 ft film. The latter is of the co-axial double-compartment type in which the feed and take-up reels lie side by side with the result that the magazine can be kept relatively small and light. On request this magazine can also be equipped with reverse drive.

The camera features low operating noise. Pilot tone and automatic clap-stick mechanism are standard equipment. The handling of the ARRIFLEX 16 M is very easy. The hinged camera door, when opened, allows easy cleaning of the deflecting prism. Moreover, with the exception of the magazines, the complete accessory programme of the model 16 St can be utilized for the ARRIFLEX 16 M.

On request we will send you our Technical Information A 02150.

The **ARRIFLEX 16 BL** is a noiseless 16 mm mirror reflex newsreel camera with electric drive and all advantages of the proven models ARRIFLEX 16 St and M. The self-blimped construction renders an extremely low noise level at relatively light weight. All components that produce or conduct noise have been isolated from the camera body. This applies to the entire camera driving mechanism including the film transport system, the interchangeable motors, the lens, the viewfinder system, and the magazines. The ARRIFLEX 16 BL can be used equally well mounted on a tripod or hand-held, with or without shoulder pod. Taking into consideration today's highly advanced zoom lenses, the ARRIFLEX 16 BL has been equipped

with only one lens mount, especially designed for the use of zoom lenses although it also takes normal ARRIFLEX lenses (except from 9 mm to 25 mm focal length). The lenses can be interchanged quite easily. The ARRIFLEX 16 BL works with 400 ft quick-change magazines with built-in feed and take-up mechanism. The film transport is the same as in the ARRIFLEX 16 St and 16 M with its precision film registration movement which operates both forward and reverse. The view-finding system is different in some respects from the other ARRIFLEX 16 models, the most important difference being the relocation of the ground glass in the forward focal plane. Please write for further printed information.



### ARRIFLEX 16 BL



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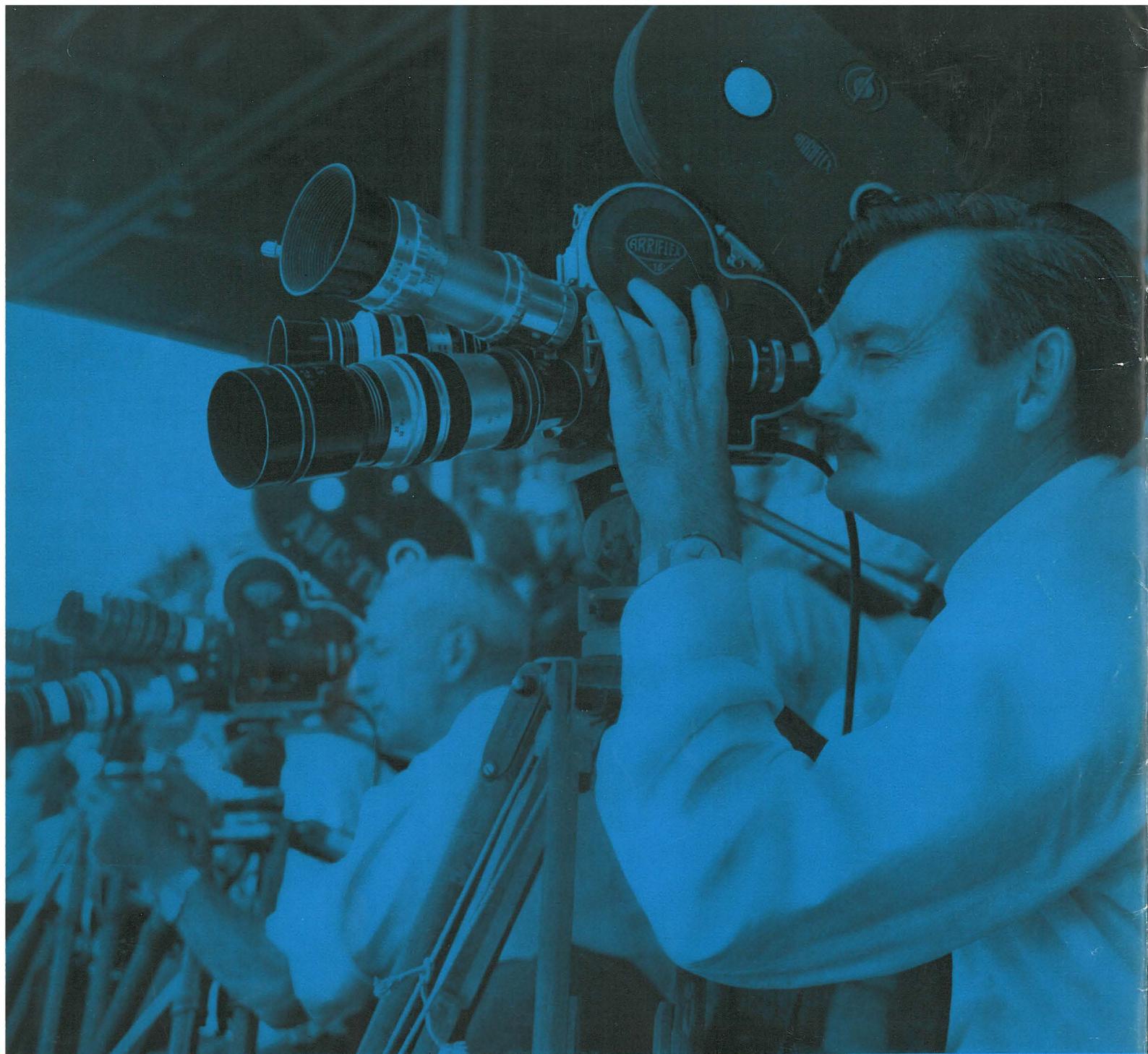
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