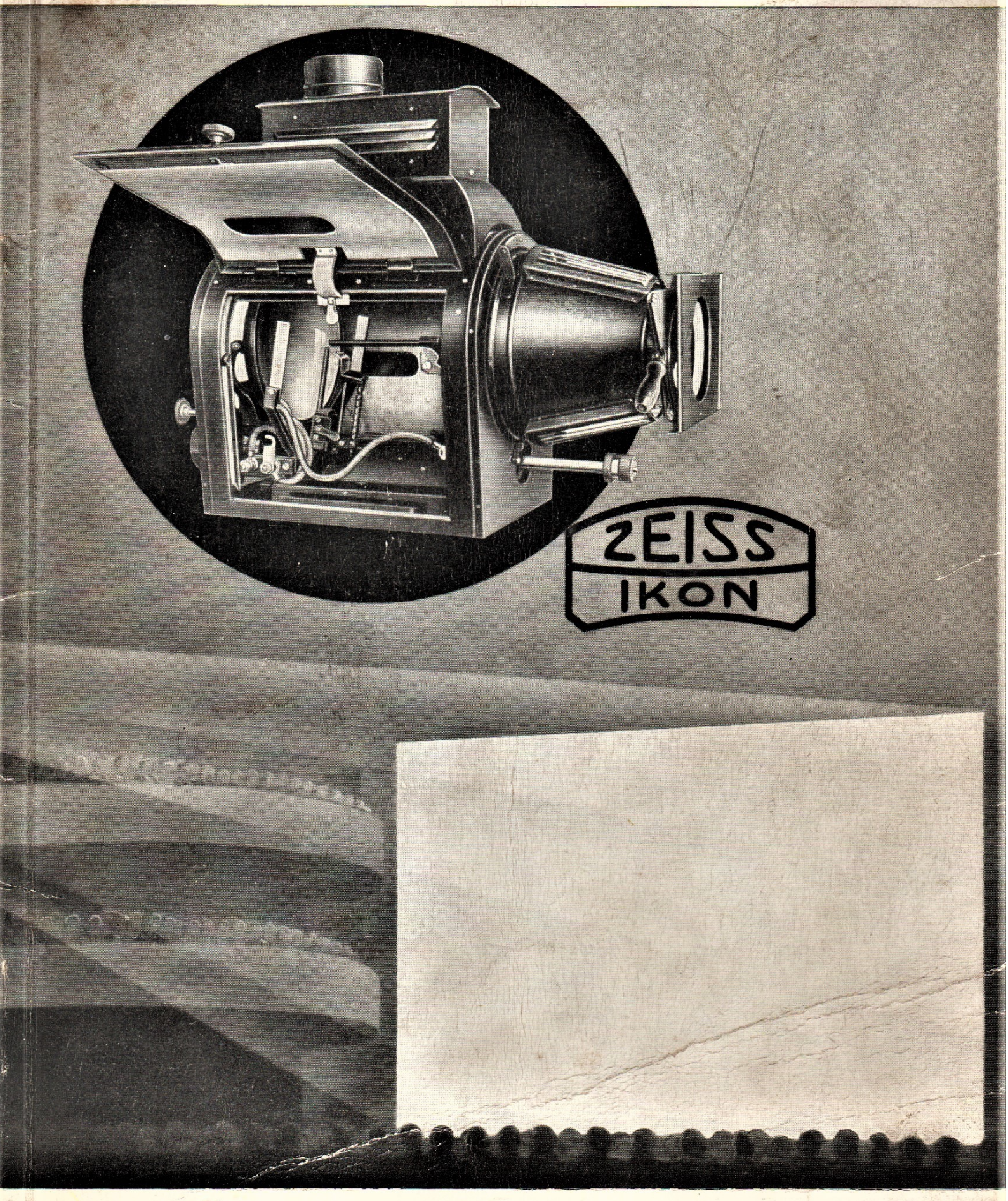
Zeiss Ikon



Cine Lamps

Zeiss Ikon

CINE LAMPS AND ACCESSORIES

Zeiss Ikon A.G. Dresden

K 367 E

CONTENTS

The quality of the screen picture is in a great measure determined by its brightness and the uniformity of the lighting. It is particularly important that the lighting power of the projector should be capable of satisfying the requirements which arise out of the size of the theatre and the consequent size of the screen picture. Our illuminating systems, apart from satisfying these requirements, ensure the highest degree of economy in working. The numerical data given for the various sources of light are derived from practical experience in theatre working extending through a great many years.

The choice of the proper source of light and illuminating system is governed by a number of factors. Generally speaking, it may be said that only D.C.-fed mirror arc lamps come up to the highest requirements in the matter of the brightness of the pictures. Where for economic reasons the available A.C. must needs be used without the intervention of a transformer and where the size of the picture does not exceed 6 × 4.5 metres the projection filament lamp should be employed, and in these circumstanes will furnish pictures of standard brightness.

Experience extending over many years and derived from the working of a very large number of theatres in all countries shows that generally speaking the brightness of the picture (measured in lux) should be such as to be numerically 10 to 15 times greater than the width of the picture (measured in metres). Thus for a screen picture 8 metres wide (surface 48 sq.m.) it would accordingly be necessary to provide an illuminating intensity of 80 to 120 lux on the screen. The intrinsic intensity required to achieve this surface illumination may be found by multiplying the surface of the picture into the intensity of illumination, i. e.

48 sq.m × 80 lux = 3840 lumen
or 48 sq.m × 120 lux = 5760 lumen,

as the case may be.

The subjoined table, based upon this relation, gives the intrinsic intensity values of the sources of light in lumen for picture surfaces ranging from 4 m × 3 m to 11 m × 8.25 m.

Table of Screen Picture Sizes and the required Light Yield Values

Screen picture Size			Light Yield Values in lumen for a surface intensity of	
Width	Height	Surface	Lux = 10 × Width of Picture	Lux = 15 × Width of Picture
metres	metres	sq.metres	good	intense
4	3,0	12,00	480	720
4,5	3,38	15,20	685	1030
5	3,75	18,75	940	1410
5,5	4,13	22,70	1250	1875
6	4,5	27,00	1620	2430
6,5	4,88	31,70	2060	3090
7	5,25	36,75	2575	3860
7,5	5,63	42,20	3165	4745
8	6,0	48,00	3840	5760
8,5	6,37	54,15	4600	6900
9	6,75	60,75	5460	8190
9,5	7,12	67,60	6420	9630
10	7,50	75,00	7500	10250
10,5	7,88	82,80	8700	12420
11	8,25	90,70	10000	14600

The ampere values given in the tables for the different sources of light are based upon comprehensive practical measurements. The value of an illuminating system should be judged more especially by the degree of uniformity with which the screen picture is covered with light. This is a most important criterion. Our sources of light and the optical illuminating apparatus supplied with them furnish screen pictures which are uniformly illuminated up to the edge of the picture. The stated lighting effects imply in every case that this important condition is satisfied by the optical illuminating system.

The effective application of the beam emitted by the source of light is largely governed by the aperture of the projection-lens employed. The volume of light which reaches the screen increases with the aperture, and as the brightness of the screen pictures increases in proportion a like gain is obtained in the economy of working. Whilst formerly the light-yielding capacity of the

sources of light was stated with reference to the most favourable projection-lens (of 100 mm focus and 62.5 mm diameter, as a rule), we give in this catalogue the values of the light-yielding capacities for various focal lengths. We do so since it has been found that when in accordance with former usage the diameter of the lens (now 62.5 mm) is kept constant the light-yielding capacities diminish, as the focal length increases, down to one third of the maximum value. Thus, the maximum intensity yield of the 'Artisol' lamp which can be turned to account at 45 amperes with an

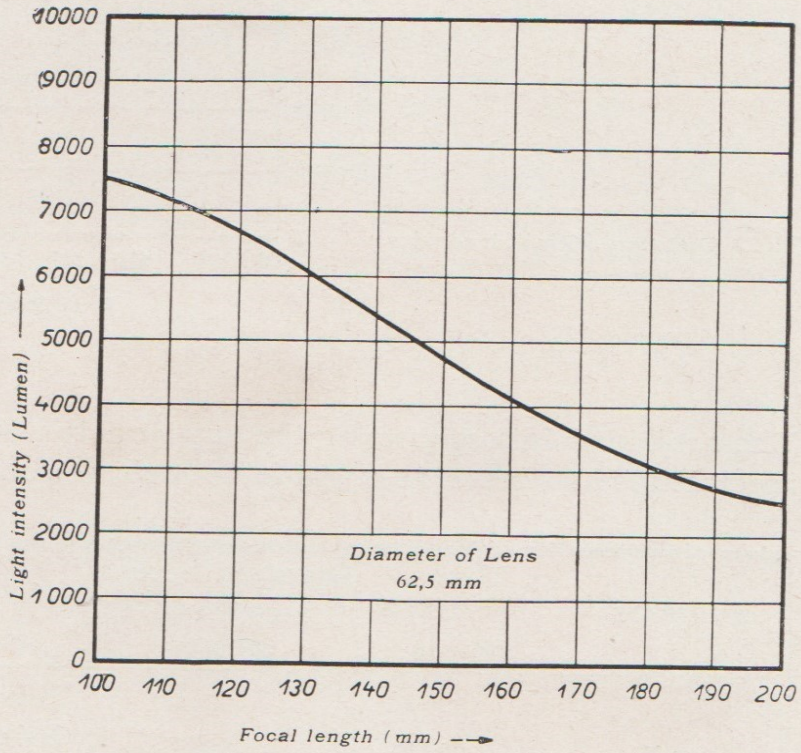


Fig. 1 Diagram of light intensity

objective of 100 mm focus and 62.5 mm diameter is 7500 lumen. In the event, however, of the focal length being 180 mm, while the lens diameter remains 62.5 mm, less than one half, viz. only 3200 lumen, reaches the screen (fig. 1). In the case of our Ernemann III Super-Intensity Projector we have abandoned the constant lens diameter principle and have in its place endowed the objectives with a constant light-transmission ratio of F/1.9, so that at all focal lengths the maximum light-yield can be turned to account (fig. 2). The maintainance of the constancy of the light-transmission capacity implies that the objectives require to be given increasing diameters. The mount diameters of these objectives are accordingly 62.5, 80, and 100 mm respectively. In the tables of the light-yielding capacities of the illuminating systems the values for the special objectives for the Ernemann III machine are appended to those given for the objectives of 62.5 mm diameter.

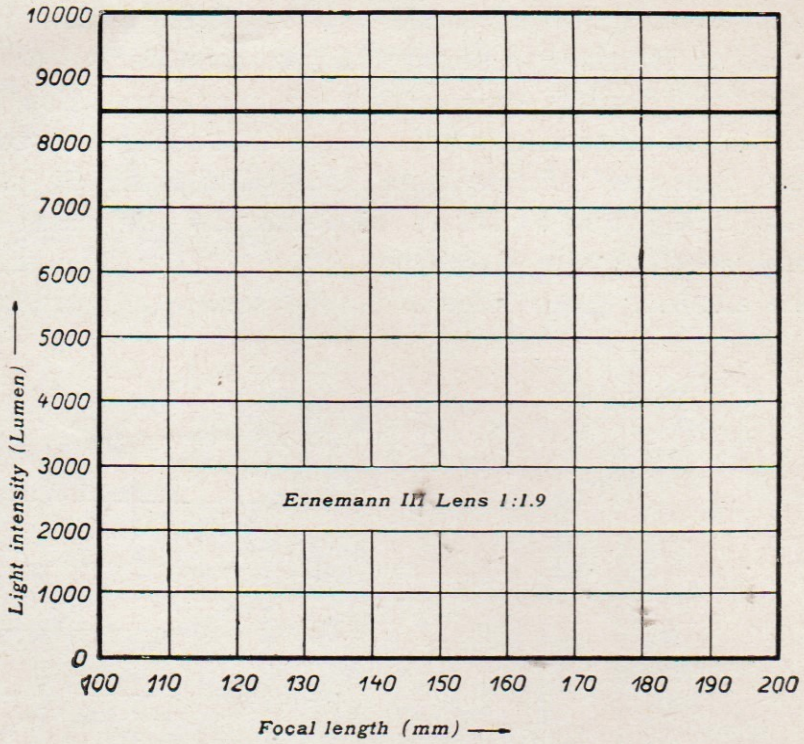


Fig. 2 Diagram of light intensity

The subjoined data respecting the application of the various sources of light are intended to serve as a guide to their selection:

Theatres	Size of Picture metres	Greatest Screen Distance metres	Source of Light
Small	5 × 3,75	20	Filament lamp reflector Filament lamp holder with auxiliary mirror Mirror arc lamp "Model M"
Medium sized	6 × 4,5	30	Mirror arc lamp "Model M" Mirror arc lamp "Model E" Artisol mirror arc lamp with mirror 200 mm diam.
Fairly large	8 × 6	40	Mirror arc lamp "Model E" Artisol mirror arc lamp with mirror 200 and 250 mm diam.
Largest	10 × 7,50	Greater than 40	Artisol mirror arc lamp with mirror 250 mm diam. «Artisol 75» High-Intensity lamp

ARC LAMPS AND ACCESSORIES

ZEISS IKON

Our arc-lamps have been in use for many years and are well proved types. While operating exceedingly economically, the lamps yield a light which produces screen pictures of highest and uniform brightness up to the edges.

Mirror Arc Lamp "Model M"

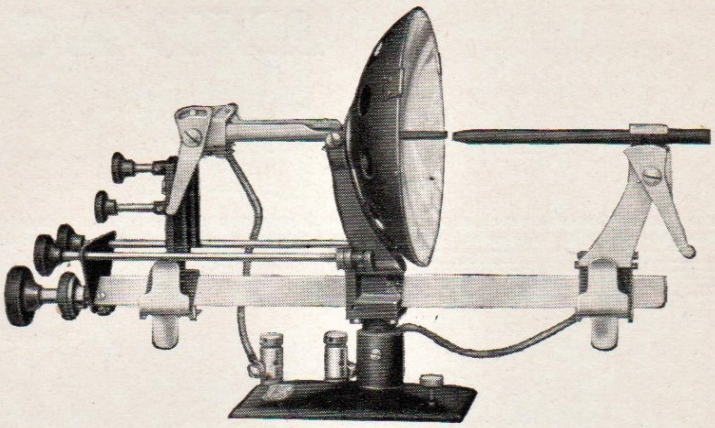


Fig. 3 The "M"-lamp

The mirror arc-lamp "Modell M" is of a very stable design and is fitted with all adjusting and feed motions required for its successful working, so that it is always practicable to obtain the maximum yield of light. It is primarily designed for use in small and medium sized theatres and in large lecture halls.

General principle

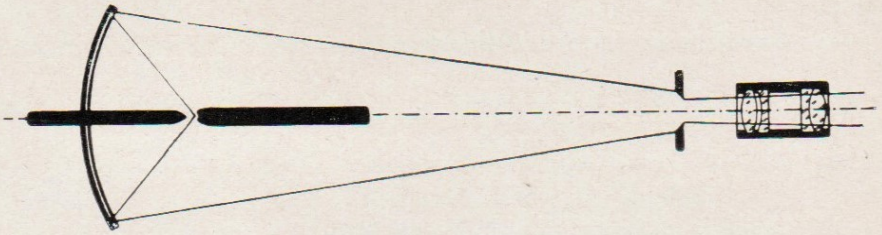


Fig. 4
Optical Diagram
of the M-lamp

The beam of light issuing from the crater of the positive carbon of a D.C.-fed lamp or from the arc of an A.C.-fed lamp is received by a concave mirror and concentrated towards the film-gate.

Position of the Carbons

Since experience has shown that the horizontal position of the carbons is that on which a lamp is easiest to manipulate, the M-lamp is furnished with horizontal carbons.

Carbon Holders

For practical working it is a matter of importance that the carbons should be capable of being easily and rapidly exchanged while the control of the carbon feed should be equally simple and convenient. The carbon is put into the front holder by pushing it into the upper angular portion of the carbon-

holder, wherein it is gripped by a clamping lever in a manner which maintains it firmly in a horizontal position. The angular fitting can be displaced and admits of the carbon-holder taking carbons up to 11 mm thick and yet maintaining their proper position with respect to the optical axis. The holder is so designed that only short stumps will remain.
The rear carbon-holder likewise takes carbons up to 11 mm in diameter and admits of their easy exchange. The carbon requires only to be pushed into the holder and to be clamped by an eccentric clamping lever.
The holders themselves are substantially made and are securely insulated from other parts of the lamp, so that even carbon dust will not occasion any short circuit.

Controls

In practical working it has been found that it is necessary to provide a number of adjustments so that it may be always practicable to ensure the highest intensity and uniformly distributed illumination over the picture, even where the carbons do not burn down evenly. The positive front carbon holder is stationary, as any displacement of this holder would be liable to move the carbon out of the optical axis and thereby upset the optical relations. In the event of the crater becoming oblique the vertical plane may at once be restored by directing the negative rear carbon into the appropriate position relatively to the positive carbon by operating the vertical and transverse motion to the negative carbon-holder. The corresponding device has parallel motions so that a single readjustment will suffice during working. Similarly, where an A.C. is used to feed the lamp this device provides a means of forming and maintaining a good arc.
Also, the carbons may be fed forward as they burn down, and there are controls for maintaining the correct focal intercept, i. e. for preserving the correct position of the crater or arc relatively to the reflector. The control-spindles move one within the other and are effectively protected from the access of dirt and consequent wear thanks to the angular form of the motion-bar upon which the carbon-holders move. The control heads are mounted one behind the other and are very convenient to work.
The slideways as well as the slide fittings are so formed as to obviate any tendency of the holders to tilt in their bearings when being displaced. To avoid the necessity of having to turn the screw spindles within their nuts all the way back the holders are furnished with releasing levers. They have also automatic end motion releases, which protect the holders from melting.
The reflector mount is furnished with a shifting device, with the aid of which it may be tipped and slewed so as to ensure that the film-gate may always be evenly filled with light.
The lamp has, in addition, a vertical motion, with the aid of which it can be set with respect to the optical axis. The foot of the lamp is a standardised size and shape so that the reflector lamp "Modell M" fits any of the lamphouses.

The Reflector

The reflector is in the form of a concave mirror of 170 mm diameter and 80 mm focus or of a like mirror of 200 mm diameter and 90 mm focus. It is contained in a special spring mount which effectively protects it from cracking in consequence of heating.

Electrical connections

The lamp is connected to the supply circuit by means of substantially made and well insulated screw terminals, from which asbestos-clad cables lead to the carbon-holders.

Light Yield

The lamp amperages require to be chosen in accordance with the table to suit the demands made upon the intensity on the screen, which is governed by the local conditions.

The light-yield values hold good for objectives in mounts 62.5 mm in diameter.

Table of Light Yield Values

Size of Picture			Required Amperage, the intensity of the screen illumination being			
			normal		intense	
Width metres	Height metres	Surface sq.metres	D.C. amperage	A.C. amperage	D.C. amperage	A.C. amperage
up to 2,5	1,87	4,70	—	15	5	20
3	2,25	6,75	5	20	7,5	30
4	3,00	12,00	7,5	30	10	40
5	3,75	18,75	10	40	12,5	50
5,5	4,13	22,70	12,5	50	15	60
6	4,50	27,00	15	60	20	—
6,5	4,88	31,70	20	—	—	—

When operating with a D.C. of 20 amperes the mirror of 200 mm diameter should be used in order to obtain the required light-yield.

Carbon Table

The table gives the carbon thicknesses for the various types of current and amperages.

Direct Current:

Amperage	Diameter of Carbons in mm	
	Cored (+)	Solid (—)
5	8	5
7,5	8	5
10	9	6
12,5	9	6
15	10	7
20	11	8
Minimum supply voltage: 65 volts Arc voltage: 48 volts		

Alternating Current:
(Both carbons of like diameters)

Amperage	Impregnated Carbons Diameter in mm	Impregnated Carbons Diameter in mm
15	8	—
20	9	—
25	10	—
30	11	8
40	—	9
50	—	10
60	—	11
Arc voltage: 25 to 35 volts		

Order Item Nos.

5211/1 miwey Mirror arc lamp, "Model M", with concave glass mirror 170 mm diameter, with centre hole.

5211/2 miwax Mirror arc lamp, "Model M", with concave glass mirror 200 mm diameter, with centre hole.

Mirror Arc Lamp "Model E"

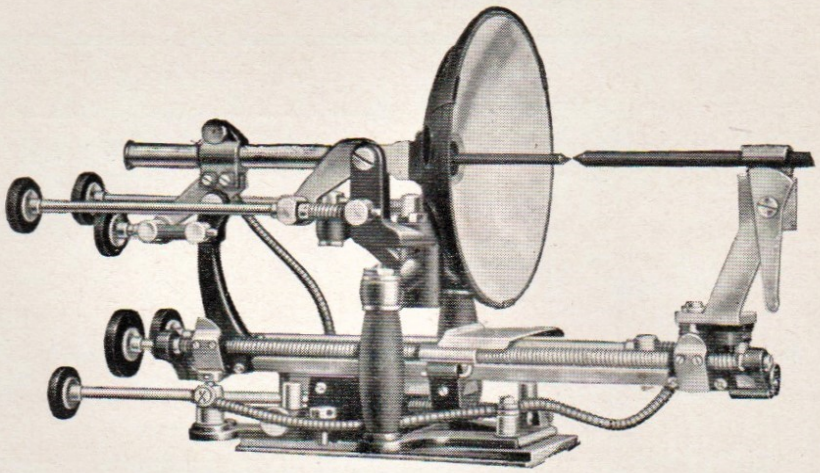


Fig. 5 The "E"-lamp

The mirror arc lamp "Model E" represents a type which is the outcome of years of experience in the design of high-grade reflector lamps derived from close cooperation with practical theatre operators. It is primarily intended for use in medium-sized and large theatres.

General Principle

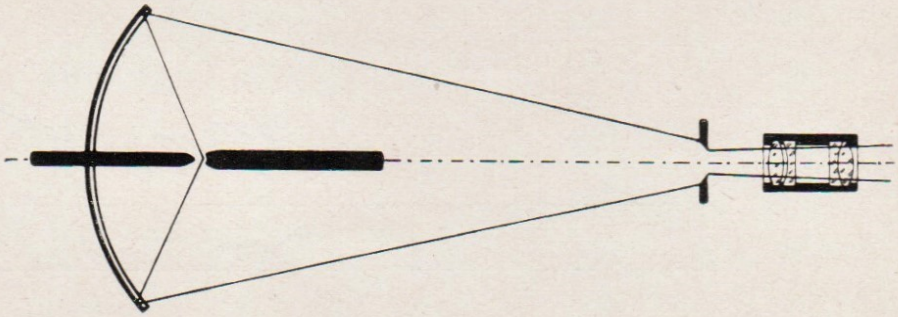


Fig. 6
Optical diagram
of the "E"-lamp

In the mirror arc lamp "Model E" the volume of light emitted by the crater of the positive carbon (in the case of a D.C. lamp) or the arc (in the case of an A.C. lamp) is received by a concave mirror and so directed that the highest degree of concentration of light results upon the film-gate.

Position of Carbons

The mirror arc lamp "Model E" has horizontal carbons, this position of the carbons having proved to ensure an easy management of the lamp and to furnish the highest yield of light, whilst when fed by an A.C. it gives uniformly and well illuminated screen pictures.

Carbon Holders

The carbon-holders are among the most important parts of mirror arc lamps. In the "E" model the design of the holders ensures a rapid exchanging and an absolutely exact position of the carbons. The front carbon-holder has a movable clamping piece which admits of carbons up to 12 mm in diameter being put in and always maintains the carbons accurately central with respect to the optical axis. The carbon is held in position by a substantially made clamping lever. Carbons may therefore be exchanged without the least loss of time. The rear carbon-holder consists of a lining which slips into the carbon-holder proper. The linings vary in size according to the thickness of the carbons (which may be up to 11 mm). The design admits of rapid and exact exchanging. The holders are carefully insulated from the other parts of the lamp so that no short-circuiting is liable to be caused by deposits of carbon dust.

Controls

In order to attain the utmost intensity yield combined with economic working it is in practical theatre operation of the greatest importance to form a perfect crater (in the case of the D.C. lamp) or a perfect arc (in that of an A.C.-fed lamp), and also to ensure a correct position of the crater or arc relatively to the mirror. The lamp is accordingly provided with a number of controls so that in every case, also where the carbons are not burning as they should do, the requisite corrections may be applied to ensure a maximum yield of light and a uniform brightness on the film.

The positive front carbon-holder is stationary since any displacement of it would be liable to disturb the position of the carbon relatively to the optical axis. In the event, however, of the crater burning obliquely for any reason a vertically formed crater may be promptly restored with the aid of the devices fitted to the negative carbon-holder for inclining and slewing the carbon. Also, in an A.C.-fed lamp the arc, if faulty, can be rectified by this motion.

The carbon-holders are made to move upon a Dovetail slideway bar, which obviates the holders setting themselves askew when displaced. The holders have adjustable cheeks so that they may be readjusted in the event of the slide fittings showing wear. Either carbon-holder is fitted with a screw

release, which obviates the necessity of having to screw the motion spindles right back when fresh carbons require to be put in. The releasing levers, when disengaged, allow of the holders being pushed back into their initial positions without operating the screw.

For feeding the carbons and for setting the crater or the arc at the proper distance from the mirror, i. e. the focal intercept, the lamp is furnished with two conveniently disposed spindles. The mirror holder has two motions, with the aid of which the spot of light may be easily and accurately set to the film-gate in all cases, i. e. also in the event of an oblique crater having formed. This mirror adjustment is made with the aid of two spindles, one of which is for slewing the mirror and the other for inclining it. The E-lamp has a vertical motion, whereby it may be set with its optical axis in alignment with that of the projector. The entire lamp mechanism is for this purpose made to rest upon three studs in the lamp foot.

The lamp foot is of standardised dimensions and may thus be used with any of the various lamphouses. A separate knurled screw is provided for clamping it. For the convenient removal of the lamp without handling the motion spindles it is fitted with two wood-encased handles.

Reflectors

This lamp can be fitted with either of two reflectors:

A parabolic glass mirror, diameter 207 × 200 mm, focal length 75 mm,

A metal ellipsoid mirror, diameter 210 × 205 mm, focal length 70 mm.

Both mirrors are of high optical precision and have the highest reflecting capacity. The glass reflector is held in a resilient mount so that it is not liable to crack under the influence of heat. The mirror mount attaches to the holding screw. The metal mirror, which is particularly to be recommended for operation with an alternating current, screws directly to the holding screw.

Electrical Connections

The current is admitted through two well insulated terminals, whence it is taken through asbestos-lined cables to the carbon-holders.

Light-yielding Capacity

The light-yield values obtainable with D.C. and A.C. of different amperages are given in the annexed table. The latter indicates the amperages which are required to cover the picture in a faultless manner and in such a way as to satisfy the local requirements in the matter of brightness. The amperage most commonly employed is that given in the column headed "Normal Illumination".

Table of the Light-yield Values of the Mirror Arc Lamp "Model E"

Size of Picture			Required D. C. Amperage for the different Objectives							
			Normal Illumination				Intense Illumination			
Width m	Height m	Surface sq.m	Standard Cine Lens 62,5 mm diameter			Special Objective for Erne-mann III F/1.9	Standard Cine Lens 62,5 mm diameter			Special Objective for Erne-mann III F/1.9
			f=100mm	f=140mm	f=180mm		f=100mm	f=140mm	f=180mm	
up to 4	3,00	12,00	5	5	5	5	5	7,5	7,5	5
4,5	3,38	15,20	5	5	5	5	7,5	10	10	7,5
5	3,75	18,75	5	7,5	7,5	5	10	12,5	15	10
5,5	4,13	22,70	7,5	10	10	7,5	12,5	15	20	12,5
6	4,50	27,00	10	12,5	15	10	15	20	—	15
6,5	4,88	31,70	12,5	15	20	12,5	20	25	—	20
7	5,25	36,75	15	20	—	15	25	—	—	25
7,5	5,63	42,15	20	25	—	20	—	—	—	—
8	6,00	48,00	25	—	—	25	—	—	—	—

The required A. C. amperage has 4 times the D. C. value (maximum 60 amps.)

Carbon Table

The subjoined table gives for D.C. and A.C. the carbon diameter for the various amperages.

Direct Current:

Amperage	Diameter of Carbons in mm	
	Cored Carbon (+)	Solid Carbon (—)
5	8	5
10	9	6
12,5	9	6
15	10	7
17,5	10	7
20	11	8
25	12	9
Minimum Voltage: 65 volts Arc Voltage: 48 volts		

Alternating Current:

Amperage	Impregnated Carbons Diameter in mm	Impregnated Carbons, coppered Diameter in mm
15	9	—
20	10	—
25	11	—
30	12	8
40	—	9
50	—	10
60	—	11
Arc Voltage: 25 — 35 volts		

Order Item Nos.

5212 miwiz Mirror arc lamp "Model E", with parabolic glass mirror 207/200 mm diameter, f = 75 mm, with centre hole.

5212/1 miwob Like No. 5212, but with metal mirror 210/205 mm diameter, f=70 mm, with centre hole.

Artisol" Mirror Arc Lamp

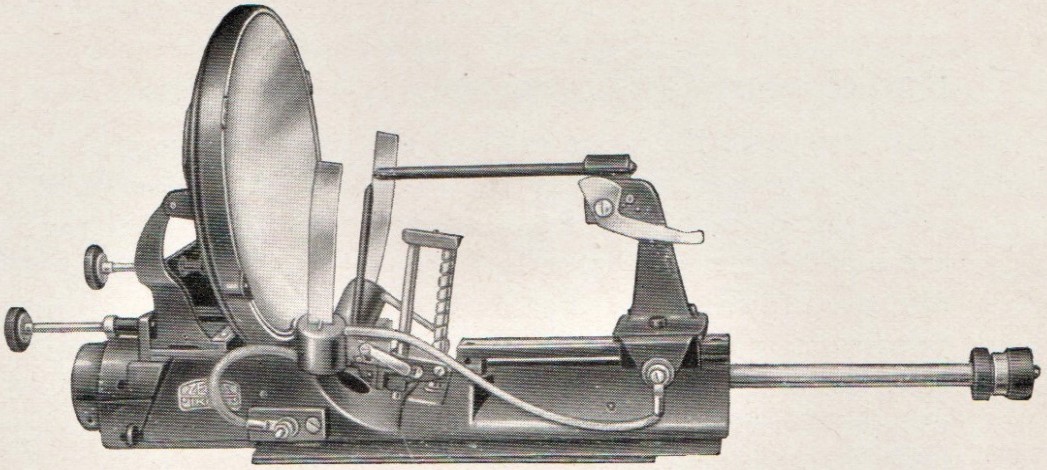


Fig. 7
Artisol Lamp

The Artisol lamp is designed for greatest light-yields for use in large and very large theatres. It permits of the full utilization of the high speed objectives F/1.9 in mounts of 80 — 100 mm diameter, which especially with longer focal distances transmit to the screen a light yield which may be as much as three times greater than that transmitted by an objective in a mount of 62.5 mm diameter.

General Principle

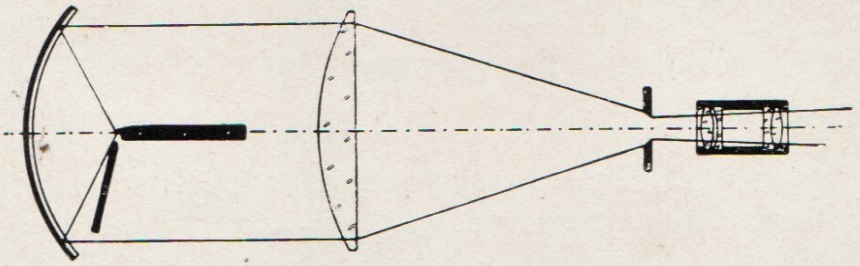


Fig. 8
Optical Diagram
of the Artisol Lamp

This type of lamp is of a new construction, in which is retained the fundamental idea of all the many thousands of the highly successful "Artisol" lamps turned out by us. The modifications which the lamp has undergone relate to the high-grade mechanism with which the lamp is now provided. The parabolic glass mirror is made to receive the rays proceeding from the

source of light, it forms a parallel pencil of light and projects it upon a converging lens of the same diameter as the mirror. This lens concentrates the rays upon the film-gate. The use of the converging lens has the special incidental advantage that it diminishes any tendency to heat the film.

Position of Carbons

In this type of lamp the carbons are set at an angle, which has been found to give the best results in that, owing to the unimpeded presentation of the crater to the mirror an exceptionally large amount of the light emitted by the arc can be turned to practical account. This position of the carbons has the further advantage that it affords a simple means of maintaining the permanently unchanging position of the crater relatively to the mirror, so that the operation of feeding the carbons does not disturb the conditions of maximum yield of light. We recommend this lamp for operation by a D.C. only.

Carbon Holders

The holders of the Artisol lamp render it remarkably easy to exchange carbons and maintain their permanently correct position. The positive carbon-holder is adapted for carbons up to 17 mm thick and allows of the carbon being quickly and easily exchanged by simply lifting a clamping lever. The negative carbon-holder takes carbons up to 14 mm in diameter, which are held in position in the same manner as in the positive holder. The guide fitting can be so set to suit the diameters of the carbons that the carbons may be firmly retained in position in correct relation to the mirror. The holders themselves are exceptionally rigid and so designed as to function unerringly however hot they may become. They are completely insulated from the lamp.

Controls

The number of the requisite motions has been reduced to a minimum, which renders the lamp exceedingly convenient to operate. The positive carbon-holder is stationary, since any displacement of it would have the effect of moving it out of the optical axis and of disturbing the path of the rays. The negative carbon-holder can be displaced transversely, so that a faultless crater may be produced in the event of a carbon burning obliquely. For feeding the carbons the carbon-holders are made to move along a slide or special cylindrical motion bars. The motion spindles telescope and have two knurled heads, by means of which either carbon may be operated separately or jointly, for which latter purpose they may be coupled. A

separate adjustment for the positive carbon is not required in that the crater in the process of feeding the carbons also resumes its correct position relatively to the mirror. The spindles with the knurled heads are on the side facing the projector. In actual working this arrangement affords a particularly convenient means of attending to the carbons as the operator is not compelled to reach around the lamphouse.

The slideway motion to the carbon-holders as well as the slides are so formed as to work easily and accurately, without being liable to set themselves askew.

The mirror is capable of being moved in the direction of the optical axis for the purpose of forming the parallel pencil of rays. To this end the foot of the mirror mount is made in the form of a slide moving within a slideway. For the exact centration of the pencil of light with respect to the condensing lens or the film-gate the mirror has two additional adjustments, viz. one for inclining it, the other for slewing it.

The lamp is furnished with a vertical motion for accurately setting it with respect to the optical axis of the apparatus. The lamp as a whole may be set parallel to the lamp foot with the aid of a set-screw. The cast iron foot is very stable and has standardised dimensions. It has a fixing screw for securing the lamp in position within the lamphouse rails.

The Reflector

The mirrors have the following diameters and focal lengths:

Parabolic glass mirror, diameter 207/200 mm, focal length 75 mm,
Parabolic glass mirror, diameter 258/250 mm, focal length 110 mm.

The mirrors are furnished with a mount suiting their diameters and fitted with a spring arrangement which protects the mirrors from cracking when heated.

The mirrors have an excision so that, when greatly inclined, they are not exposed to the danger of cracking.

The condenser lenses are of the same diameter as the mirrors and have a focal length of 500 mm.

Blower Magnet

At high amperages and where the machine is much inclined there was formerly a risk of the mirror coming in contact with the flame of the arc, so that it was liable to crack. The dip of the machine imposed accordingly a certain restriction on the amperage which it was unsafe to exceed. In many cases it was thus not permissible to turn to account the full light-yielding capacity of the lamp. The blower magnet employed with the Artisol lamp directs the arc away from the mirror, so that there is no longer any risk of the mirror cracking when it is much inclined or when highest amperages are put in operation.

Table of Light-yield Values of the "Artisol" Mirror Arc Lamp

Size of Picture			Required D. C. Amperage for the different Objectives							
			Normal Illumination				Intense Illumination			
Width m	Height m	Surface sq.m	Standard Cine Lens 62.5 mm diameter			Special Objective for Erne-mann III F/1.9	Standard Cine Lens 62.5 mm diameter			Special Objective for Erne-mann III F/1.9
			f=100mm	f=140mm	f=180mm		f=100mm	f=140mm	f=180mm	
up to 5	3,75	18,75	10	10	10	10	10	10	10	10
5,5	4,13	22,70	10	10	10	10	10	10	12,5	10
6	4,50	27,00	10	10	10	10	12,5	12,5	15	12,5
6,5	4,88	31,70	10	10	15	10	15	15	45	15
7	5,25	36,75	12,5	15	25	12,5	20	25	—	20
7,5	5,63	42,20	15	20	45	15	25	35	—	25
8	6,00	48,00	20	25	—	20	30	45	—	30
8,5	6,37	54,15	25	35	—	25	35	—	—	35
9	6,75	60,75	30	45	—	30	45	—	—	40
9,5	7,12	67,60	35	—	—	35	—	—	—	45
10	7,50	75,00	45	—	—	40	—	—	—	—
10,5	7,88	82,80	—	—	—	45	—	—	—	—

Up to 20 amperes mirrors of 200 mm diameter and 75 mm focus,
from 25 amperes mirrors of 250 mm diameter and 110 mm focus should be used.

Electric Connections

The current is admitted to the lamp by perfectly insulated terminals, whence the current is taken by asbestos-sheathed cables via the blower-magnet to the carbon-holders.

Light-yield Values

The table of light-yield values gives the D.C. amperages required for fully and evenly illuminating screen pictures up to 10.5 metres wide, also the light-yield values which are attainable with objectives 62.5 mm in diameter as well as those resulting with objectives of relative aperture F/1.9 as used with our Super-Intensity Ernemann III machines.

Carbon Table

The table gives the carbon diameters for various D.C. amperages

D.C. Amperage	Pure Core Carbons	
	+ mm	— mm
10	9	7
15	10	8
20	12	9
25	13	10
30	14	11
35	15	12
40	16	13
45	17	13
Minimum D.C. Voltage: 75 volts Arc Voltage: 55 volts		

Order Item Nos.

5218/2 miwuc Artisol mirror arc lamp with blower magnet and parabolic glass mirror 207/200 mm diameter, f=75 mm, with excision at the rim.

5218/12 mixez Artisol mirror arc lamp with blower magnet and parabolic glass mirror 258/250 mm diameter, f=110 mm, with excision at the rim.

The "Artisol 75" High Intensity Lamp

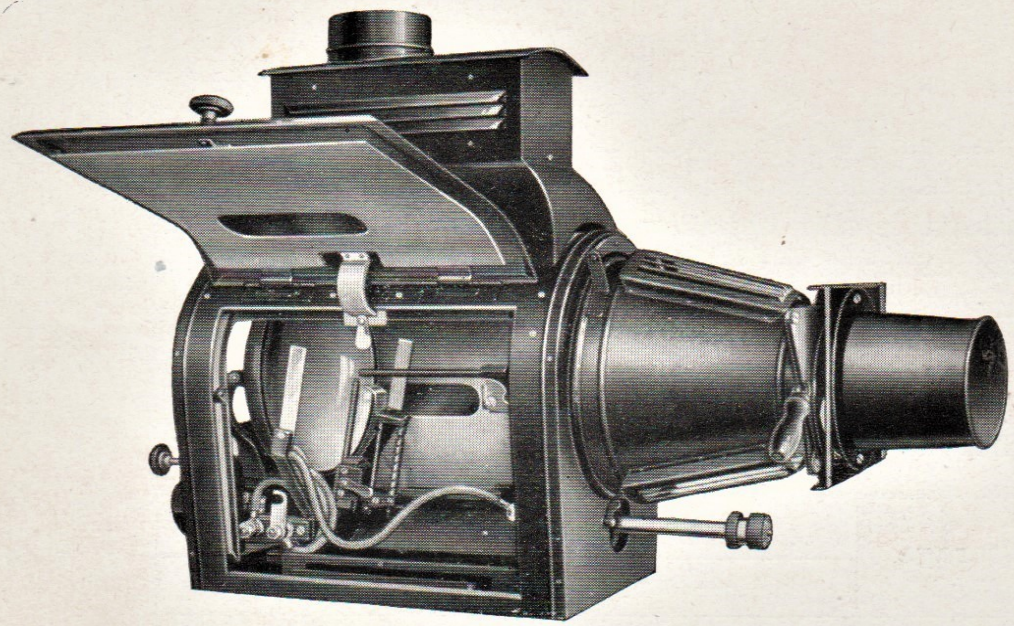


Fig. 9
The "Artisol 75"
High Intensity Lamp

After the introduction of the sound transmitting projection screen for sound-film pictures it soon became evident that it was possible only in small theatres to make up for the loss of illuminating power by increasing the amperage. For operation in large theatres, where mirror lamps were already being worked to their utmost capacity, it became necessary to design a new type of lamp capable of furnishing faultless and adequately bright screen pictures. Moreover, the increasing popularity of colour-films had greatly intensified the demands made upon the illuminating equipment of the cinematograph projectors. The yield of light which is required to be passed through a colour-film is at least twice that needed to illuminate a black-and-white film. Moreover, an intense translumination of the colour-film is of far more material significance since the colour effect is not brought out fully unless a stream of light of great intensity is sent through the film. In order that a colour-film may successfully attract the public it is essential that the film should be projected with white light of extreme intensity.

These conditions are completely fulfilled by the Zeiss Ikon High-Intensity Lamp "Artisol 75". The former maximum light-yield of the Artisol lamp working at 45 amperes has been nearly doubled, the light-yield of the "Artisol 75" high-intensity lamp being 15500 lumen when fed by a D.C. of 75 amperes.
In all theatres with a screen of a width of more than 18 feet and where colour-films are shown on a porous sound screen an "Artisol 75" high-intensity lamp is indispensable.

Principle of Construction

The optical principle upon which the "Artisol 75" high-intensity lamp is constructed is the same as that of the standard Artisol lamp. It is accordingly furnished with a parabolic mirror of 10 inch diameter in conjunction with a condenser lens. The employment of the latter has the special advantage that it reduces the heating effect upon the film. The intense stream of light emitted by the lamp results from the nature of the optical system in conjunction with the use of a special kind of carbons.
The lamp is designed for use with a D.C. only, either with special carbons for 75 amperes or with standard carbons at 25 to 45 amperes.

Design

The design of the lamp conforms in its general features to that of the well known Artisol lamp, from which it differs only in that a number of modifications have been introduced whereby the working of the lamp becomes absolutely reliable when the higher load of 75 amps. is impressed on it. The carbons have been set at an angle in order to simplify the act of regulating the carbon-feed and to always maintain an unvarying position of the crater relatively to the mirror. The carbon controlling devices have been reduced in number to their lowest limit. Whereas the positive carbon-holder is stationary, the negative holder may be moved transversely. The carbon-holders are heavily insulated and will bear the large current of 75 amps. permanently without leakage or breakdown. The positive carbon-holder will take carbons up to 17 mm thick, while the negative carbon-holder takes carbons up to 14 mm thick.
The carbons are fed forward by two screw-spindles moving one within the other. By means of these the positive and negative carbons may be controlled independently or jointly, the two spindles being capable of being coupled for the latter purpose. The mirror mount is capable of displacement in the direction of the optical axis. To this end the foot of the mirror is in the form of a slide carriage moving within a slideway. In addition, the mirror mount is furnished with tilting and slewing devices for centring it.

In order to ensure the maintainance of a steady arc and to obviate its tending too much towards the mirror, especially when working at pronounced negative angles, the lamp is provided with an exceptionally powerful blowing magnet. The latter is set at full action when the lamp is to be operated under a load of 75 amperes, whereas it is set to a lower power by a simple switching arrangement when the lamp is required to operate at 25 to 45 amperes.
The lamp has moreover a vertical motion, whereby it may be centred within the lamphouse. The self-feeding device is incorporated within the lamphouse.

The Mirror

The mirror employed with this lamp is a parabolic glass reflector of a special type. Its axes are 258 and 250 mm respectively, while its focal length is 110 mm. The mirror has an excision in the upper portion and has the letters H. I. inscribed on it to indicate that its silvering is of a special heatproof kind. The condenser lens is of the same diameter as the mirror and is made of Ignal glass, which is a special heat resisting kind of glass.

The Lamphouse

The "Artisol 75" high-intensity lamp is only supplied in conjunction with a specially designed lamphouse. It cannot be accommodated in an existing lamphouse as the high amperage would occasion undue heating of its sides. The lamphouse has double sides made up of sheet nickel with asbestos insertion, which effectively obviates radiation of heat from within. The lamphouse has incorporated in it a special device for the protection of the mirror during the act of striking the arc, which in its formation is always unusually long. This device consists of a flap which can be operated from without so as to swing it in between the mirror and the arc while the latter is in the stage of formation. The lamphouse has a high top, a vent for the hot gases, and a tube with cat's eye shutter. The doors on both sides are fitted with inspection windows with red glass and can be locked when folded up. One of the doors has a crater reflector for controlling the position of the carbon crater and the manner in which the carbons burn down.
For the projection of lantern slides a supplementary lamphouse can be hung on to the main lamp body in the place of one of the doors. This supplementary lamphouse has an arc-lamp of its own, a condenser combination, and slide stage.

The Light-yield

The light-yield of the "Artisol 75" lamp is such that a screen surface of no less than 120 square yards may be fully covered with light of adequate inten-

sity. It is naturally an immense advantage to employ in conjunction with this lamp a projection lens having a relative aperture of F 1.9, as in that case the screen illumination is the same with all focal lengths. The light-yield at 75 amperes is 15500 lumen, and hence a faultless screen illumination results also with sound-transmitting screens and colour-films.

Carbons

The carbons used with the Artisol lamps are as specified below.

For 75 amperes

Carbons to be used:
Positive carbon: H. I. Noris chromo 1032, coppered, 11 mm dia., 250 mm long.
Negative carbon: H. I. Elektra nega, coppered, 8 mm dia., 200 mm long.
Minimum supply voltage: 75 volts D. C. Arc voltage: 45 volts.

For 25 to 45 amperes

D. C. Amperes	Pure cored carbons	
	+ mm	— mm
25	13	10
30	14	11
35	15	12
40	16	13
45	17	14

Minimum supply voltage: 75 volts D. C. Arc voltage: 50—55 volts.

Order Item No.

5229/49 mocat High-Intensity Arc Lamp "Artisol 75" for 75 amperes with blower magnet and parabolic glass mirror of 250 mm diameter, f = 110 mm with special lamphouse, light-screening tube with shutter and plano-convex lens of 250 mm diameter, f = 660 mm, with automatic carbon feed with relay and crater reflector.

Arc Lamp

with aligned carbons

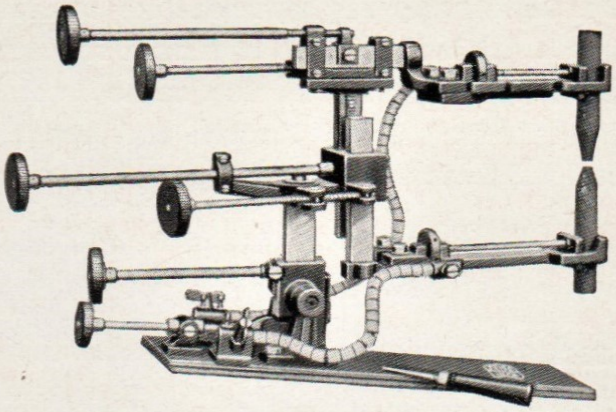


Fig. 10
Arc-lamp with aligned carbons

This arc-lamp in conjunction with a three-lens condenser is intended for use with the Additional Lamphouse for the projection of lantern slides.

Design.

The standard baseplate id fitted with the input-terminals. The six control spindles provide for the following motions: Dipping of the lamp, raising and lowering the crater, lateral displacement, carbon feed, and transverse, backward and forward displacement of the upper carbon.

Carbon Table

The table gives particulars of the requisite carbons for the various amperages.

Amperage	Carbon Diameters in mm			
	D.C.		A.C.	
	+	—	Upper Carbon	Lower Carbon
10	12	9	—	—
15	14	10	12	11
20	15	11	13	12
25	16	12	14	13
30	16	12	15	14
35	18	13	—	—
40	18	13	16	15
50	—	—	18	17
60	—	—	20	18
	Arc Voltage: 50 volts		Arc Voltage: 25—35 volts	

Order Item No.

1466/9 mixoc Arc-lamp with six setting spindles, taking loads of up to 60 amperes, adapted for the Additional Lamphouse No. 5229/50 (see p. 44).

Carbon Feed Attachment

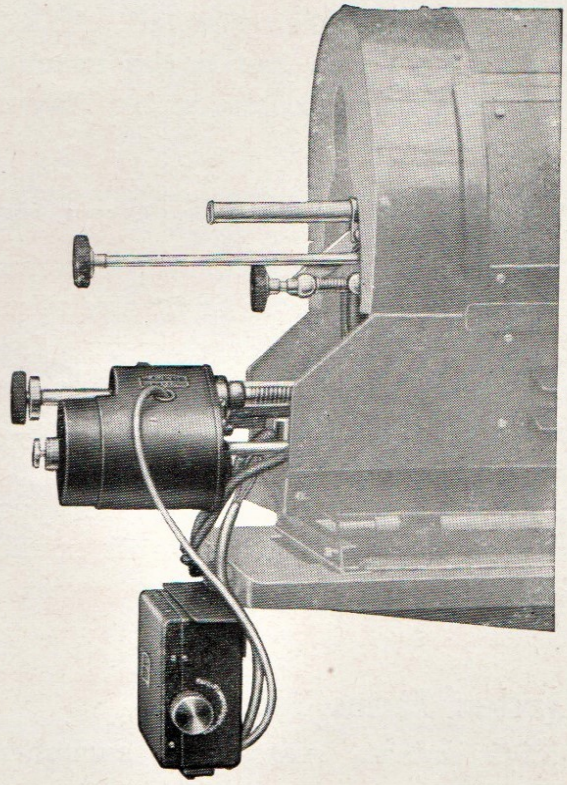


Fig. 11 Carbon Feed Attachment

The carbon-feed is a particularly important adjunct for use with the reflector arc-lamps as it is only when operating in conjunction with an automatic feed that they can be relied upon to produce a permanently unvarying brightness in the screen picture.

General Principle

The carbon-feed serves for continuously moving the carbons forward as they burn down. When controlled by hand, the crater is regulated at prolonged intervals, in consequence of which its position inevitably experiences certain changes relatively to the mirror and thereby gives rise to variations in the screen lighting. An essential quality of a feed mechanism is that it should work perfectly automatically and with unfailing regularity so that the operator may bestow his undivided attention upon the sharpness of the screen picture and the running of the film, while the brigthness of the screen picture remains constant.
Our automatic carbon feed consists of the feed mechanism proper and a switch-gear box. It works on the following principle: At the instant when the gap between the carbon points becomes such that the arc-voltage rises by one or two volts a relay automatically switches on a small motor which is coupled to a reducing gear and thence to the feed-control spindle of the lamp. The motor then actuates the spindle and restores the proper distance between the carbon points.

The advantage of the arrangement is that the motor is set in motion at its full power and is thus able to ensure correct feeding even in the event of the motion surfaces being soiled. An additional relay incorporated in the switch-gear box ensures that in the event of the lamp being switched off, while the lamp current is on, the motor may not receive the full voltage.

Design

The carbon-feed consists of a switch-gear box, which may be attached to the table of the projector or at any other part of the operating room. In the case of the "E"-lamp the carbon-feed is coupled directly to the feed spindle, while in that of the Artisol lamp it is incorporated in the lamp. The design is so arranged that the carbon feed mechanism may be added to an existing lamp of either type.

A special filter embodied in the apparatus renders the carbon-feed mechanism suitable for operation with sound-film installations without affecting the sound reproduction.

Order Item Nos.

5220/1 makan Automatic carbon-feed, with relay, for the mirror arc lamp «Model E».

5220/2 majus Automatic carbon feed with relay, for the new Artisol mirror arc lamps with blower-magnet.

FILAMENT LAMPS

The chief advantage of the use of filament lamps in cine projection arises from the fact that truly non-flick pictures may be obtained with alternating current.

Filament Lamp Projector

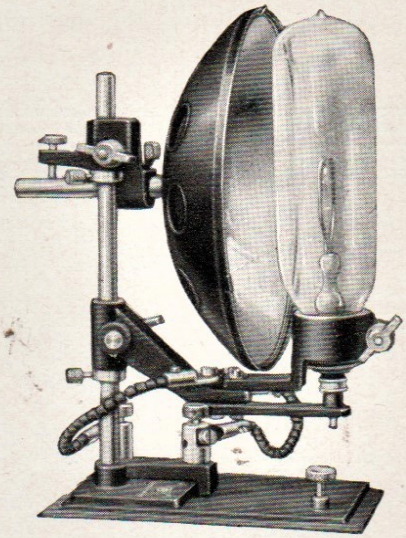


Fig. 12 Filament Lamp Projector

This arrangement is to be more especially recommended where an alternating current only is available and where it is required that the service should be of the simplest. In this respect the filament lamp is unsurpassed, since after its initial adjustment it requires no further attention. The filament lamp projector may likewise be operated with a D. C. in conjunction with a 1000 watt, 110 volt lamp, so long as the screens which are to be covered with light are not too large.

General Principle

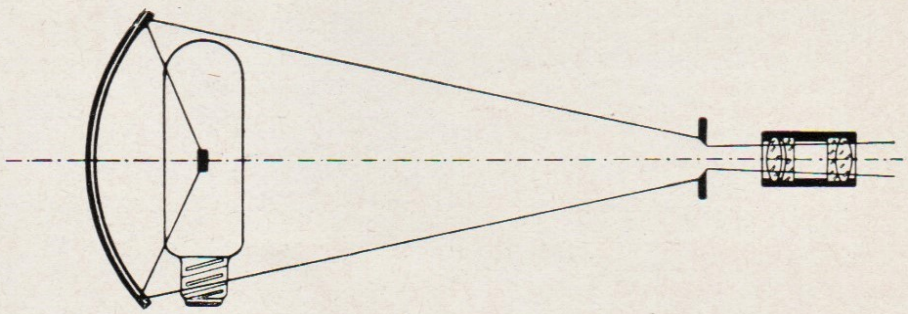


Fig. 13 Optical Diagram of the Filament Lamp Projector

The filament lamp projector works on the same principle as the mirror arc lamp without condenser. The rays emitted by the filament lamp are received by a concave mirror and made to converge upon the film-gate.

Design

The filament lamp projector consists of a lamp-holder which receives a 1000 watt 110 volt or a 900 watt 30 volt 30 ampere lamp and a parabolic glass mirror of 200 mm diameter and 75 mm focus in a special mount. The filament lamp is received in a clamping mount, with the aid of which it can be put in quickly and so as to ensure reliable working including good contact. The mirror-holder is provided with a number of controls for accurately setting the mirror and the spot of light with respect to the film-gate. For its accommodation in the lamphouse the lamp is fitted with the standard baseplate with two insulated input terminals.

Table of Light-yield Values

The table shows the screen picture size which may be adequately illuminated.

Types of lamps	Screen Picture Sizes (in metres) obtainable with the various objectives				
	Standard Cine Lens 62.5 mm diameter				Special Ernemann III Objective F/1.9
	f=100 mm	f=120 mm	f=140 mm	f=160 mm	
1000 watts 110 volts	4.25×3.20	4.00×3.00	3.75×2.80	3.50×2.60	4.50×3.40
900 watts 30 volts	5.00×3.75	4.75×3.55	4.50×3.40	4.25×3.25	5.50×4.10

Order Item Nos.

5221 mizid Filament lamp searchlight projector with parabolic glass mirror 200 mm diameter, excl. of tubular lamp bulb.

5221/2 mizof Filament lamp searchlight projector consisting of: Lamp-holder with parabolic mirror No. 5221/11, 900 watt 30 volt tubular lamp bulb, transformer primary 110/160/220 volt secondary 30 volt, regulating from 28 to 32 amperes, incl. amperemeter.

Filament Lamp Holder

with Auxiliary Mirror

This lamp type is particularly to be recommended where an A. C. is available and where it is of primary importance that the apparatus should be extremely easy to work.

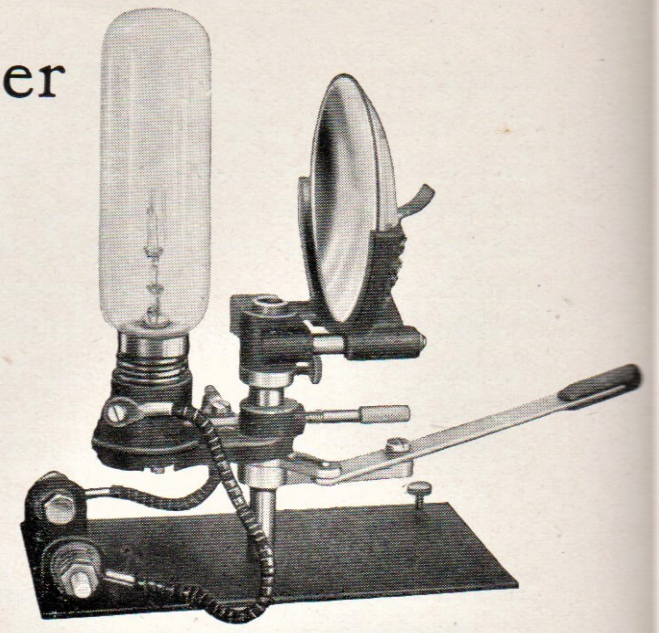


Fig. 14 Filament Lamp-holder with Auxiliary Mirror

General Principle

The rays issuing from the lamp are received by the condenser and directed towards the filmgate. In order that the rearward radiation may by turned to account an auxiliary mirror is mounted behind the lamp, whereby the intensity of the screen picture is increased by 75 per cent. This lamp is used in conjunction with our triple condenser.

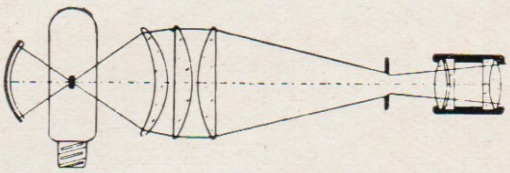


Fig. 15 Optical Diagram of the filament lamp-holder with auxiliary mirror and condenser

Design

The filament lamp is secured in a screw fitting having an adjustable bottom contact screw, which ensures that perfect connection and flow of current may be established. The lamp is capable of adjustment in height and transversely. The mirror, a concave mirror of 140 mm diameter, has additional controls. The filament lamp-holder may be so arranged that by the operation of a hand lever it may be turned about its vertical axis through an angle of 90°, and thereby rendered available for the projection with the reflector diascope attachment G.

Table of Light-yield Values

The table gives the attainable picture sizes on a normally illuminated screen.

Types of Lamps	Size of Screen Picture (in metres) obtainable with the various objectives				
	Standard Cine Lens 62.5 mm diameter				Spec. Ernemann III Object. F/1.9
	f = 100 mm	f = 120 mm	f = 140 mm	f = 160 mm	
1000 - watt 110 - volt	3.50 × 2.60	3.25 × 2.45	3.00 × 2.25	2.75 × 2.05	3.75 × 2.80
900 - watt 30 - volt	4.50 × 3.38	4.25 × 3.20	3.50 × 2.60	3.00 × 2.25	4.75 × 3.55

Order Item Nos.

5222/2 mizab Filament lamp-holder with auxiliary mirror (with Goliath fitting, excl. of tubular lamp bulb).

5222/1 mizec Like 5222/2, but with radial motion for diascope projection.

LAMP HOUSES AND ACCESSORIES

ZEISS IKON

The lamphouses and their accessories are distinguished by their substantial make and their suitable design.

The "T" Lamphouse

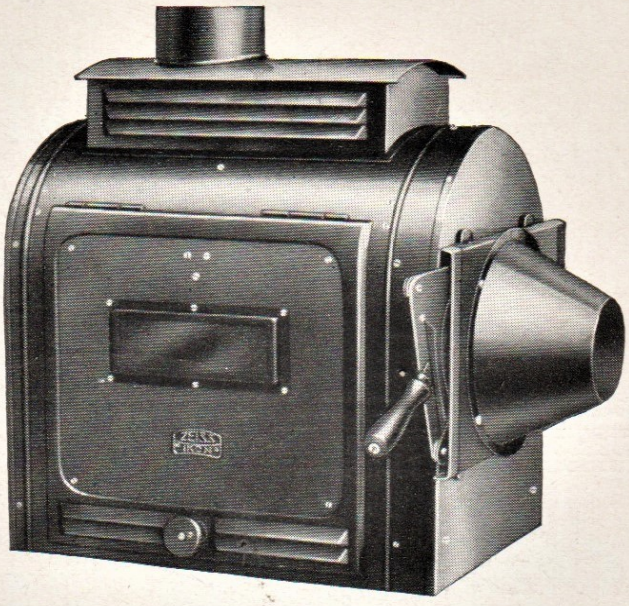


Fig. 16
"T" Lamphouse

Range of Uses

The T-Lamphouse is adapted for the use of the following lamps:
Mirror arc-lamp "Model M".
Filament lamp-holder with auxiliary mirror,
Filament lamp searchlight projector.

The lamphouse is available for use with the
Hahn I Projector and the Monopol Projector.

Design

The T-Lamphouse is half-round in shape and has double-walled sides of sheet nickel. This ensures exceptionally good heat insulation and ventilation. On the operating side, the lamp is provided with a door fitted with a red glass window. At the back it is closed by a sheet metal panel. The front is shaped to suit the particular type of lamp which is to be accommodated. In the case of the "M" mirror arc-lamp and the filament lamp searchlight projector the front is fitted with a cat's eye shutter and a tube. For use with the filament lamp-holder this part serves as a carrier for the three-lens condenser and the tube with shutter.
The lamphouse attaches without the slightest difficulty to the table top of the projectors.
By way of lantern slide projectors adapted for use with this lamphouse our "C" diascope attachment should be used in conjunction with the filament lamp-holder with auxiliary mirror and the "E" diascope attachment in conjunction with the filament lamp searchlight projector and "M" mirror arc-lamp. The former attaches to the left side, the latter to the front of the lamphouse.

Order Item Nos.

5228/1 miret	T-Lamphouse with cat's eye shutter and light-screening tube, for Hahn I projector with Mirror arc lamp "M".
5228/2 misat	Like 5228/1 but with reflecting diascope attachment "E".
5228/5 misev	T-Lamphouse with light-screening tube and cat's eye shutter; aspherical condenser lens 115 mm diam., for Hahn I equipped with filament lampholder.
5228/6 misox	Like 5228/5, but with reflecting diascope attachment "G".
5228/7 misuy	T-Lamphouse with cat's eye shutter and light-screening tube, for Hahn I equipped with filament lamp searchlight projector.
5228/8 mitav	Like 5228/7, but with reflecting diascope attachment "E".

Universal Lamphouse

Range of Applications

The Universal Lamphouse accommodates the following lamps:
the mirror arc lamp "Model M",
the mirror arc lamp "Model E",
the Artisol mirror arc lamp with mirror of 200 or 250 mm diameter,
the filament lamp projector.

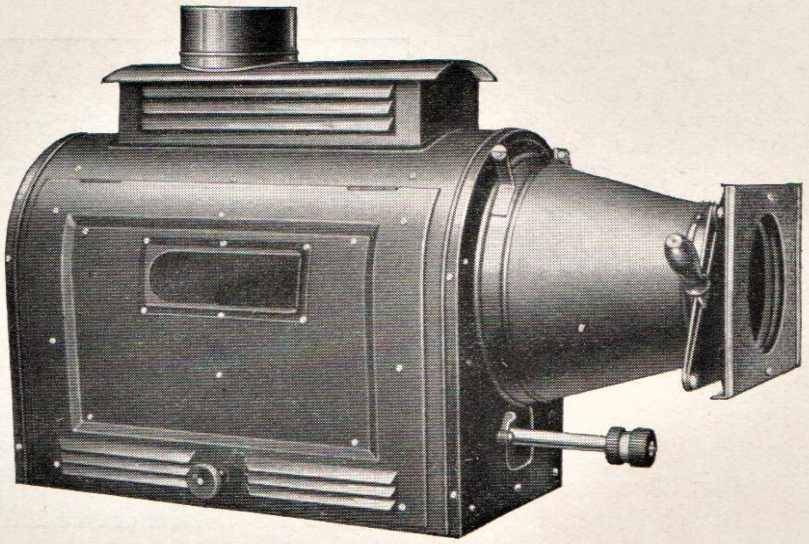


Fig. 18 U-Lamphouse

The lamphouse may be used in conjunction with the following projectors: Ernemann III, Ernemann II, Hahn II, and Ernemann I.

Design

The U-Lamphouse is half-round in shape and satisfies official regulations. It is double-walled and lined inside with asbestos so as to obviate undue heating even under the highest ampere loads. The choice of the equipment is governed by the lamp used. In the case of the "E" reflector arc-lamp and the filament lamp projector the front panel is fitted with a cat's eye shutter and a tube. In the Artisol lamp this part carries the condenser lens of 200 or 250 mm diameter and the tube with cat's eye shutter. The back panel is likewise determined by the type of lamp used.
The lamphouse is so arranged that it may by screwed without difficulty to the projector table. The cast iron baseplate has guide-grooves for the foot of the lamp to slide in. There are two large doors with locking devices and observation windows with red glass discs protected by wire gauze. The lamphouse is furnished with an uptake for the escape of the gases issuing from the arc-lamp.

Order Item Nos.

5229/1	miner	U-(universal)Lamphouse with cat's eye shutter and light-screening tube for mirror arc lamps "E" and "M".
5229/2	minap	Like 5229/1, but with reflecting diascope attachment.
5229/5	minis	U-Lamphouse with light-screening tube and shutter, for the Artisol lamp with 250 mm diameter mirror, without condenser.
5229/6	minot	Like No. 5229/5, but with reflecting diascope attachment.
5229/9	minuv	U-Lamphouse with light-screening tube and shutter, excl. of condenser lens, for Artisol lamp with 200 mm diameter mirror.
5229/10	miolm	Like No. 5229/9, but with reflecting diascope attachment.

Crater Reflector

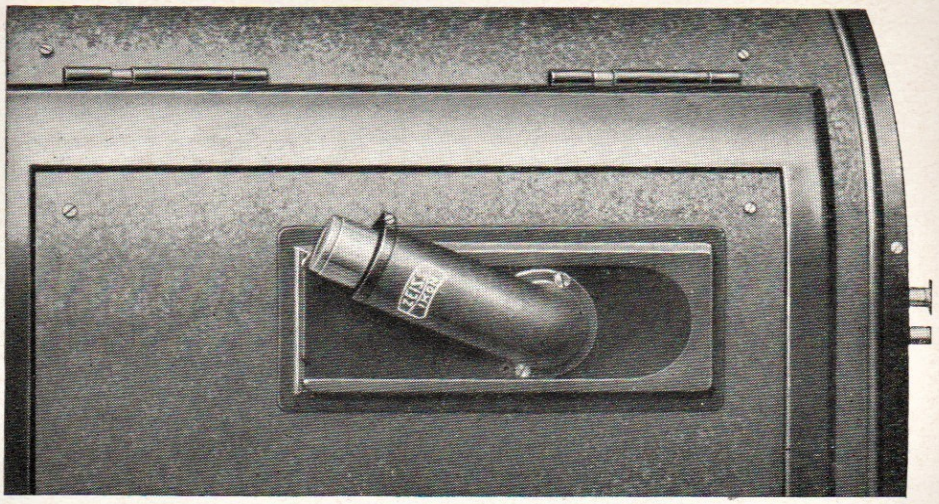


Fig. 19
Crater Reflector

In order to ensure maximum intensity and perfectly uniform and unvarying illumination of the screen picture with a minimum consumption of current it is necessary to set the crater with conscientious precision. Our crater reflector affords considerable assistance in this respect.

General Principle

The device contains an optical combination, by means of which a magnified image of the carbon points may be thrown on any portion of the wall of the operating room. A gauge-mark on the wall may be used to show where the carbon points ought to be.

Design

The crater reflector consists of a cylindrical body which is mounted upon a plate taking the place of the red-glass disc in the door of the lamphouse (Model "U"). The reflector can be moved radially so as to direct the projected image upon the desired spot in the operating room. The image may be set upright and also focused by turning the front portion of the reflector mount. In order to obtain an erect and right-and-left unreversed image of the crater the reflector contains two prisms.

Order Item Nos.

5229/21 maixy Crater reflector with two prisms for the U-lamphouse.

DIASCOPE ATTACHMENTS

ZEISS IKON

The diascope attachments are so designed that the type of lamp used in any given case will furnish the highest requisite brightness and a uniform illumination without shadows, while the transition from cine projection to lantern slide projection is made in the simplest manner.

Reflecting Diascope Attachment "A"

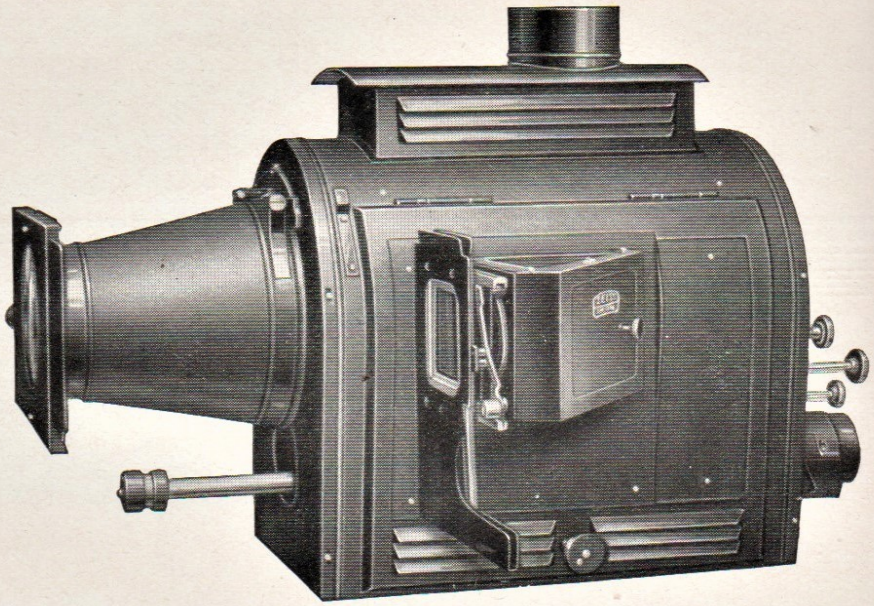


Fig. 21 "A" Reflecting Diascope Attachment

This arrangement is designed for use with the Artisol mirror arc-lamp in conjunction with the Universal lamphouse.

General Principle

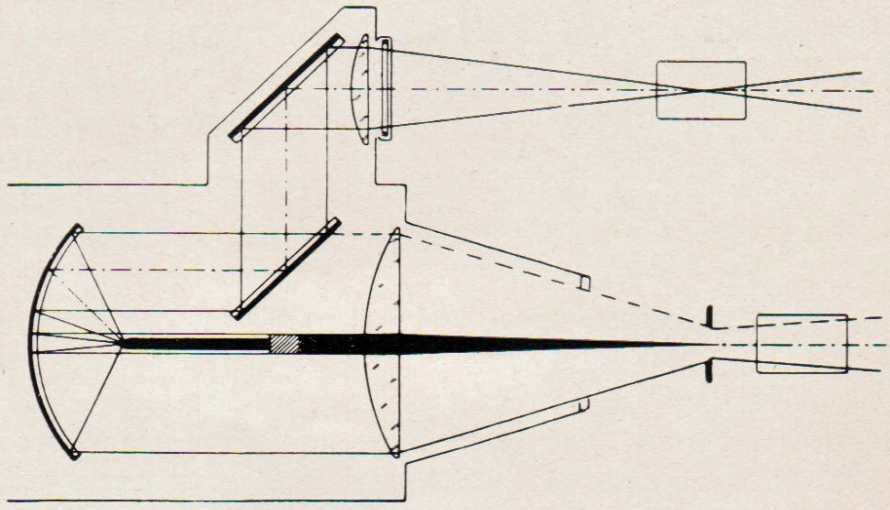


Fig. 22 Optical Diagram of the "A" Reflecting Diascope Attachment

The "A" Reflecting Diascope Attachment consists of a lamphouse attachment and a plane mirror within the lamphouse, which with the aid of a rod may be introduced into the parallel beam of rays of the Artisol lamp so as to direct the rays upon the mirror in the attachment and thence to a lens in front of the lantern slide.

In the case of the Artisol lamp with a mirror of 200 mm diameter a negative lens is added in order to cover the $3^1/_4 \times 3^1/_4$ in. slide completely with light.

Design

The mirror attachment screws to the left door, which is specially arranged for this purpose. The mirror in the attachment has the requisite control motion by means of which the rays may be directed into the optical axis of the diascope objective. The mirror and condenser holders as well as the carrier stage for the lantern slides are made particularly substantial so as to obviate vibration and ensure steady pictures on the screen.

The $3^1/_4 \times 3^1/_4$ in. and $4 \times 3^1/_4$ in. slides fit the same slide frame. The surface which is fully covered with light measures $3^1/_4 \times 3^1/_4$ in.

The transition from the machine projection to that of the lantern slides is made by turning the mirror within the lamphouse about its hinge. The slide changes are covered automatically.

Table of Lenses

The lenses in the attachment should be selected to suit the focal length of the diascopic projection lens and the mirror of the Artisol lamp in accordance with the particulars given in the subjoined table.

Diascope Lens Focal Length	Lens in the Mirror Attachment Focal Length	Lens in the Lamphouse Focal Length
Artisol Lamp with mirror of 200 mm diameter		
F = 300 and 350 mm	250 mm	500 mm
F = 400 and 450 mm	300 mm	
F = 500 to 600 mm	350 mm	
Artisol Lamp with mirror of 250 mm diameter		
F = 300 and 350 mm	300 mm	—
F = 400 and 450 mm	350 mm	
F = 500 to 600 mm	500 mm	

Order Item Nos.

5229/44 myunc Reflecting Diascope Attachment "A" with lamphouse door for the subsequent attachment to existing U-lamphouses No. 5229/9 (see p. 35).

5229/43 myinz Reflecting Diascope Attachment "A" with lamphouse door for subsequent attachment to an existing lamphouse No. 5229/5 (see p. 35).

The focal length of the diascope lens should be stated.

Reflecting Diascope Attachment "E"

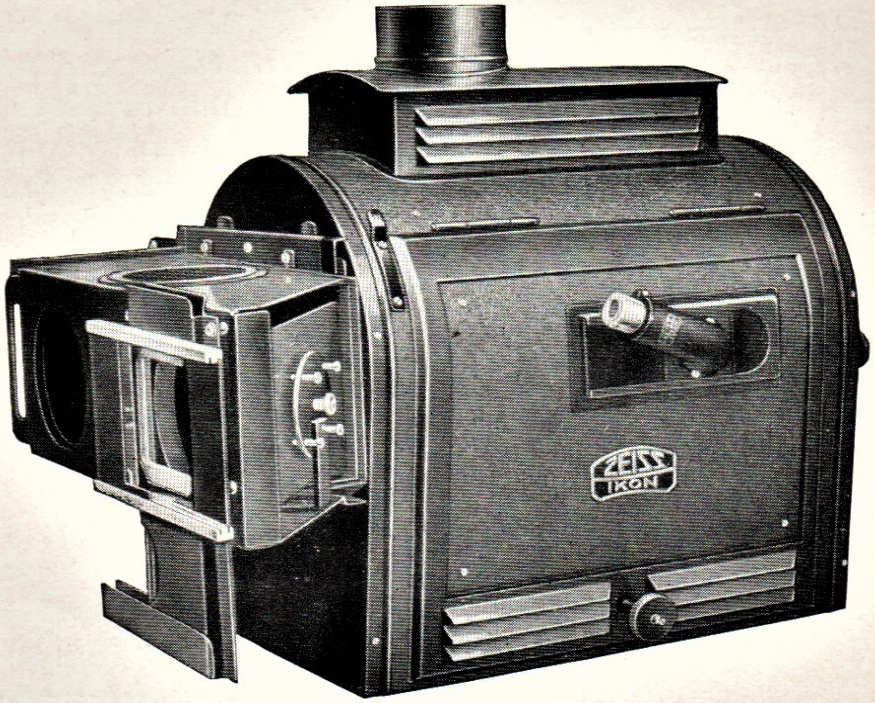


Fig. 23 "E" Reflecting Diascope Attachment

The "E" reflecting diascope attachment is adapted for use with the following types of lamps:

Mirror arc lamp "Model M",
Mirror arc lamp "Model E",
Filament lamp projector,

in conjunction with the Universal lamphouse.

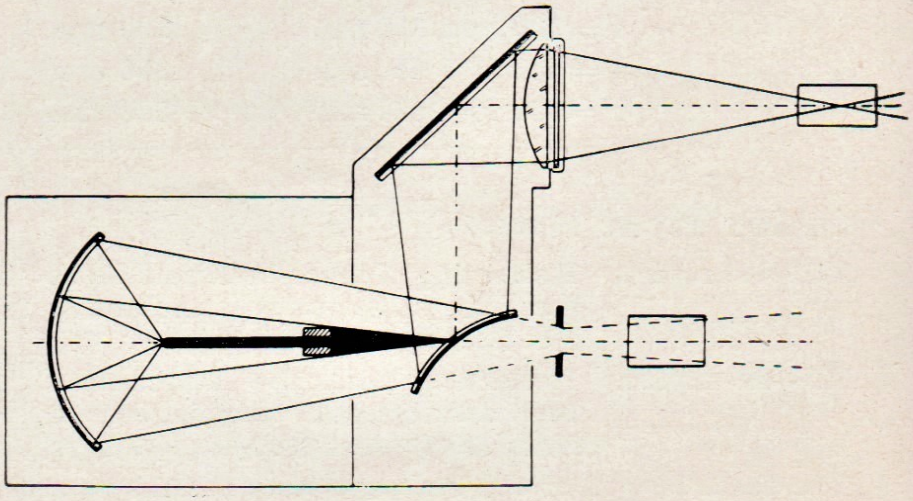


Fig. 24 Optical Diagram of the "E" Reflecting Diascope Attachment

General Principle

In this arrangement lantern slides are projected without shadow effects with the aid of a concave mirror which enters the beam of light of the mirror arc lamp "Model M" or "Model E" or the filament lamp projector, whence the rays are directed via a plane mirror to a condenser lens. This lens causes the rays, after traversing the objective to reach the screen. The curvature and focal length of the mirror is determined by the type of lamp used and the focal length of the objective.

Design

This apparatus consists of a mirror casing which attaches to the front panel of the lamphouse. Between the latter and the mirror-box there is a cat's eye shutter. Both mirrors, the curved mirror as well as the plane mirror are provided with motions for adjusting the beam of light with perfect precision. The transition from machine to lantern slide projection is made by swinging the curved mirror in or out of the path of the rays and can by made quickly and with precision.

The carrier stage to the reflecting diascope attachment admits of the use of lantern of $3^1/_4 \times 3^1/_4$ in. and $4 \times 3^1/_4$ in., the fully illuminated surface being $3^1/_4 \times 3^1/_4$ in. During the transition from one to the next picture the beam of rays is cut off automatically.

Table of Mirrors and Lenses

The curved mirror and the condenser respectively should be selected in accordance with the table to suit the focal length of the objective and the type of lamp used.

Diascope Objective Focal Length	Concave Mirror in the Diascope Attachment	Focal Length of the Condenser Lens as used with the "E" mirror arc lamp		Filament lamp search-light projector
		with glass mirror and Model M	with metal mirror	
F = 200 to 400 mm	deeply curved	250 mm	—	250 mm
	lightly curved	—	220 mm	—
F = 500 to 700 mm	deeply curved	350 mm	—	350 mm
	lightly curved	—	250 mm	—

Order Item No.

5230/5 myarz Reflecting diascope attachment "E" for lamphouses Nos. 5229/1, 5228/1 and 5228/7 (see p. 34 and 35).

The focal length of the dia-objective should be stated.

Reflecting Diascope Attachment "G"

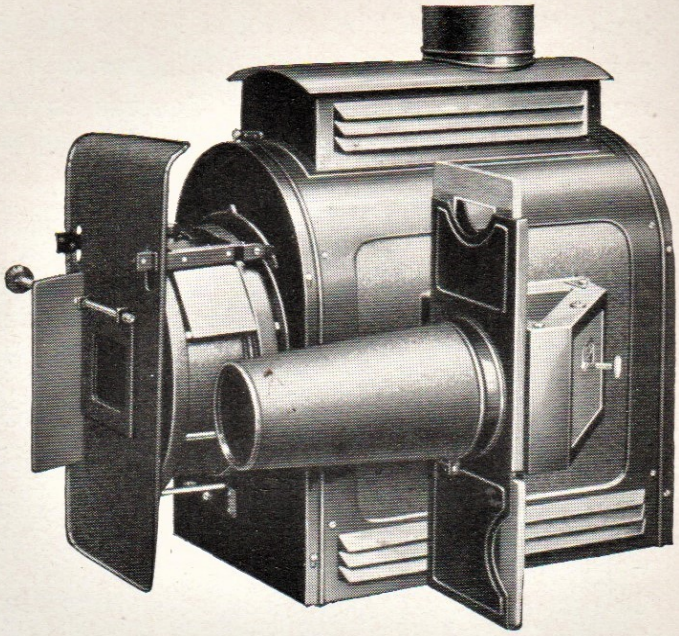


Fig. 25 "G" Reflecting Diascope Attachment

This arrangement is used in conjunction with the filament lampholder with auxiliary mirror and double-walled lamphouse.

General Principle

The arrangement consists of an attachment to the lamphouse containing a plane mirror and a condenser lens. For projecting lantern slides the filament lamp-holder with its slewing device is turned through an angle of 90^0 so that the light-rays of the lamp may be intercepted by a condenser lens in the lamphouse and directed to the plane mirror. The latter reflects the rays to the condenser lens in front of the lantern slide, this lens being so formed that, after passing through the slide and the objective, the rays form the image on the screen.

Design

The design of this apparatus is the same as that of the "A" attachment. There is, however, no provision for automatically shutting off the beam of light when changing slides. The lens in the attachment has a focal length of 250 mm, that of the lens in the lamphouse being 160 mm for all objective foci ranging from 300 to 650 mm.

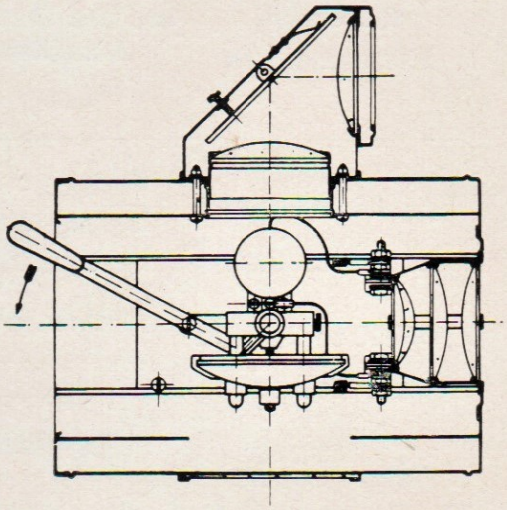


Fig. 26
Optical Diagram of the "G" Reflecting Diascope Attachment

Order Item No.

5235/6 nabil Reflecting Diascope Attachment "G" with slide carrier stage for lamphouse No. 5235.

Additional Lamphouse

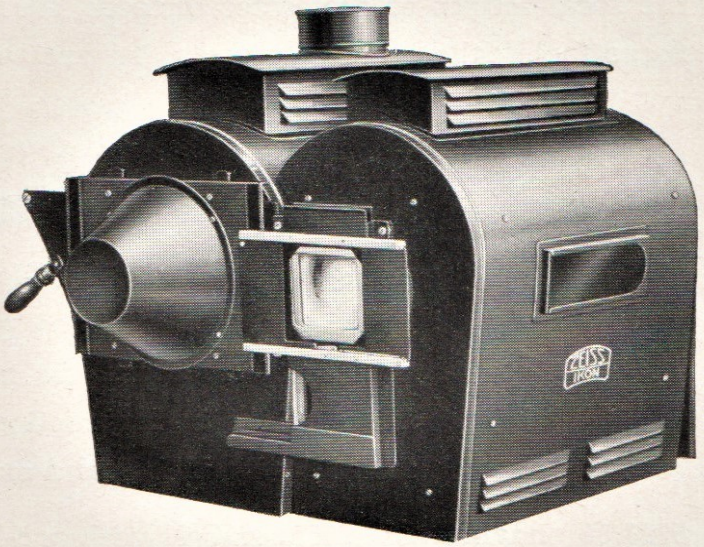


Fig. 29 Supplementary Lamphouse

For those cases where it is required to show exceptionally bright illuminated slides on the screen, e. g. where this is to be done in a brightly lit theatre we would recommend the use of the additional lamphouse with separate illuminating arrangement.

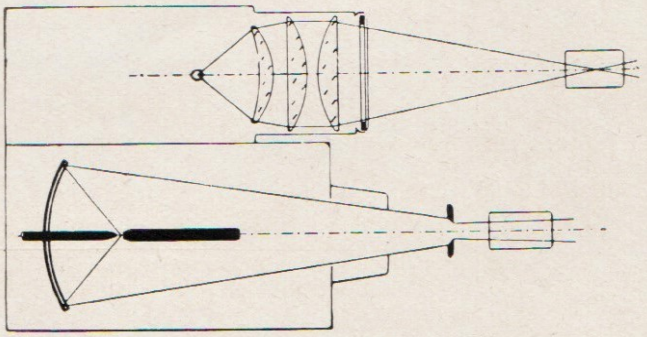


Fig. 30 Optical Diagram of the Supplementary Lamphouse

General Principle

The supplementary lamphouse has a separate illuminating system incorporated in it, consisting of our arc-lamp with carbons in aligned position and a three-lens condenser. The lamp should preferably be connected in parallel to the reflector arc-lamp for machine projection so that the latter goes out as the diascope projection lamp lights up.

Design

The supplementary lamphouse is mounted alongside the "Model U" lamphouse in the place of its left-hand door and contains a slideway for the lamp and the condenser with its mount. In front of the condenser a carrier stage is provided

for the reception of $3^1/_4 \times 3^1/_4$ in. and $4 \times 3^1/_4$ in. slides. The three-lens condenser requires to be adapted to suit the focal length of the diascope objective. Where the focal length of the latter exceeds 400 mm the condenser lens of 220 mm focus facing the slide requires to be exchanged for one of 350 mm focus.

Order Item Nos.

5229/40 miors Additional Lamphouse with carrier stage and slide changing frame, three-lens condenser 120 mm in diameter (meniscus lens of hard glass) and condenser mount, for diascopic projection in association with mirror arc lamp installations in conjunction with the U-lamphouse, available for use with right-hand machines only.

5229/50 naaln Like No. 5229/40 with arc-lamp No. 1466/9.

ELECTRIC APPURTENANCES

ZEISS IKON

The electric appurtenances are all types which have been specially designed for their specific purposes so as to ensure economic and permanently reliable working.

Resistances

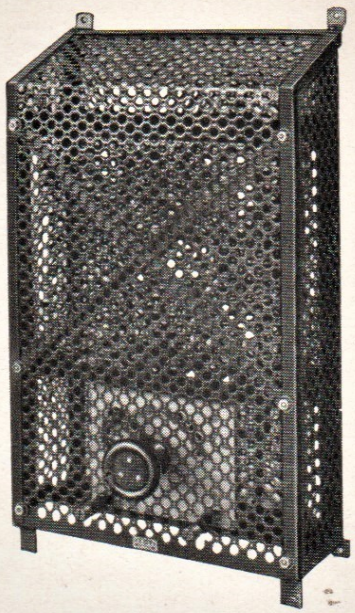


Fig. 31 Arc-lamp Resistance

Our resistances for arc-lamps and for filament lamps are so designed as to present the correct resistance for the amperage in question, while undergoing little heating and conforming to official requirements.

Fig. 32 Filament Lamp Resistance

General Principle

Arc-lamps operating on a D. C. circuit require to work in series with resistances for the purpose of bringing supply voltage down to the arc voltage and also for steadying the arc. In the case of the filament lamps resistances are used

solely for reducing the supply voltage to the lamp voltage. In the case of an A. C. circuit both arc-lamps and filament-lamps should preferably be fed through transformers.

Design

The resistances are made up of wire coils of a cross-section which obviates undue heating. The casing consists of perforated metal sheeting, and the top is slanting according to the regulations. The terminals, switch levers, and contacts are specially broad and well insulated. The arc-lamp resistances can be set for different amperages. The filament lamp resistances are furnished with terminals to suit the supply voltage.

Types

We supply the following types:

Arc-lamp Resistances

Supply Voltage	Adjustable Amperage
70	5 to 20 15 to 30 20 to 40
110	5 to 20 15 to 30 20 to 40
220	5 to 20 15 to 30 20 to 40
110 or 220	5 to 20 15 to 30 20 to 40

Filament Lamp Resistances

Supply Voltages:	For Lamp:
1558/15 125 and 200 and 220 volts.	1000 watt, 110 volts.

Order Item Nos. (See main price-list)

Transformers

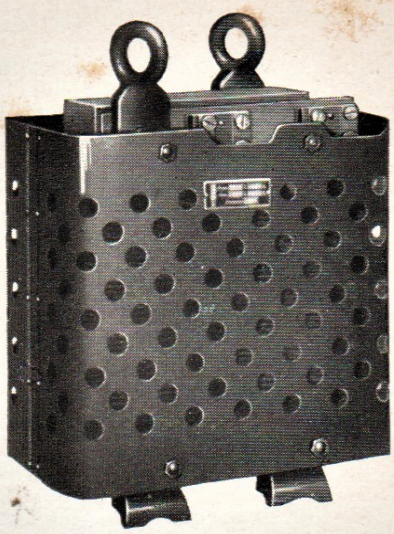


Fig. 33 Arc-lamp Transformer

General Principle

The lowering of the supply voltage to the required lamp-voltage is effected in the transformers by induction, which involves a loss of only 10 to 15 per cent of the input within the transformer. The transformers are so dimensioned that in the case of arc-lamps the maximum amperage yields a lamp voltage of 30, while in the case of filament lamps the required lamp-voltage results.

Design

The transformers are provided with a guard-hood of perforated sheet metal. They are made for different voltages. The transformer for our filament lamps is a regulating transformer, which with the aid of a lever may be set to the prevailing amperages.

Types

The subjoined table comprises various types and indicates the uses for which they are intended.

Arc-lamp transformers:

Supply Voltage	Maximum Amperage	For intermediate Amperages
110 220 110 and 220	40 40 40	Resistance regulating from 20 to 40 amperes
110 220 110 and 220	60 60 60	Resistance regulating from 30 to 60 amperes

Regulating Filament Lamp Transformer

Supply Voltage:
110, 160 and 220 volts.

For Lamp:
900 watts, 30 volts, 30 amperes.

Order Item Nos. (See main price-list)

Converters

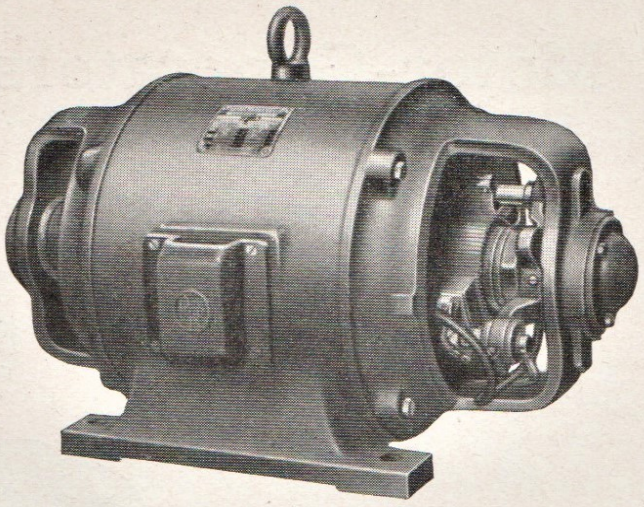


Fig. 34 Converter

An alternating supply current (alternating current) requires to be converted into a continuous current when arc-lamps are to be operated both for reasons of economic working and in order to obtain perfect screen pictures. It is well known that arc-lamps operated by A. C. do not produce flawless pictures, and, moreover, in order to achieve a like intensity on the screen as with a D. C. the requisite amperage would need to be 3 to 4 times greater. Also, with a D. C. the supply voltage, where it exceeds 220 volts, can be reduced by a rotary transformer much more economically than by resistances.

General Principle

The converters supplied by us are of the single-armature type and have the two-fold advantage of occupying very little space, besides being highly efficient and exceedingly economic in working. The loss of electric energy is only about 20 per cent. For the purpose of steadying the arc a regulating resistance for a supply voltage of 70 or 80 volts is required to be installed between the converter and the lamp.

Design

The continuous-to-continuous as well as the alternating-to-continuous current converter is in the form of a single machine, the armature of which has at either end a commutator or slip-rings at one end and a commutator at the other. The converter is started by a starting resistance supplied with it. The bearings are provided with exceptionally good means of lubrication. The brushes are attached to a brush yoke. All parts are substantially made and are well adapted for continuous working. These single-armature converters yield a constant secondary D.C. of 70 or 80 volts.

Order Item Nos. (See main price-list)

Motor-Generators

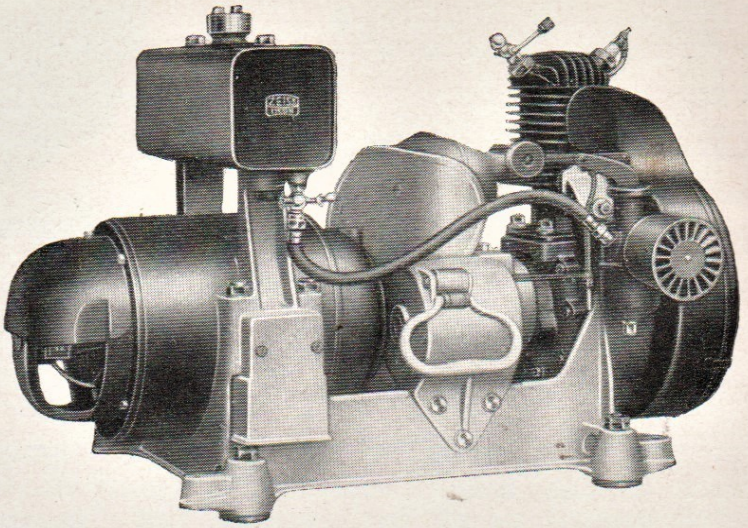


Fig. 35 Motor-Generator

A cinema theatre is rendered considerably more immune from breakdowns where the supply of current is not restricted to a single source and where there is an alternative source in reserve. Such an independent source in the form of a reliable motor-generator is, moreover, indispensable to travelling cinema shows and for stationary use in localities where there is no public supply.

ZEISS IKON

Design

The machine consists of a petrol motor and a direct coupled D.C. compound-wound dynamo.

The starting gear has a self-coiling starting belt. While working the motor is permanently cooled by a fan. The motor and dynamo are mounted upon a common baseplate with four rubber buffers. Uniformity of motion is maintained independently of the current load by means of a speed regulator.

Types

We supply two types of petrol motor generators to suit different conditions:

1. For operating filament lamps of 500 to 1000 watts at 110 volts or for mirror arc lamps of 6—10 amperes.
2. For operating mirror arc lamps of up to 20 amperes.

In every case the motor-generator is dimensioned to supply sufficient current for working the projector motor.

Table of Chief Particulars

KW	Volts	Ampères	Motor Power	
			H. P.	R. p. m.
0.6—1.1	110	5.4—10	2	3000
2.2	110	20	5	3000

Order Item Nos.

5351 Petrol Motor Generator, complete, of sufficient power for 6 to 10 ampere reflector arc-lamp or 500 to 1000 watt, 110 volt filament lamps and projector motor of up to $^1/_{13}$ H. P., consisting of
Air-cooled two-cycle motor, direct-coupled dynamo, and speed regulator.
Dynamo output: 0.6—1.1 kw, 110 volts, 5.4—10 amperes.

5352 Petrol Motor Generator, complete, of sufficient power for reflector arc lamp of up to 20 amperes and projector motor of up to $^1/_5$ H. P., consisting of air-cooled two-cycle motor, direct-coupled dynamo and regulator.
Dynamo output: 2.2 kw, 110 volts, 20 amperes.

ZEISS IKON

II 5123.25.531

Din A 5

K 367 E

Printed in Germany