

The King of Projection Lenses for Kinematograph Theatres is the

Busch "Glaukar" Anastigmat.

THE optical system is the most important part of your apparatus, it being the means by which the picture is projected. It is also the most lasting and durable part of the machine.

Therefore, in having the best lens that money can buy, you are studying economy and at the same time giving the utmost satisfaction to your patrons.

The ordinary lens may project well enough the pictures in which there are mainly large moving objects, but those that contain a large amount of detail—small objects, still life, landscape and scenic effects, educational subjects, &c.—require a lens that will give the finest definition.

Such definition is only possible with the BUSCH "GLAUKAR" ANASTIGMAT, which is the most perfect Projection Lens that modern science and mechanical skill has produced.

Its optical qualities exceed that of any other Lenses yet made for Picture Theatres.

The correction for astigmatism and curvature of the field, secure the finest possible definition right to the extreme margins of the screen.

No.	Focus Inches	PRICE Series I Brass Mount with Rack and Pinion			PRICE Series II In Cylindrical Tube		
0 ...	1 ¹ / ₂"	...	...	...	£4	0	0
¹ / ₂ ...	2 ¹ / ₂"	...	...	...	4	10	0
1 ...	2 ³ / ₄"	...	...	...	4	15	0
1 ¹ / ₂ ...	2 ¹ / ₂"	...	...	...	5	5	0
2 ...	3 ¹ / ₄"	...	...	...	5	10	0
2 ¹ / ₂ ...	3 ¹ / ₂"	...	...	...	5	17	6
3 ...	4 ¹ / ₄"	...	...	...	6	5	0
3 ¹ / ₂ ...	4 ¹ / ₂"	...	...	...	7	0	0
4 ...	5 ¹ / ₄"	...	...	...	7	15	0
5 ...	6 ¹ / ₄"	...	...	...	10	0	0

Nos. 0 to 3 ¹/₂ Series II are supplied in Standard size tubes Diameter 42.5 m/m, and No. 4 in tube diameter 52.5 m/m.

Dear Sirs, COPIES OF TESTIMONIALS. January 15th, 1912.

We are much obliged to you for the new lens which throws a picture exactly the size we require, and in conjunction with the new Condenser we bought from you and have used for the first time, gives a perfect picture and a brilliancy to the same we have up to the present been unable to obtain.

We are more than pleased, and beg to tender you our best thanks.

Yours faithfully, N.P.P., Ltd.

Dear Sirs, Glasgow, 20/5/12.

With reference to the Busch Glaukar Anastigmat with which you have just supplied us, we had this fitted to the machine at Ayr, and you will be pleased to know it has given every satisfaction.

Yours faithfully, H.P., Ltd.

EMIL BUSCH OPTICAL CO.,

Manufacturers of Photographic & Cinematograph Lenses,

35, Charles Street, Hatton Garden,

London, E.C.



BUSCH

**PROJECTION
AND
ENLARGING LENSES**

**FOR CINEMATOGRAPHS,
LANTERNS, AND
ENLARGING
CAMERAS**



Emil Busch Optical Co.

**35 Charles Street, Hatton Garden
London, E.C.**

CATALOGUE OF PROJECTION APPARATUS



Emil Busch Optical Co.

35 CHARLES STREET,
HATTON GARDEN,
LONDON, E.C.

Telegrams:
"PURELLO, LONDON."

Telephone:
2563 CENTRAL.

W.D.
8°
131
BR

NOTES ON PROJECTION

THE projected enlargement of small photographic glass or film negatives is accomplished entirely by optical lenses.

The lens system gathers up the light and passes it on to the screen, and, according to the density of the film, the quantity and quality of the light, and the perfection of the optical system, you have a good, bad, or indifferently illuminated and defined picture.

Too much importance cannot, therefore, be attached to the selection of the lenses.

It is too often true that the part of the projection apparatus that has least care and attention is the lens system, and yet, as we have already suggested, it is **the** part which produces the picture.

The neglect arises from the fact that the mechanic is dependent on the optician, and price consideration may often lead the former to buy that which a scientific optician would reject as being unfit for association with a high class instrument.

Many machines are fitted with lenses costing only a few shillings. Needless to say, neither the scientist nor the skilled mechanic can have had much to do with an article the price of which is so low, and the result is a "woolley" picture, entirely wanting in that brilliancy and crispness that a good lens gives.

The following information may assist operators to obtain the best results from their apparatus.

The necessary articles for projection are :—

L. A Source of Light.	O. A Projection Lens.
K. A Condenser.	S. A Screen.
P. Glass Plate or Film.	

The rays of light from L are received by the condenser lens K, and made to converge passing through the negative film or

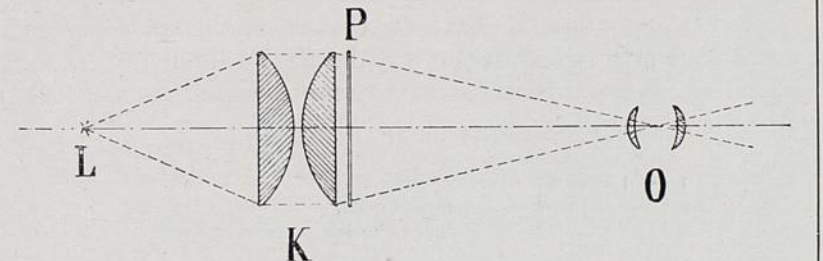


plate on to the projection lens O. In passing through the projection lens, the rays cross and emerge diverging, and so produce the enlarged image on the screen.

The focus of the projection lens governs the size of the picture on the screen, and as it is not commercially possible to make a special lens for each hall or screen, it is advisable to consider the lenses available before putting the finishing touches to the screen or the placing of the operating machine.

The following simple formula for obtaining the focus of lenses required, distance separating lens and screen, and size of picture for cinematograph work, will be found useful. To find the focus of lens necessary to give a certain size picture, divide the distance of screen by the diameter of picture required.

EXAMPLE. Distance of screen from machine, 36 feet.
Size of picture required, 12 feet.
$$F = \frac{36}{12} = 3 \text{ inches focus.}$$

To find size of picture given with a certain lens, divide distance between screen and lens by the focus of lens.

EXAMPLE. $P = \frac{36}{3} = 12 \text{ feet picture.}$

To find distance between lens and screen with a given size picture and lens, multiply diameter of the picture by the focal length of lens.

EXAMPLE. Picture 18 feet, lens 4 inches.
 $18 \times 4 = 72 \text{ feet.}$

These formulæ are not strictly accurate for all machines, being based on a one inch film, whereas in some machines the "gate" is about 9/10ths of an inch, and the resulting picture will be a trifle smaller. They will be found a quick and ready guide however, for general purposes, and more exact figures in reference to the actual lenses available are given on page 8 of our list.

For lantern projection the formula is practically the same, but one has to take into consideration the size of the lantern slide, which is usually 3 inches in diameter. The formula then is:—

F = Focus of Lens.

S = Diameter of Slide (3 inches).

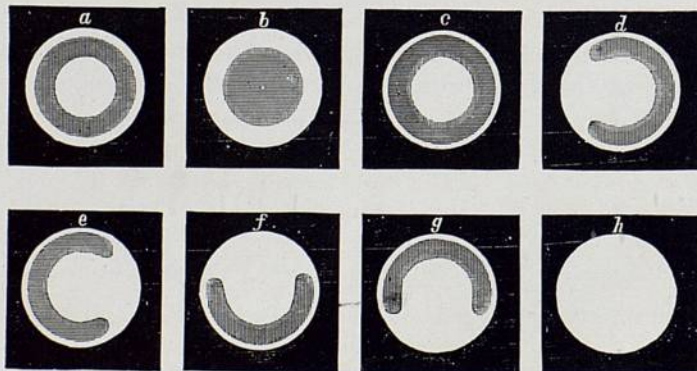
P = Diameter of Picture on Screen.

T = "Throw," or Distance between Screen and Lens.

$$\text{Then } F = \frac{T \times S}{P} \quad \text{Then } P = \frac{T \times S}{F} \quad \text{Then } T = \frac{P \times F}{S}$$

It is important in all projection work that the source of light, the optical centre of the condenser, and the projection lens, should be in a perfectly straight line, and that the source of light is at the correct distance from the condenser.

The following diagrams show the effect on the screen of the source of light in various positions, and a little practice will enable the operator to quickly adjust the light so as to produce an equally illuminated circle.



a and b—The light is too near condenser. c—The light is too far from the condenser. d—The light is not central, being too far to the right. e—The light is not central, being too far to the left. f—The light is not central, being too low. g—The light is not central, being too high. h—The light is in the right position.

THE CARE OF THE OPTICAL SYSTEM AND CONDENSER LENSES

The lenses should be kept clean, and care should be taken not to handle them with greasy fingers.

The liability of condenser lenses to breakage is due to various causes:

1st.—The unequal contraction and expansion of the glass and metal mounts arising from the heat rays from the source of light. The lenses should fit loosely in the mounts, and the mounts loosely into the machine, so that there is room for unequal expansion of each part.

2nd.—Sudden heating of the cold glass when turning on light.

3rd.—Sudden cooling of the hot glass by the inlet of draughts. The light should always be turned on away from the lens and brought gradually towards the condenser, so that it has time to become slowly heated. Take all possible precaution against cold air entering the machine while condenser is hot.

PROJECTION LENSES

The "Ki" and "Kino" Lenses are formed of two combinations, one (the front lens) consisting of two lenses cemented together, and the other (the back combination) consisting of two lenses separated by a ring.

An arrow on the lens mount shows which way it should be placed in the jacket. The point of the arrow should be directed towards the light.

In cleaning, care should always be taken to put the lenses back into their correct position, and it is advisable to do only one combination at a time.

The cemented lens is always that which is nearest the screen, and with the other two lenses, that with a concave surface is placed inside the tube.

The "Glaukar" Anastigmat is of quite different construction to the "Ki" or "Kino" Lenses and consists of three lenses, the front and back being symmetrical with a negative lens placed between them.

The symmetrical construction enables the lens to be placed in the focussing jacket in either position, and it is, therefore, not possible to make a mistake in replacing the lenses after cleaning. The central lens is attached to the cell of what we may call the front lens (that having the engraving on), and can be separated when necessary.

A clean dry soft rag is the best material with which to clean the surface of the lens, after having first removed any grit from them by means of a camel hair brush.

Grease or any other formation can be taken off with a little alcohol.

January, 1912.

Evidence from the Theatres as to the Merits of Busch Lenses

H. Dickons, Wellington Palace, Dundee.

December 5th, 1911.

"I get twice as good a light on my screen as I previously did with an ordinary Condenser, and it is a pure white light, not like that given by other condensers which have a brown tint."

Theatre de Luxe, Leamington.

May 19th, 1911.

"I have to thank you for making a special mount for 'Glaukar' Lens, and am pleased to say it is eminently satisfactory."

Picture Hall, Ilfracombe.

July 17th, 1911.

"I wish to express my great satisfaction with the results obtained by your Cine. lens. Many of the visitors to my Hall from London have stated that they have not seen such good pictures projected in town as those I am showing, and although other little details may help to produce good effects, I am convinced that the main point is the excellent lens you supplied me with."

An Operator, Ilfracombe.

July 12th, 1911.

"I may say I have been called, in to shows where they have had high grade machines, yet only obtained poor results. Having persuaded them to change the lens for a Busch, the results have been excellent."

Newbury Picture Palace, Reading.

November 13th, 1911.

"We are pleased to inform you that the lens sent is a great success and improves our pictures immensely." ("Glaukar" Anastigmat.)

Farnborough Electric Theatre, Ltd., Farnborough.

Nov. 28th, 1911.

"Lantern Lens is A1."

G. E. Arkell, N.A.C.O., Grand Electric Theatre, Wakefield.

Nov. 27th, 1911.

"I may add that this is by far the best lens I have ever used." ("Kino.")

SIR BENJAMIN STONE

Dear Sirs,

The Grange, Erdington. July 5th, 1911.

"You will like to know that your new 'Glaukar' Lens largely contributed to the success of my Coronation Photographs."

"In surmounting the difficulties of the normal subdued light of the Abbey, increased by the temporary erected galleries, and the trouble of ever restless movement, made it necessary to consider the extreme limit of possibilities in every contributing factor in the work. Your lens with its available wide aperture and good definition gave favourable results, exceeding the several other lenses with which it was put in competition and this throughout some dozens of trial tests made previous to the great ceremony."

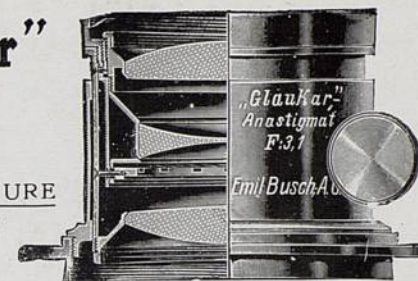
I am, yours truly, (Signed) J. Benjamin Stone.

"PHOTO MONTHLY"

"The 'Glaukar' submitted to us for examination was a No. 4 of 5½ inch equivalent focus, and we tested it for area of illumination, astigmatism, definition, flatness of field, freedom from flare, purity of glass, surface finish, and absence of striæ, and it came out of the test most satisfactorily, and we can, therefore, unhesitatingly recommend the lens as an excellent large aperture Anastigmat."

Busch "Glaukar" Anastigmat

FOR CINEMATOGRAPH PICTURE
TAKING & PHOTOGRAPHIC
ENLARGING CAMERAS



Series I.

THE remarkable adaptability of the new Busch "Glaukar" Anastigmats to so many classes of photographic work, entitles it to rank as one of the most important additions made in recent years to the apparatus of the scientific and amateur worker.

The aperture F/3.1 is so large as to enable pictures to be taken even in the most unfavourable lighting conditions, and offers the photographer the means of securing mementos of theatrical or other performances and ceremonies indoors, and all photographic work, either interior or exterior, where lighting conditions require an exceptionally large aperture lens.

The smaller sizes, Nos. 1 to 3, are specially suitable for picture-taking Cinematograph work in studios, and the larger sizes for all other work, including Portraiture, Colour Photography, Reproduction and Enlarging.

The correction for astigmatism and curvature of the field, are such as to give a sharply defined image right up to the margin of the film—a feature of enormous importance when one remembers that any distortion or want of marginal definition will be seriously accentuated under the great enlargement that takes place in projecting the image on the screen.

For enlarging by means of oil or gas light, the large aperture of the "Glaukar" will be found very advantageous.

Series I. "Glaukars" are made in Brass Mounts, with Rack and Pinion and hard steel leaved Iris Diaphragms, as a protection against heat and climatic changes.

No.	Diameter of Lenses	Focus	For Plates	PRICE Series I.		
	Inches	Inches	Inches	£	s.	d.
1	$\frac{3}{8}$	$2\frac{3}{8}$	$1\frac{3}{8} \times \frac{3}{8}$	5	0	0
$1\frac{1}{2}$	$1\frac{5}{8}$	$2\frac{1}{2}$	$1\frac{3}{8} \times 1\frac{3}{8}$	5	10	0
2	$1\frac{7}{8}$	$3\frac{1}{8}$	$2\frac{3}{8} \times 1\frac{3}{8}$	5	15	0
$2\frac{1}{2}$	$1\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{3}{8} \times 2\frac{3}{8}$	6	2	6
3	$1\frac{3}{4}$	$4\frac{1}{8}$	$3\frac{1}{8} \times 3\frac{1}{8}$	6	10	0
4	$1\frac{1}{4}$	$5\frac{1}{8}$	$4\frac{1}{8} \times 3\frac{1}{8}$	8	0	0
5	2	6	$4\frac{3}{8} \times 3\frac{1}{8}$	10	0	0
6	$2\frac{1}{8}$	$8\frac{1}{8}$	7×5	16	5	0

Table of Distances for Cinematograph Lenses

WORKED OUT FOR A GATE APERTURE OF 9/10THS

Screen Distance in feet	FOCI IN INCHES														
	1 1/8	2	2 1/8	2 1/2	3	3 1/8	3 1/2	3 3/8	3 3/4	4	4 1/8	4 1/4	4 1/2	4 3/4	5
10	5.6	4.6	4.3	3.10	3.3	3.0	2.11	2.8	3.1	2.7	2.5	2.3	2.2	2.1	2.0
12	6.8	5.5	5.1	4.6	3.11	3.7	3.6	3.2	3.1	2.7	2.5	2.3	2.2	2.1	2.0
15	8.4	6.9	6.4	5.8	4.11	4.6	4.4	4.0	3.10	3.3	3.2	3.0	2.8	2.6	2.4
20	11.1	9.0	8.6	7.7	6.7	6.0	5.9	5.4	4.0	4.6	4.4	4.0	3.9	3.6	3.4
25	13.10	11.3	10.7	9.6	8.2	7.6	7.2	6.8	5.2	5.8	5.6	5.0	4.9	4.5	4.2
30	16.7	13.6	12.9	11.4	9.10	9.0	8.8	8.0	7.9	6.9	6.7	6.0	5.8	5.3	5.0
35	19.5	15.9	14.10	13.3	11.5	10.6	10.1	9.4	9.0	8.6	8.5	7.11	7.8	7.4	7.0
40	22.2	18.0	16.11	15.2	13.1	12.0	11.6	10.8	10.3	9.9	9.7	9.0	8.9	8.4	8.0
45	24.11	20.3	19.1	17.0	14.9	13.6	13.0	12.0	11.7	11.0	10.10	10.2	9.10	9.5	9.0
50	27.8	22.6	21.2	19.0	16.4	15.0	14.5	13.4	12.10	12.3	12.0	11.3	10.11	10.5	10.0
60	33.3	27.0	25.4	22.9	19.8	18.0	17.3	16.0	15.5	14.8	14.5	13.6	13.1	12.6	12.0
75	41.6	33.9	31.9	28.5	24.7	22.6	21.7	20.0	19.3	18.4	18.0	16.11	16.4	15.8	15.0
100	55.5	45.0	42.4	37.11	32.9	30.0	28.10	26.8	25.8	24.5	24.0	22.6	21.10	20.10	20.0

SIZE OF PICTURE.

MODEL "K1."

Busch Cinematograph Projection Lenses



Standard size. Diameter of Tube 42'5 m/m.

13 SIZES AS BELOW

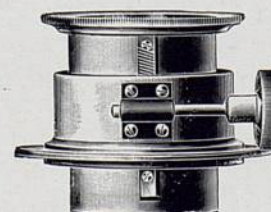
Equivalent Focus	PRICE In Tubes only
Inches	Each
2 1/8	£1 8s.
2 1/2	
2 3/4	
3	
3 1/8	
3 1/2	
3 3/4	
4	
4 1/8	
4 1/4	
4 1/2	
5	
5 1/2	
6	
7 1/4	

A Series of first quality Objectives constructed on the most approved formula for Cinematographs, giving a brilliant and well-illuminated picture with good marginal definition.

The Lenses are supplied mounted in Brass Cylinders or Tubes, and a Brass Rack and Pinion "Jacket" can be had separately.

Brass Jacket

FOR MODEL "K1."



Diameter of Flange opening, 2 inches.

With Single Rack and Pinion.

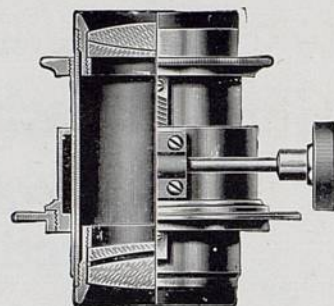
12/6 each.

MODEL "KINO"

Busch Cinematograph Projection Lenses

Double Illumination

Equivalent Focus	PRICE each
Inches	In cylindrical brass tubes 40/-
3	
3 $\frac{1}{2}$	
3 $\frac{3}{4}$	
4	
4 $\frac{1}{2}$	
5	

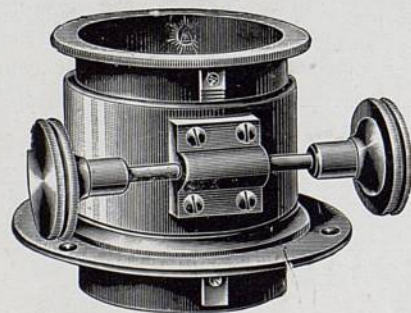


The Objectives of this series give an image twice as brilliant as that given by the ordinary patterns on the market.

The diameter of the lenses is 47 m/m and of the Brass Cylindrical Mount 52.5 m/m, which is the same size as the regular Lantern Lenses.

The Tubes will consequently fit any ordinary lantern jacket.

Brass Jacket



MODEL "KINO."

With double Rack and Pinion and Adapter for all foci.

17/6 each.

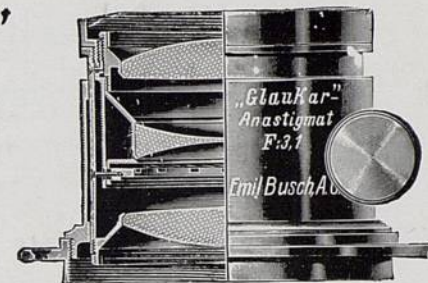
BRASS ADAPTER to enable the large "Kino" Jacket to be used on the flange of ordinary small Jacket ... **5/-** each.

BRASS ADAPTER to enable the "KI" Lenses to be used in the large "Kino" Jacket ... **7/6** ..

In using the "Kino" Large Aperture Lenses, it may be necessary with some machines to increase the width of shutter blades $\frac{1}{4}$ to $\frac{1}{2}$ an inch, so as to prevent any light due to the larger aperture of the lens passing on to the screen and producing what is termed a "Ghost."

When ordering adapters give the name of machine.

Busch "Glaukar" Cinematograph Projection Lenses



THE Optical system is the most important part of your apparatus, it being the means by which the picture is projected on the screen. It is also the most lasting and durable part of the machine.

In having the best lens that money can buy you are, therefore, studying economy, and at the same time giving the utmost satisfaction to your patrons.

The "Glaukar" Anastigmat is the most perfect of all lenses for Cinematograph Projection.

It is the very highest class of lens that modern science and optical skill can produce.

The corrections for astigmatism and curvature of the field secure the finest possible definition right to the extreme margin of the screen; a feature that will be appreciated especially in Halls where the conditions necessitate the use of a short focus lens.

Lenses of ordinary construction having a focal length less than about 3 inches cannot be made to give equal definition at the margins of the screen when a large picture is required, but the "Glaukar" will satisfy the most critical requirements in such cases.

Two series are made, Series II. in Cylindrical Tubes to fit Standard size Jackets with diameter of 42.5 m/m. and Series I. in Brass Mounts with Rack and Pinion.

No.	Focus	PRICE Series I.			PRICE Series II.		
		£	s.	d.	£	s.	d.
0	1 $\frac{1}{2}$	—	—	—	4	0	0
$\frac{1}{2}$	2	—	—	—	4	10	0
1	2 $\frac{3}{4}$	5	0	0	4	15	0
1 $\frac{1}{2}$	2 $\frac{1}{2}$	—	—	—	5	5	0
2	3 $\frac{1}{8}$	5	15	0	5	10	0
2 $\frac{1}{2}$	3 $\frac{1}{2}$	—	—	—	5	17	6
3	4 $\frac{1}{8}$	6	10	0	6	5	0
4	5 $\frac{1}{8}$	8	0	0			
5	6	10	0	0			



All the Series II. Lenses will fit the Standard size Jacket.

Brass Jackets for "Glaukar" Lenses, Series II. **12/6** each.

Table of Distances and Enlargement for Lantern Slides

Screen Distance in feet	FOCI IN INCHES														SIZE OF PICTURE.	
	4½	5½	6	7	8	10½	12	12½	14½	16	18	20	22	24	24	
10	7.1	5.6	5.0	4.3	3.9	2.11	2.6	2.1	1.10	1.8	1.8	1.6	1.4	1.3		
12	8.6	6.7	6.0	5.1	4.6	3.6	3.0	2.11	2.6	2.3	2.0	1.9	1.7	1.6		
15	10.7	8.2	7.6	6.5	5.8	4.4	3.9	3.8	3.1	2.9	2.6	2.3	2.0	1.10		
20	14.1	10.11	10.0	8.7	7.6	5.10	5.0	4.10	4.12	3.9	3.4	3.0	2.9	2.6		
25	17.8	13.8	12.6	10.10	9.4	7.4	6.3	6.1	5.2	4.8	4.2	3.9	3.5	3.1		
30	21.2	16.4	15.0	12.10	11.3	8.9	7.6	7.4	6.3	5.7	5.0	4.6	4.1	3.9		
35	24.8	19.1	17.6	15.0	13.1	10.3	8.9	8.7	7.3	6.7	5.10	5.3	4.9	4.4		
40	28.3	21.10	20.0	17.2	15.0	11.8	10.0	9.9	8.3	7.6	6.8	6.0	5.4	5.0		
45	31.9	24.6	22.6	19.3	16.10	13.2	11.3	11.0	9.4	8.5	7.6	6.9	6.1	5.7		
50	35.3	27.3	25.0	21.5	18.9	14.8	12.6	12.3	10.4	9.4	8.4	7.6	6.10	6.3		
60	42.4	32.9	30.0	25.9	22.6	15.0	14.8	12.5	11.3	10.0	10.0	9.0	8.2	7.6		
75	52.11	40.11	37.6	32.2	28.1	21.11	18.9	18.4	15.6	14.1	12.6	11.3	10.3	9.4		
100	70.7	54.6	50.0	42.10	37.6	29.3	25.0	24.6	20.8	18.9	16.8	15.0	13.8	12.6		

12

Busch Achromatic Double Lantern Objectives

SERIES V.

FOR LANTERN SLIDE PROJECTION
IN CYLINDRICAL MOUNTS



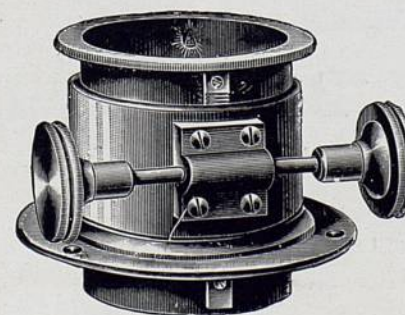
A Series of first quality Lantern Objectives for $3\frac{1}{4} \times 3\frac{1}{4}$ slides, giving fine definition right to the margin.

They are made to the standard size and will fit the regular Brass Rack and Pinion Jacket, as supplied with most lanterns.

Equivalent Focus	Back Focus	PRICE	Equivalent Focus	Back Focus	PRICE
Inches	Inches	Each	Inches	Inches	Each
5½	4	16/6	12½	10	16/6
6	4½		14½	12½	
7	5½		16	13½	
8	6½		18	16	
10½	8		20	18½	

Brass Jacket for Series V.

DIAMETER OF FLANGE OPENING,
 $2\frac{1}{2}$ INCHES.



With Double Rack and Pinion ... 17/6

Brass top with hinged flap "flasher" and slot for inserting coloured glasses, to fit on to jacket ... 6/-

Set of six different coloured glasses ... 2/-



Busch Achromatic Double Objectives

Giving Great Illumination

Model W. for lantern slide projection, in cylindrical mounts.

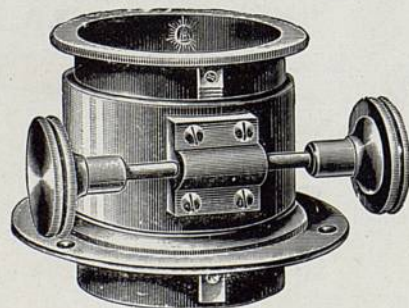
Diameter of lenses, $53/60$ m/m, outer diameter of Mount, 62.5 m/m.

THE illumination of this series is one and a half times greater than that of the ordinary lantern objective, a feature that will be found invaluable when a considerable separation of apparatus and screen necessitates the use of long focus lenses.

Owing to the large diameter of the lenses, the objectives of this series are extremely suitable for apparatus in which incandescent gas or paraffin light is used.

They can be used for any size plates from the ordinary lantern size, $3\frac{1}{4} \times 3\frac{1}{4}$ to $4\frac{1}{4} \times 3\frac{1}{4}$, and give an image sharply defined right up to the margin without distortion.

Equivalent Focus	Back Focus	PRICE
Inches	Inches	
4 $\frac{1}{2}$	2 $\frac{1}{2}$	40/-
7	5 $\frac{1}{2}$	
8	6 $\frac{1}{2}$	25/-
10	8	
12	9 $\frac{5}{8}$	
14	12 $\frac{1}{2}$	
16	14	
18	16	
20	18	
22	20	
25	22	



Brass Jacket

With double Rack and Pinion and Adapter for all foci ... 20/-

Brass top with "flasher" and slot for inserting coloured glasses 7/-

Set of six different coloured glasses ... 3/6

Busch Achromatic Lantern Projection Set

For Plates $3\frac{1}{4} \times 3\frac{1}{4}$

These Lenses are constructed on the Petzval Formula and mounted in Brass Cylinder Tubes, interchangeable, to fit the Jacket.

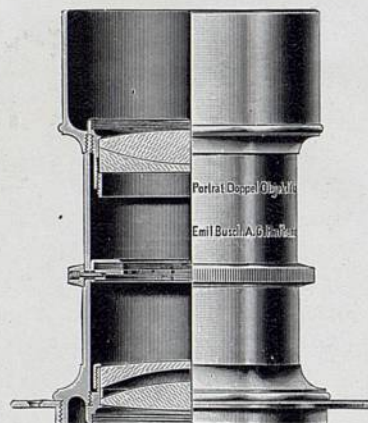


The Set consists of the following:

1. The Brass Jacket with Flange and double Rack and Pinion ... 16/6 each.
Extra Flange ... 3/- "
 2. Objectives in Brass Tubes; Lenses 2-in. diameter; Equivalent Focus, $5\frac{1}{2}$, 6, 7, 8, 10, 12, 14, 16 and 18 inches at ... 16/6 "
 3. Brass Top, with Flasher and Slot for the insertion of coloured glasses (made to fit easily to any of the objectives by means of a Bayonet Joint) ... 4/- "
 4. A set of six Coloured Glasses for projection purposes, in leather case ... 2/- "
- The Set as illustrated, consisting of Jacket and Flange, SIX OBJECTIVES, Top with Flasher, and Coloured Glasses, in Polished Wood Case ... £7 5 0
With Hinged Flap Flasher ... 2/- extra.

Busch Studio Portrait Lenses

NEW SERIES.



BUSCH PORTRAIT LENSES were amongst the earliest of those constructed on the Petzval Formula, they having been on the market upwards of 60 years.

Modern scientific knowledge combined with the production of new kinds of glass have enabled us to make certain alterations and improvements in the construction, particularly as regards the working aperture of those with longer focus. We have also added some larger sizes, so that the series now includes lenses up to 17 inches focus.

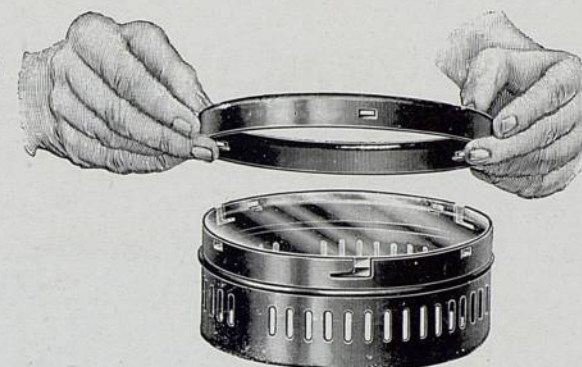
In the Mounts of the new series the Rack and Pinion has been discarded and Iris Diaphragms are fitted instead of the Waterhouse Stops as formerly.

No.	Focus	Aperture	For Pictures	Price
	Inches		Inches	£ s. d.
1	6 $\frac{1}{4}$	F/3	2 $\frac{1}{2}$ x 2 "Mignon"	5 10 0
2	7	F/3	3 $\frac{1}{2}$ x 2 $\frac{1}{2}$ C.D.V.	6 15 0
3	8	F/3	3 $\frac{1}{2}$ x 2 $\frac{1}{2}$ "	8 5 0
4	9 $\frac{3}{4}$	F/3.1	3 $\frac{1}{2}$ x 2 $\frac{1}{2}$ "	10 0 0
5	11	F/3.4	6 x 4 "Cabinet"	10 10 0
6	12 $\frac{1}{2}$	F/4	7 x 5 Promenade, Boudoir, Cabinet	11 0 0
7	15	F/4	8 $\frac{1}{2}$ x 6 $\frac{1}{2}$ "Imperial"	16 5 0
8	17	F/4	12 x 7 Royal, Panel	20 0 0

Condensers

In Brass Mounts

FOR
PROJECTION
AND
ENLARGING
APPARATUS



THE lenses of these Condensers up to 6 $\frac{1}{4}$ inches diameter are now made of absolutely colourless crown glass, which has the advantage of absorbing considerably less light than the glass generally used for Condensers. Consequently the image is whiter and more brilliant.

Owing to a special process of cooling, our Condensers made of crown glass have a greater power of resistance against changes of temperature, and are, therefore, cheaper in use than those of ordinary construction.

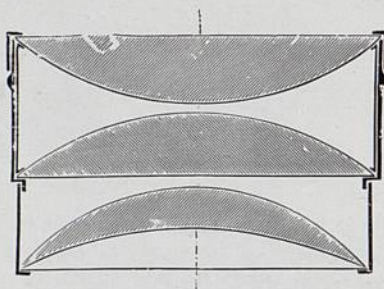
The mount is specially designed on the Bayonet Joint principle, enabling the operator to quickly and easily separate the parts of the Condenser.

To open the mounting, turn the cover cell to the left by means of three nipples up to the pins and then pull out. To close it, place the cover cell so that the pin can enter the slot and then turn to the right.

Diameter of Lenses	Back Focus	PRICE	Diameter of Lenses	Back Focus	PRICE
Inches	Inches	£ s. d.	Inches	Inches	£ s. d.
4	2 $\frac{3}{4}$	0 18 0	6 $\frac{1}{4}$	5	1 13 0
4 $\frac{1}{8}$	3	0 18 6	7 $\frac{1}{8}$	5 $\frac{3}{8}$	1 18 0
4 $\frac{3}{8}$	3	1 0 0	7 $\frac{1}{2}$	6	2 13 0
4 $\frac{1}{2}$	3	1 1 6	8 $\frac{1}{4}$	6 $\frac{1}{2}$	3 6 0
4 $\frac{3}{4}$	3 $\frac{1}{8}$	1 3 0	9 $\frac{1}{4}$	6 $\frac{3}{4}$	3 18 0
5 $\frac{1}{8}$	3 $\frac{1}{2}$	1 5 0	9 $\frac{3}{8}$	6 $\frac{1}{4}$	4 13 0
5 $\frac{1}{2}$	4	1 7 6	11 $\frac{1}{8}$	8 $\frac{1}{4}$	7 12 0
5 $\frac{3}{8}$	4	1 10 0			

Triple Condensers

In Brass Mounts



The lenses consist of two Plano-Convex Condenser Lenses with the addition of a Periscopic or Meniscus Lens, which can be easily detached and the ordinary Plano-Convex combination used alone.

The advantage of the additional lens is that, according to circumstances, the amount of light given is from two to five times greater than that given by the ordinary Condenser of two Plano-Convex Lenses.

Diameter of Lens	Back Focus		PRICE
	With Periscopic Lens	Without Periscopic Lens	
Inches	Inches	Inches	£ s. d.
4 $\frac{3}{8}$	1 $\frac{3}{8}$	3 $\frac{1}{8}$	1 18 0
4 $\frac{3}{4}$	1 $\frac{3}{8}$	3 $\frac{1}{8}$	2 0 0
6 $\frac{1}{4}$	3	5	2 17 0
9 $\frac{1}{4}$	3 $\frac{1}{8}$	6 $\frac{1}{8}$	5 12 0

The diameter of Periscopic Lens is a trifle smaller than the Plano-Convex Lenses.

Unmounted Condenser Lenses

FOR PROJECTION AND ENLARGING APPARATUS



Plano-Convex

Diameter of Lenses	Focus	PRICE		
Inches	Inches	£	s.	d.
4	7 $\frac{1}{8}$	0	7	9
4 $\frac{1}{8}$	7 $\frac{1}{8}$	0	8	0
4 $\frac{3}{8}$	7 $\frac{1}{8}$	0	8	9
4 $\frac{1}{2}$	7 $\frac{1}{8}$	0	9	6
4 $\frac{3}{4}$	7 $\frac{1}{8}$	0	10	3
5 $\frac{1}{8}$	7 $\frac{1}{8}$	0	11	3
5 $\frac{1}{4}$	9 $\frac{1}{8}$	0	12	6
5 $\frac{3}{8}$	9 $\frac{1}{8}$	0	13	6
6 $\frac{1}{8}$	11 $\frac{1}{8}$	0	15	0
7 $\frac{1}{8}$	12 $\frac{1}{8}$	0	17	0
7 $\frac{3}{8}$	13 $\frac{3}{8}$	1	3	6
8 $\frac{1}{4}$	14 $\frac{3}{8}$	1	10	6
9 $\frac{1}{4}$	14 $\frac{3}{8}$	1	15	0
9 $\frac{3}{8}$	15 $\frac{1}{4}$	2	1	6
11 $\frac{1}{8}$	19	3	10	0

Unmounted Periscopic or Meniscus Lenses

FOR TRIPLE CONDENSERS

4 $\frac{1}{4}$ inches diameter	-	-	-	12/- each.
4 $\frac{3}{8}$ " "	-	-	-	12/6 "
6 " "	-	-	-	15/6 "
9 " "	-	-	-	31/- "

