Film-Tech

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The Simplex

De Luxe Projector

MADE AND GUARANTEED BY

THE PRECISION MACHINE CO. INC.

317 East 34th St. New York

OFFICES AND FACTORY OCCUPY 25,100 SQUARE FEET

The Simplex TRADE MARK PAT'D De Luxe Projector

LICENSED BY THE MOTION PICTURE PATENTS COMPANY AND PROTECTED BY UNITED STATES AND FOREIGN PATENTS OWNED BY THE PRECISION MACHINE COMPANY, INC.

APPROVED FOR MOTOR OR HAND DRIVE BY UNDERWRITERS' LABORATORIES, INC.—NATIONAL BOARD OF FIRE UNDERWRITERS—THE MASSACHUSETTS DISTRICT POLICE—ELECTRICAL INSPECTION DEPARTMENTS OF NEW YORK, CHICAGO, WASHINGTON, D. C., PHILADELPHIA AND OTHER PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

CATALOGUE 1914-15

DESTROY ALL PREVIOUS ISSUES

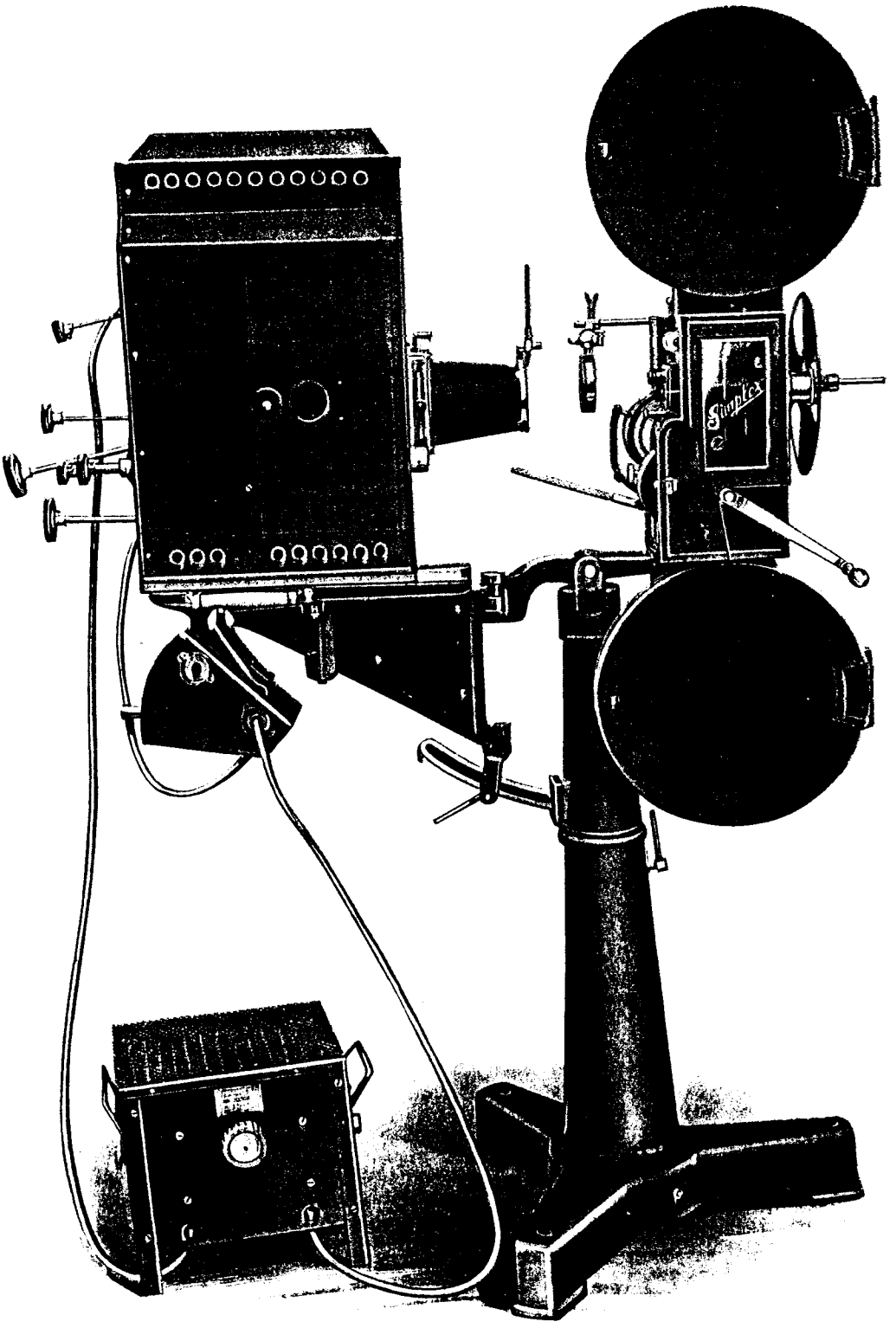
ACCURATE MACHINES FOR TAKING AND PROJECTING MOTION PICTURES

FOR DESCRIPTION OF SIMPLEX CAMERA, SEE PAGE 28

MADE AND GUARANTEED BY

THE PRECISION MACHINE CO. INC.

317 East 34th St. New York



THE SIMPLEX PROJECTOR

Introduction

IN presenting this catalogue, we are directing attention to a projector which has successfully competed with all types of American and European machines and which, by sheer merit alone, has won the title "Peerless Projector."

In this catalogue we endeavor to present in a generously illustrated form and as completely as space permits, an exhaustive description of our well known Simplex Projector, camera and accessories.

The Simplex Projector was placed on the market in the Fall of 1911. Since then we have tripled our floor space and equipment and increased our rate of manufacture until now we have one of the largest factories in the world devoted exclusively to the manufacture of motion picture apparatus.

Although the Simplex Projector has been on the market only three years, the inventor who created it and dominates its construction today has been unceasingly engaged in this profession since its practical inception in 1897. Operators of many years' experience have wrought their knowledge and ability into the design of the Simplex Projector, so that we are amply justified in saying that its existence is not antedated by any machine on the market.

Our host of satisfied customers have made the Simplex machine popular, and to them we are deeply indebted. Our appreciation can best be expressed through our constant effort to improve the standard of our output.

It is interesting to note that over 75 per cent of our machines are purchased by experienced exhibitors who have used practically all other makes of machines and found that the Simplex accomplishes the high standard of projection which they have heretofore sought in vain.

We deem it a pleasure to answer any specific questions regarding our machine, or the art of projection, and solicit correspondence from those who are desirous of more knowledge on these subjects.

New York, N. Y.

THE PRECISION MACHINE CO. INC.

Conditions of Sale

ORDERING Specify whether goods are to be shipped by freight, express or parcel post. Rail shipments should be accompanied by routing. In the absence of such instructions, we will use our own discretion, endeavoring at all times to give our customers prompt service at a minimum of expense.

VERBAL OR TELEGRAPHIC ORDERS should always be confirmed in writing.

TERMS Remittance with order, less 5 per cent; or C. O. D. upon receipt of 25 per cent of the amount of the purchase price to guarantee transportation charges, cartage and packing. Remittance should be in the form of New York draft, postal or express money order.

DELIVERY F. O. B. New York City. No extra charge for cases or packing, except for special apparatus.

TRANSIT All goods are sent at consignee's risk. Every care is taken in packing, and we do not hold ourselves responsible for loss or damage in transit. Customers should make such claims on carriers.

FOREIGN SHIPMENTS Packed for export, F. O. B. New York City. New York draft with order, or cash upon delivery to steamer or forwarding agent.

CABLE ADDRESS "Presimplex."

CODE A. B. C., 5th Edition, and Western Union.
We do not ship goods on approval.

GUARANTEE We guarantee all Simplex machines and accessories to be free from defects of workmanship and material. Any part of the mechanism which becomes worn out in service, or any part of the entire machine which shows a defect of any kind within one year from date of sale, will be replaced by us, without charge, if such part is returned to us, charges prepaid, for inspection.

RETURNING GOODS All claims for shortage, etc., to receive recognition, must be made in writing accompanied by packing slip, within five days after receipt of goods.

Always notify before returning anything to us, mentioning the article, stating date of invoice and through whom purchased.

Mark all goods legibly with tag bearing your name and address.

Use the same care in packing goods for returning, that we do in shipping to you.

Making of the Perfect Projector

FOR the benefit of those operators and exhibitors who are not familiar with the detailed construction of the Simplex Projector and for those who still doubt its pre-eminent points of superiority, we offer for perusal, several descriptive articles under the above heading.

We have precise machinery to turn out precision work. This, together with our thorough knowledge of what is required of a motion picture machine, has enabled us to present to the patrons of motion picture houses a quality of projection heretofore unknown.

The degree of success to be attained by the theatrical proprietor depends, to a large extent, upon the manner in which his individual enterprise is conducted. It should be borne in mind that the first requisite for conducting a first-class photoplay theater is the projecting machine, for if the projection is not perfect, success cannot be hoped for. It is of vital importance, in order that the projector may work at its highest efficiency, that it be properly cared for by a competent operator who takes pride in his work.

We believe it will benefit every exhibitor and operator, regardless of whether he be about to buy a new machine, to carefully study the making of the Simplex Projector.

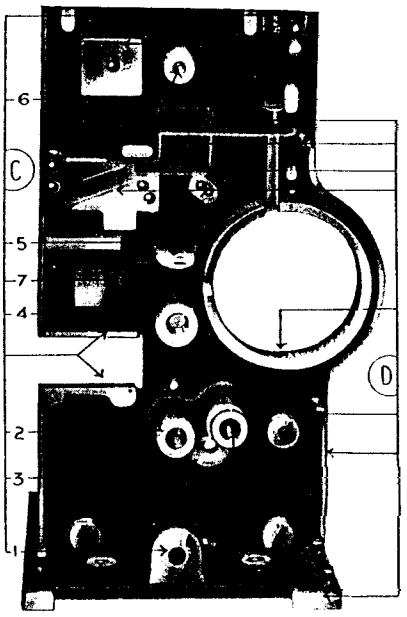


PLATE X

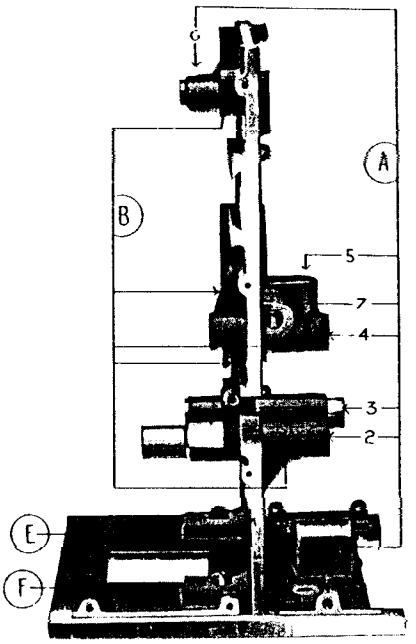


PLATE XX

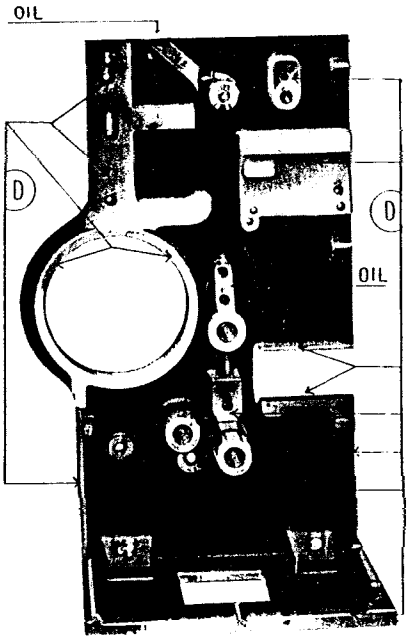


PLATE XXX

These illustrations, X—XX—XXX, represent the *center frame* upon which depends the correct working of the entire mechanism. It is made of close grain grey cast iron, the patterns being designed to reinforce all parts liable to strain in machining or use. It is then japanned before machining.

Cast iron, as a bearing metal, is recognized the world over as being par excellence. It is semi-porous, thereby retaining a quantity of oil, and causing a glazed surface to be formed by the revolving shafts of tool steel.

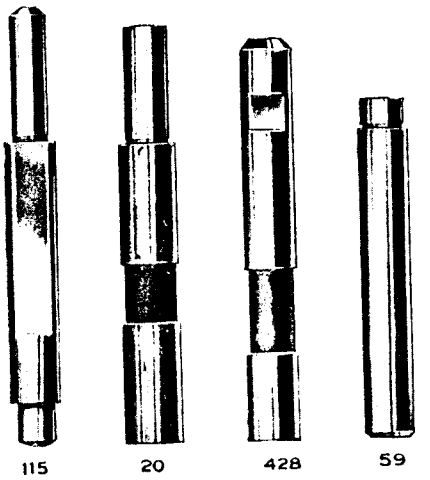
The reproductions above show at a glance the amount of machine work—such as milling and profiling, illustrated by letter "D," drilling and reaming, "C"—which is necessary in its manufacture.

Each operation must be perfect in itself or the finished piece will be rejected by the chief inspector, who makes a final and rigid inspection.

The bearings No. 1 motor drive stud, No. 2 main drive shaft, No. 3 lower feed sprocket shaft, No. 4 intermediate shaft, No. 5 vertical shaft, No. 6 top feed sprocket shaft, No. 7 framing slide cam arm, are of generous length, as shown by "A"—large in diameter "C" and are drilled and reamed to exact size. The large bearing as shown on plates X and XXX is for the framing cam, into which fits the intermittent casing.

Making of the Perfect Projector

Shafts



IN explaining the making of the shafts for use on the Simplex, note they are exceptionally large in diameter, and consequently much heavier than those used on most projecting machines.

All are made of tool steel; and after turning, they are carefully ground to within limits of 1-5000 inch, which insures great accuracy. Where high speed duty is required, they are hardened to minimize wear.

These shafts of tool steel revolve in bearings of cast iron, unusually long, in the center frame. Cast iron retains a certain quantity of oil, thereby reducing friction to a minimum and eliminating the possibility of the shafts getting out of alignment.

Shutter Shaft D 133½, the longest on the projector, is 8⅜" long by ⅜" in diameter. It is supported by two bearings, each 1" long. The only weight on this shaft is an aluminum shutter which is perfectly balanced and weighs 6 ozs.

11, main driving shaft, is one of the largest in diameter used on any projecting machine; it is ½" in diameter and 7 1/16" long. On this shaft fit two clutches to hold the main driving gear and the driving crank. Unlike other projectors, the take-up is driven from this shaft.

23, the vertical shaft is one of the smallest sizes (6" long, 5/16" diameter), and is supported by two bearings; its purpose is to support the bevel gears for driving the shutter, the upper feed sprocket, and holding the centrifugal governor, which operates the fire shutter.

37, the lower feed sprocket shaft, is ½" in diameter and exceptionally long (5 9/16").

A glance at the cut will convince the most skeptical how much the Simplex differs from any other projector, as shaft 37 is several times larger than the corresponding shaft on any other machine. 30 is one of the smaller (3⅝" long, 5/16" diameter), and is the top feed sprocket shaft; it is made of tool steel, pack hardened.

115 is the spiral driving gear shaft of the shutter bracket. The sides of this shaft are ground flat to permit the fitting of the hardened spiral gear which operates the shutter when framing the picture. (Length 3⅝", diameter 7/16".)

20 is the intermediate gear shaft and is ½" in diameter and 3⅝" long.

The previous size of this shaft was 7/16" diameter and 3" length. This is only one instance in which we have increased Simplex cost instead of cheapening it. This shaft is pack hardened.

428, motor drive pinion stud, is 7/16" in diameter and 3½" long, and is held to the center frame by a boss on the casting, 1¼" long. This shaft is hardened and ground, and its duty is to support the motor drive pinion, which meshes into the main driving gear.

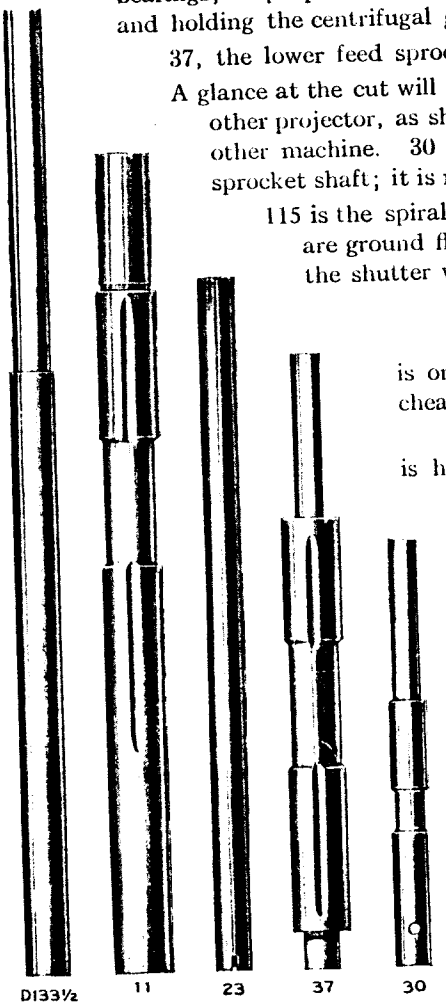
59 is the flywheel shaft which carries spiral cut gear No. 61 and the flywheel on the intermittent box. (Length 3", diameter 7/16".)

Shafts Nos. 37, 115, 20 and 59 are sold only with the gears.

The starwheel shaft and star is cut from one solid piece; it is 3" long, and 15/64" in diameter. Starwheel cam and shaft are likewise cut from one piece, and is 2 5/16" long by 5/16" in diameter.

The slideover arm, not illustrated, which actuates the gears on the shutter bracket, is 2¼" long and 7/16" in diameter.

All of the shafts are grooved to permit oiling of the entire length, which is so essential. At every step in the making and grinding of these shafts, they are carefully inspected by experts and measured with micrometers, thus insuring to operators and exhibitors, interchangeability of parts.



Making of the Perfect Projector

Gears

AN important factor in the successful operation of a motion picture machine, and one which has been the subject of much criticism in recent years, is the gears. In designing the Simplex projector we have constructed a machine with the least number of gears possible, and have placed them in a center line position. The gears and pinions on our machine are generated from cast iron, tool steel, and phosphor bronze blanks which, after turning, are carefully ground and tested for accuracy with micrometers up to 1-5000 of an inch. The machines we use for generating our gears are recognized in the mechanical engineering world as the most accurate of their kind.

All the gears on the Simplex projector (with the exception of the lower feed sprocket, gear 38, and the internal of the main driving gear) are spiral cut to diminish the noise and obviate the back lash; and, after being assembled on the projector, they are ground into a perfect mesh with glass, stone and oil. This, with the pitch and the number of teeth used, permits an even transmission of power with the least possible friction and insures longer wearing qualities.

Main driving gear 6 or 600½ are fair samples of our workmanship; both internal and external gears are cut from one solid blank of cast iron. Lower feed sprocket gear 38 meshes into main driving gear.

600½ carries a sprocket on the outside face for driving the chain take-up for the 2000-foot reels instead of carrying a pulley as used for the regular belt drive.

Intermediate driving gear 604 consists of a large gear 19, inside bevel gear 19½, steel pinion 21 and a hardened shaft 20, all of which are set into a special fixture on an arbor press and forced together, thus forming practically one solid gear.

Motor drive pinion 750 meshes into main driving gear 6, and, as you will note, is geared down to a ratio of 5 to 1. On account of the low gearing a minimum amount of power is required to drive the mechanism. The pulley carries two grooves for belt connection with an idler pulley on the pedestal.

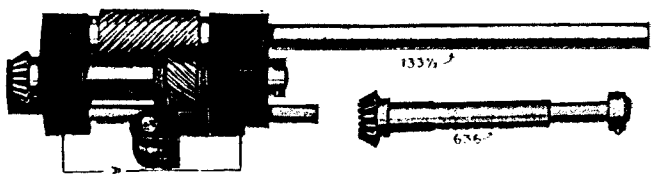
Complete shutter gear bracket 634 comprises gears 117 and 120, driving bevel gear and shaft 636 and shutter shaft 133½. Gear 117 is actuated on the shutter gear bracket by a slide, which is supported by a guide.

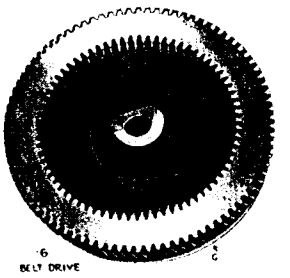
Bevel gears 25 and 31 drive the upper feed sprocket shaft. Bevel gears 23½ and 24 are attached to the vertical shaft 23, and their duty is to transmit power from intermediate gear 604 to vertical shaft and shutter driving gears.

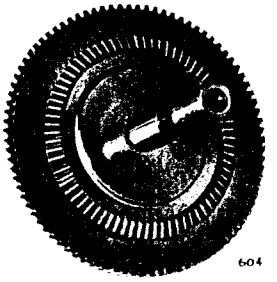
The automatic fire shutter, as used on the Simplex projector, is actuated by a centrifugal governor, illustrated by 84, 87 and 88. This type of governor is entirely free from friction, and places no tension upon the operation of the machine. In fact, it assists to balance the upper train of gears. The governor is supported to shaft 23 by top link holder 88, and two steel links which are securely fastened to the governor weights by link screws. 84, governor lift, which trips the lever of the automatic fire shutter when the machine is operating, is secured to the governor by two links.

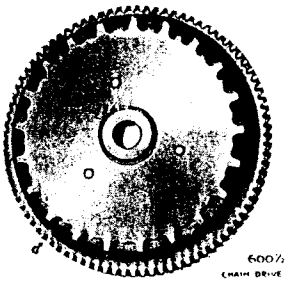
This type of centrifugal governor is extremely simple, and operates without springs, rollers, etc. Mechanical Engineers attest to its reliability.

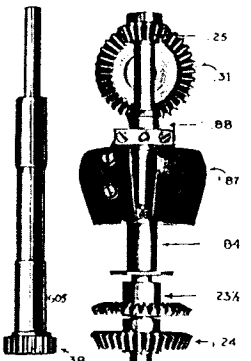
Complete Shutter Gear Bracket 634

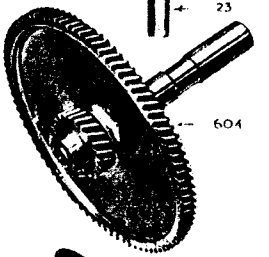


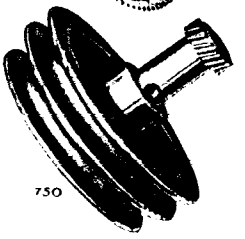






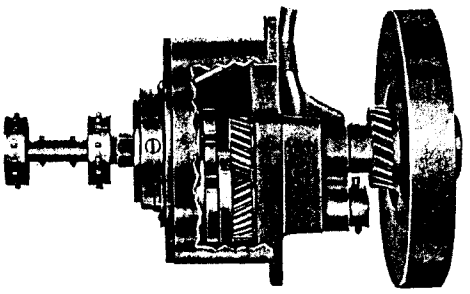






Making of the Perfect Projector

Intermittent Movement



Case Broken to Show Interior

THE intermittent movement, the most important part of a projection machine mechanism, is of the well known Geneva type, consisting of a star and cam, operating in a box filled with oil, which prevents friction, reduces wear and eliminates noise. As long as a sufficient quantity of oil is present in the box, the adjustment practically requires no attention and wear is eliminated; see page 24.

The advantageous points of the Simplex intermittent movement may be summed up in extreme accuracy, design of the highest efficiency, noiseless operation, long life, accessibility and simplicity.

Oiling of the star, cam and flywheel, shaft and gears, is accomplished through oil tubes leading to the bearings. Also the cam operates on a system commonly termed the splash feed, which keeps a stream of oil playing on the gears and the Geneva movement.

The intermittent case is made in two pieces (Box 49 and screw cover 50) of close grain grey cast iron, in which vanadium is mixed.

The intermittent movement is perfectly balanced, as may be readily ascertained by a glance at illustrations.

The framing of the film is accomplished by advancing or retarding the intermittent movement by a clever, reliable framing device for turning the intermittent box forward or backward; the revolving shutter by a simple cam system, synchronizing automatically. By this construction the intermittent sprocket is always in line with the film and the feed sprockets, both vertically and horizontally, and revolves in its own center; as there is no moving carriage, the possibility of losing the lower loop is eliminated.

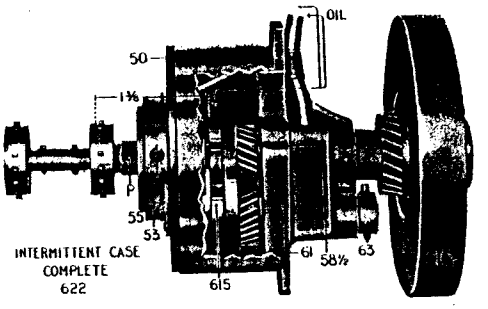


Plate B1

The gears 58½, 61, illustrated on Plate B1, are of tool steel, spiral cut, pack hardened and ground into a perfect mesh, so as to roll together without the slightest friction. They are attached to the flywheel and cam shafts by a jig which sets them accurately in place.

Bearing 54 of the intermittent sprocket shaft 67 is of machine steel, into which is set a pack hardened, ground and lapped steel bushing 1⅜″ long and ⅝″ in diameter, as illustrated on Plates B1 and B2. By loosening two set screws 55 Plate B1, visible on the cover of the oil box, and using wrench 614 Plate B2 over the hexagon head of the eccentric bushing, the relative position of the star to the cam can be adjusted on the Simplex with far greater ease and precision than on ordinary projecting machines, because of the one bearing.

Starwheel and shaft 67, cam and shaft 615, are made from a special drop forging of tool steel, and are cut on specially designed machines, requiring the most careful workmanship and skill to produce accurately to within 1-10000″ limit.

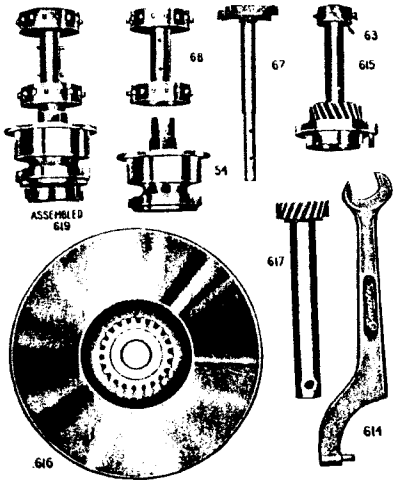
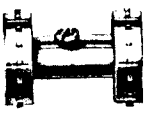


Plate (Parts) B2

The starwheel shaft is small in diameter, which reduces the weight to a minimum, so that when turned and stopped 16,000 times during the projection of a 1000-foot reel of film, the back lash, which causes vibration, is eliminated. The lightness of this shaft and the intermittent sprocket is of obvious advantage and accomplishes steadiness due to the slight momentum developed in it on each impulse of the cam.

The teeth of intermittent sprocket 68, feed sprocket 40, illustrated, are cut involute, the most perfect form for film contact—a feature vitally important in obtaining the rock-steady perfect projection, for which the Simplex machine is famed.

The entire intermittent movement, as illustrated, can be removed from the mechanism and replaced in two minutes by loosening four screws. This enables the exhibitor to obtain an extra framing device or practically the equivalent of an extra mechanism for only $30.



No. 40

Making of the Perfect Projector

Film Trap

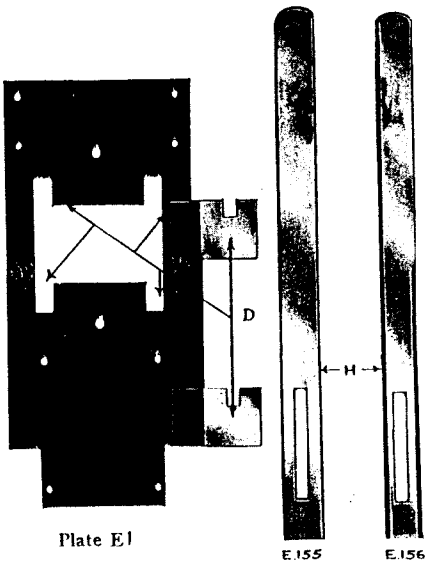


Plate E1

ORIGINALITY and efficiency of the design of the Simplex Film Trap have been the subject of much praise from experienced operators.

Two most important features are: First, the fact that the tension is on the polished or celluloid side of the film, thus insuring an even pressure; second, that a slight upward lift removes the gate quickly, permitting the easy cleaning of any emulsion or foreign matter from shoes 155 and 156.

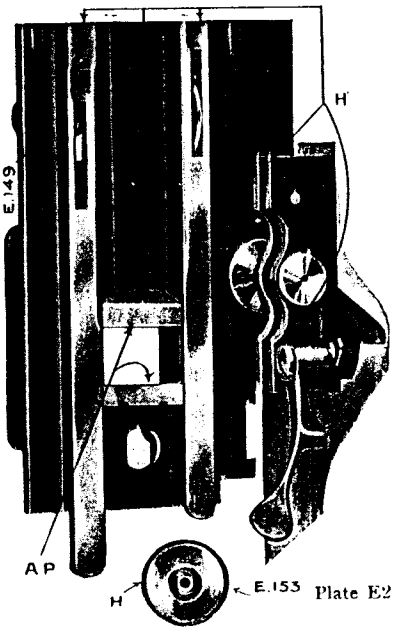


Plate E2

The Gate (illustration E1) is made of machine steel, the lugs securing the Gate to the holder being electrically welded, forming one solid piece. "D" shows the milling machine work, painstakingly done to rough out the steel blanks.

Film Trap Shoes (155, 156, Plates E1, E3) are of steel, pack hardened, ground on both sides and beveled ("H," Plate E1) to permit sliding into the dove tail slots (E2) with ease and exactness. There can be no warping of the film trap shoes, as they are securely fastened to the aperture casting. These features, and the unusual care and precision with which each part is made and assembled, show you their remarkable durability, lasting qualities and efficiency.

The lateral guide rollers (153, E2, E4) are of steel, hardened and ground ("H," Plate E2), thereby insuring perfect accuracy and exceptional wearing quality, resulting in the absolutely straight guiding of the film into the film trap. The film cannot pass the guide rollers unless it is set between the two. If it should not be it automatically rights itself. The distance between the rollers can be adjusted at will by set collar (153½, E).

The Gate (641, Plate E3) is opened for threading by a light inward pressure on thimble (167, Plate E4) and is closed by releasing film trap door trip lever (645, Plate E3). Thus in threading there are only two operations: one to open, one to close gate, as compared with four operations necessary on other projectors. The intermittent sprocket tension shoe (646) is made of ten pieces of tool steel, each hardened, ground, polished, and securely riveted together to form one solid piece. The two inside shoes are offset and do not touch the film.

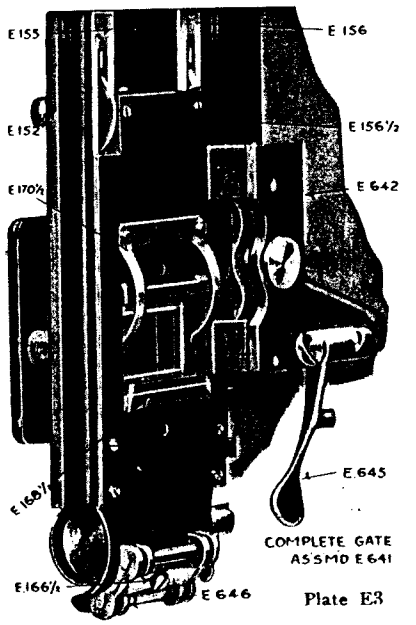


Plate E3

To safeguard against accidents, the cooling plate (648A, E4) is made of two pieces of sheet steel, separated ¼ inch, which arrests the heat by radiation and protects the fire shutter and aperture side of the film trap. The air space between the automatic fire shutter and film is ½". This prevents the firing of the film when the spot is allowed to strike the shutter.

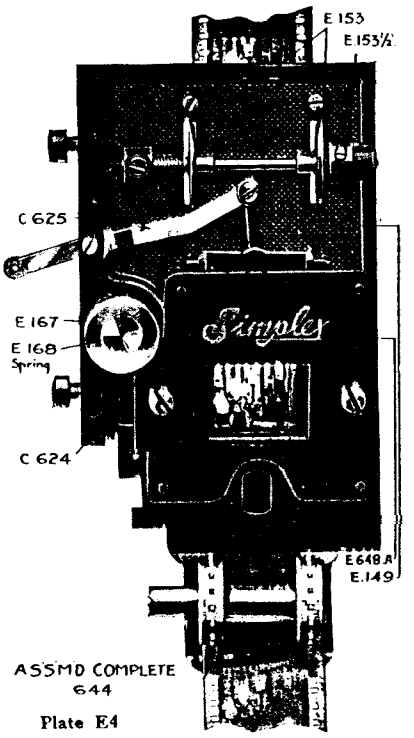
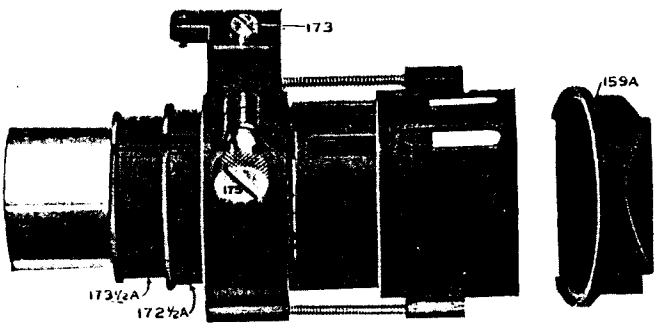


Plate E4

Making of the Perfect Projector

Lens Holders

THE superiority of the arrangement of the lens holders and focusing devices on the Simplex projector are such that the lenses are always held absolutely parallel with the aperture plate.



FILM PROTECTOR COMPLETE WITH TWO ADAPTERS-650

Plate F

The film protector and projecting lens holder 650 are made of a suitable metal, and are securely held in the mechanism by set screw 173. The ordinary projection lens is fitted into the adaptor 173½, which is securely clamped and held parallel with the aperture plate by screw 175. When a No. 1 Gundlach or Simplex De Luxe lens is used, adaptor 173½ is removed, and the lens tube inserted into adaptor 172½ as illustrated on Plate F.

When one-half size lens is used, as shown on Plate F3, the rear end cell must be threaded so that the connectors can be secured to the lens to hold it in the projection lens holder.

The connector 175½ is for 5½″ one-half size lens, and is fitted into projecting lens holder by removing both adaptors and inserting small end. The extension collars 1, 2, 3, 4 and 5 are for lenses of longer focus, being used to extend the lens further away from the film.

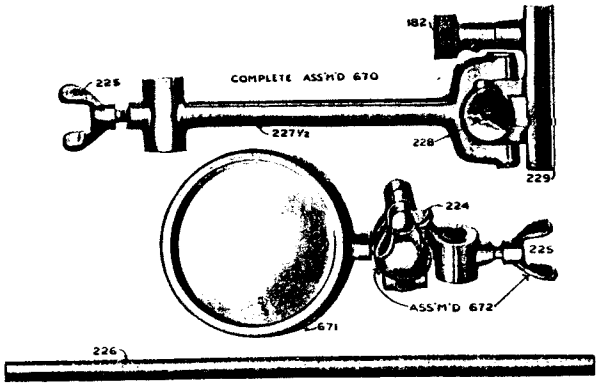


Plate F2

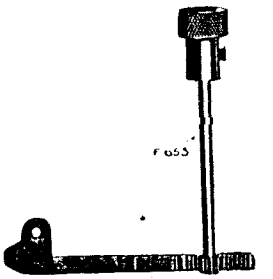


Plate F1

A novel arrangement for focusing, located on the left hand side of the machine, convenient for the operator, is shown on Plate F1. The rack 180 is fastened to the lens holder and film protector 650 by a set screw which travels in a milled groove on the center frame. Figure 653, focusing pinion and shaft, are cut from one piece of tool steel, thereby obviating the possibility of the gear becoming loose upon the shaft.

The focusing pinion adjust screw 182 has a knurled head so that it can easily be gripped between the thumb and index finger for exact focusing. This focusing arrangement is an exclusive feature, to be found only on the Simplex machine.

The stereo. lens holder, as illustrated on Plate F2, is made of coarse grained cast iron, carefully machined, all bearings drilled and reamed. The single glass stereo. lens is furnished with the Simplex projector, and is clamped into the holder. Adjustments are simple and their accessibility is almost self-explanatory, as the ball and socket joint, 672, and wing screws, 225 and 228, permit a lateral or horizontal movement of any part of the lens or holder.

The method of exact focusing is similar to that of the projection lens, and is accomplished by turning the knurled screw, 182, which is to be found next to the projection lens focusing knob.

Write for prices of Simplex De Luxe Lenses.

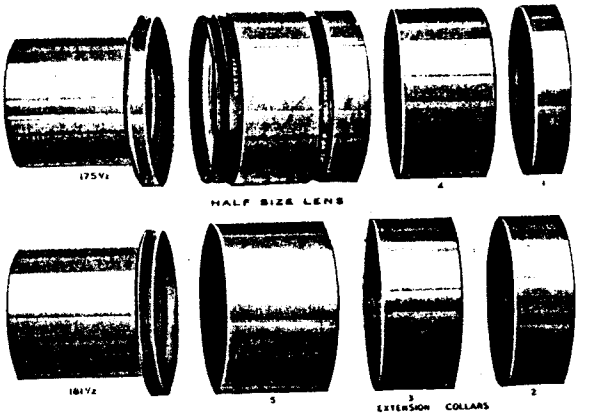


Plate F3

TABLE OF PROJECTION CALCULATIONS

BASED ON PROJECTOR APERTURE OPENING 29/32 INCH WIDE (.906")

DISTANCE FROM FILM IN APERTURE TO CENTER OF SCREEN IN FEET

E.F., in inches: Stereo Lens	Motion Picture Lens		15	20	25	30	35	40	45	50	52	54	56	58	60
8	2	Width	6.72	8.99	11.25	13.52	15.78	18.05	20.31	22.58	23.49	24.39	25.30	26.20	27.11
		Height	5.04	6.74	8.44	10.14	11.84	13.54	15.24	16.93	17.61	18.29	18.97	19.65	20.33
8½	2⅛	Width	6.32	8.45	10.58	12.72	14.85	16.98	19.11	21.25	22.10	22.95	23.81	24.66	25.51
		Height	4.74	6.34	7.94	9.54	11.15	12.74	14.34	15.94	16.57	17.21	17.85	18.49	19.13
9	2¼	Width	5.97	7.98	10.00	12.01	14.03	16.04	18.05	20.07	20.87	21.68	22.48	23.29	24.10
		Height	4.48	5.99	7.50	9.01	10.52	12.03	13.54	15.05	15.66	16.26	16.87	17.47	18.07
9½	2⅜	Width	5.65	7.56	9.47	11.37	13.28	15.19	17.10	19.01	19.77	20.53	21.29	22.06	22.82
		Height	4.24	5.67	7.10	8.53	9.96	11.39	12.83	14.26	14.83	15.40	15.97	16.55	17.12
10	2½	Width	5.36	7.17	8.99	10.80	12.61	14.42	16.24	18.05	18.77	19.50	20.22	20.95	21.67
		Height	4.02	5.38	6.74	8.10	9.46	10.82	12.18	13.54	14.08	14.62	15.17	15.71	16.26
10½	2⅝	Width	5.10	6.83	8.55	10.28	12.00	13.73	15.46	17.18	17.87	18.56	19.25	19.95	20.64
		Height	3.83	5.12	6.42	7.71	9.01	10.30	11.60	12.89	13.41	13.93	14.45	14.96	15.48
11	2¾	Width	4.87	6.52	8.17	9.81	11.46	13.11	14.76	16.40	17.06	17.72	18.38	19.04	19.70
		Height	3.65	4.89	6.12	7.36	8.59	9.83	11.06	12.30	12.79	13.29	13.78	14.28	14.77
11½	2⅞	Width	4.65	6.23	7.80	9.38	10.95	12.53	14.11	15.68	16.31	16.94	17.57	18.20	18.83
		Height	3.49	4.67	5.85	7.04	8.22	9.40	10.58	11.76	12.24	12.71	13.18	13.66	14.13
12	3	Width	4.46	5.97	7.48	8.99	10.50	12.01	13.52	15.03	15.64	16.24	16.85	17.45	18.05
		Height	3.34	4.47	5.61	6.74	7.87	9.00	10.14	11.27	11.72	12.18	12.63	13.08	13.54
12½	3⅛	Width	4.28	5.73	7.18	8.63	10.08	11.53	12.98	14.43	15.01	15.59	16.17	16.75	17.33
		Height	3.21	4.30	5.39	6.47	7.56	8.65	9.74	10.82	11.26	11.69	12.13	12.56	13.00
13	3¼	Width	4.11	5.50	6.90	8.29	9.69	11.08	12.48	13.87	14.43	14.98	15.54	16.10	16.66
		Height	3.08	4.13	5.17	6.22	7.26	8.31	9.35	10.40	10.82	11.24	11.65	12.07	12.49
13½	3⅜	Width	3.95	5.29	6.64	7.98	9.32	10.66	12.01	13.35	13.89	14.42	14.96	15.50	16.03
		Height	2.96	3.97	4.97	5.98	6.99	8.00	9.00	10.01	10.41	10.81	11.22	11.62	12.02
14	3½	Width	3.81	5.10	6.40	7.69	8.99	10.28	11.58	12.87	13.39	13.91	14.43	14.96	15.46
		Height	2.86	3.83	4.80	5.77	6.74	7.72	8.69	9.66	10.05	10.43	10.82	11.21	11.60
14½	3⅝	Width	3.67	4.92	6.17	7.42	8.67	9.92	11.17	12.42	12.92	13.42	13.92	14.42	14.92
		Height	2.76	3.70	4.64	5.57	6.51	7.45	8.39	9.32	9.70	10.07	10.45	10.82	11.20
15	3¾	Width	3.55	4.76	5.97	7.17	8.38	9.59	10.80	12.00	12.49	12.97	13.46	13.94	14.42
		Height	2.66	3.57	4.47	5.38	6.28	7.19	8.10	9.00	9.37	9.73	10.09	10.45	10.82
15½	3⅞	Width	3.45	4.60	5.77	6.94	8.11	9.28	10.45	11.62	12.08	12.55	13.02	13.49	13.95
		Height	2.58	3.46	4.35	5.21	6.09	6.97	7.84	8.72	9.07	9.42	9.77	10.12	10.47
16	4	Width	3.32	4.45	5.59	6.72	7.85	8.98	10.12	11.25	11.70	12.16	12.61	13.06	13.52
		Height	2.49	3.34	4.19	5.04	5.89	6.74	7.59	8.44	8.78	9.12	9.46	9.80	10.14
16½	4⅛	Width	3.22	4.32	5.42	6.52	7.61	8.71	9.81	10.91	11.35	11.79	12.23	12.67	13.11
		Height	2.42	3.24	4.06	4.89	5.72	6.54	7.36	8.19	8.52	8.85	9.18	9.51	9.83
17	4¼	Width	3.12	4.19	5.25	6.32	7.38	8.45	9.52	10.58	11.01	11.44	11.86	12.29	12.72
		Height	2.34	3.14	3.94	4.74	5.54	6.34	7.14	7.94	8.26	8.58	8.90	9.22	9.54
17½	4⅜	Width	3.03	4.07	5.10	6.14	7.17	8.21	9.24	10.28	10.69	11.11	11.52	11.94	12.35
		Height	2.27	3.05	3.82	4.60	5.38	6.15	6.93	7.71	8.02	8.33	8.64	8.95	9.26
18	4½	Width	2.95	3.96	4.96	5.97	6.98	7.98	8.99	10.00	10.40	10.80	11.21	11.61	12.01
		Height	2.21	2.97	3.72	4.48	5.23	5.99	6.74	7.50	7.80	8.10	8.40	8.70	9.01
18½	4⅝	Width	2.86	3.84	4.82	5.80	6.78	7.76	8.74	9.72	10.11	10.50	10.89	11.29	11.68
		Height	2.15	2.88	3.61	4.35	5.09	5.82	6.56	7.29	7.59	7.88	8.18	8.47	8.76
19	4¾	Width	2.79	3.74	4.70	5.65	6.61	7.56	8.51	9.47	9.85	10.23	10.61	10.99	11.38
		Height	2.09	2.81	3.52	4.24	4.95	5.67	6.38	7.10	7.38	7.67	7.96	8.24	8.51
19½	4⅞	Width	2.71	3.64	4.57	5.50	6.43	7.36	8.29	9.22	9.59	9.96	10.33	10.70	11.08
		Height	2.04	2.74	3.43	4.13	4.83	5.53	6.22	6.92	7.20	7.48	7.76	8.04	8.31
20	5	Width	2.64	3.55	4.45	5.36	6.27	7.17	8.08	8.98	9.35	9.71	10.07	10.43	10.80
		Height	1.98	2.66	3.34	4.02	4.70	5.38	6.06	6.74	7.01	7.28	7.55	7.83	8.10
20½	5⅛	Width	2.58	3.46	4.35	5.23	6.12	7.00	7.89	8.77	9.12	9.48	9.83	10.18	10.54
		Height	1.93	2.59	3.26	3.92	4.58	5.25	5.91	6.57	6.84	7.10	7.37	7.63	7.90
21	5¼	Width	2.51	3.37	4.24	5.10	5.96	6.83	7.69	8.55	8.90	9.24	9.59	9.93	10.28
		Height	1.89	2.54	3.18	3.83	4.48	5.13	5.77	6.42	6.68	6.94	7.20	7.46	7.72
21½	5⅜	Width	2.45	3.29	4.14	4.98	5.82	6.67	7.51	8.35	8.69	9.03	9.36	9.70	10.04
		Height	1.84	2.47	3.10	3.74	4.37	5.00	5.63	6.27	6.52	6.77	7.02	7.28	7.53
22	5½	Width	2.40	3.22	4.05	4.87	5.70	6.52	7.34	8.17	8.50	8.83	9.16	9.49	9.82
		Height	1.80	2.42	3.04	3.65	4.27	4.89	5.51	6.13	6.37	6.62	6.87	7.11	7.36
22½	5⅝	Width	2.34	3.15	3.95	4.76	5.56	6.37	7.17	7.98	8.30	8.62	8.95	9.27	9.59
		Height	1.76	2.36	2.97	3.57	4.18	4.78	5.39	5.98	6.23	6.47	6.71	6.96	7.20
23	5¾	Width	2.29	3.08	3.87	4.65	5.44	6.23	7.02	7.81	8.12	8.44	8.75	9.07	9.38
		Height	1.72	2.31	2.90	3.49	4.08	4.67	5.27	5.86	6.09	6.33	6.57	6.80	7.04
23½	5⅞	Width	2.24	3.01	3.78	4.55	5.33	6.10	6.87	7.64	7.95	8.26	8.56	8.87	9.18
		Height	1.68	2.26	2.84	3.42	3.99	4.57	5.15	5.73	5.96	6.19	6.42	6.66	6.89
24	6	Width	2.19	2.95	3.70	4.46	5.21	5.97	6.72	7.48	7.78	8.08	8.38	8.68	8.99
		Height	1.64	2.21	2.77	3.34	3.91	4.47	5.04	5.60	5.83	6.06	6.28	6.51	6.74
24½	6⅛	Width	2.14	2.88	3.62	4.36	5.10	5.84	6.58	7.32	7.61	7.91	8.20	8.50	8.80
		Height	1.61	2.16	2.72	3.27	3.83	4.38	4.94	5.49	5.72	[illegible]	[illegible]	[illegible]	[illegible]
25	6¼	Width	2.10	2.82	3.55	4.27	5.00	5.72	6.45	7.17	7.46	7.75	8.04	8.33	8.62
		Height	1.57	2.11	2.66	3.20	3.75	4.29	4.84	5.38	5.59	5.81	6.03	6.25	6.46
25½	6⅜	Width	2.06	2.77	3.48	4.19	4.90	5.61	6.32	7.04	7.32	7.60	[illegible]	[illegible]	[illegible]
		Height	1.54	2.07	2.61	3.14	3.67	4.21	4.74	5.27	5.48	[illegible]	[illegible]	[illegible]	[illegible]
26	6½	Width	2.02	2.72	3.41	4.11	4.81	5.51	6.20	6.90	7.18	[illegible]	[illegible]	[illegible]	8.29
		Height	1.51	2.03	2.56	3.08	3.60	4.12	4.65	5.17	5.37	[illegible]	[illegible]	[illegible]	6.22
26½	6⅝	Width	1.98	2.66	3.35	4.03	4.72	5.40	6.08	6.77	7.04	7.31	7.59	7.86	8.13
		Height	1.48	1.99	2.51	3.02	3.53	4.04	4.56	5.07	5.28	5.48	5.69	5.89	6.10
27	6¾	Width	1.94	2.61	3.28	3.95	4.63	5.30	5.97	6.64	6.91	7.18	7.44	7.71	7.98
		Height	1.45	1.96	2.46	2.96	3.46	3.97	4.47	4.98	5.18	5.38	5.58	5.78	5.98
27½	6⅞	Width	1.90	2.56	3.22	3.87	4.55	5.21	5.86	6.52	6.79	7.05	7.31	7.58	7.84
		Height	1.43	1.92	2.42	2.91	3.41	3.90	4.40	4.89	5.09	5.29	5.48	5.68	5.88
28	7	Width	1.87	2.52	3.16	3.81	4.46	5.11	5.75	6.40	6.66	6.92	7.18	7.44	7.70
		Height	1.40	1.89	2.37	2.86	3.34	3.83	4.31	4.80	4.99	5.19	5.38	5.58	5.77
28½	7⅛	Width	1.83	2.47	3.10	3.74	4.37	5.01	5.65	6.28	6.54	6.79	7.05	7.30	7.55
		Height	1.37	1.85	2.32	2.80	3.28	3.75	4.23	4.71	4.90	5.09	5.28	5.47	5.66
29	7¼	Width	1.80	2.42	3.05	3.67	4.30	4.92	5.55	6.17	6.42	6.67	6.92	7.17	7.42
		Height	1.35	1.82	2.29	2.76	3.23	3.69	4.16	4.63	4.82	5.01	5.19	5.38	5.57
29½	7⅜	Width	1.77	2.38	3.00	3.61	4.23	4.84	5.46	6.07	6.32	6.56	6.81	7.05	7.30
		Height	1.33	1.79	2.25	2.71	3.17	3.63	4.09	4.56	4.74	4.92	5.11	5.29	5.48
30	7½	Width	1.74	2.34	2.95	3.55	4.16	4.76	5.37	5.97	6.21	6.45	6.69	6.94	7.18
		Height	1.30	1.75	2.21	2.66	3.11	3.57	4.02	4.47	4.65	4.83	5.02	5.20	5.38
30½	7⅝	Width	1.71	2.30	2.90	3.49	4.09	4.68	5.28	5.87	6.11	6.35	6.58	6.82	7.06
		Height	1.28	1.73	2.17	2.61	3.07	3.51	3.95	4.40	4.58	4.76	4.93	5.11	5.29
31	7¾	Width	1.68	2.26	2.85	3.43	4.02	4.60	5.19	5.77	6.01	6.24	6.48	6.71	6.95
		Height	1.26	1.70	2.14	2.58	3.01	3.45	3.89	4.33	4.50	4.68	4.86	5.03	5.21
31½	7⅞	Width	1.65	2.23	2.80	3.38	3.95	4.53	5.10	5.68	5.91	6.14	6.37	6.60	6.83
		Height	1.24	1.67	2.10	2.53	2.97	3.40	3.83	4.26	4.43	4.61	4.78	4.95	5.12
32	8	Width	1.62	2.19	2.75	3.32	3.89	4.45	5.02	5.58	5.81	6.04	6.26	6.49	6.72
		Height	1.22	1.64	2.07	2.49	2.92	3.34	3.77	4.19	4.36	4.53	4.70	4.87	5.04
32½	8⅛	Width	1.60	2.16	2.72	3.27	3.73	4.29	4.82	5.40	5.63	5.85	6.07	6.30	6.52
		Height	1.20	1.62	2.04	2.45	2.87	3.29	3.71	4.13	4.30	4.46	4.63	4.80	4.96
33	8¼	Width	1.57	2.12	2.67	3.22	3.77	4.32	4.87	5.41	5.63	5.85	6.07	6.29	6.51
		Height	1.18	1.59	2.00	2.42	2.83	3.24	3.65	4.06	4.23	4.39	4.56	4.72	4.89
33½	8⅜	Width	1.55	2.09	2.63	3.17	3.71	4.26	4.80	5.34	5.55	5.77	5.99	6.20	6.42
		Height	1.16	1.57	1.97	2.38	2.78	3.19	3.59	4.00	4.16	4.33	4.49	4.65	4.81
34	8½	Width	1.52	2.05	2.59	3.12	3.65	4.19	4.72	5.25	5.46	5.68	5.89	6.10	6.32
		Height	1.14	1.54	1.94	2.34	2.74	3.14	3.54	3.94	4.10	4.26	4.42	4.58	4.74
34½	8⅝	Width	1.50	2.02	2.55	3.07	3.60	4.11	4.64	5.16	5.37	5.58	5.79	6.00	6.20
		Height	1.13	1.52	1.92	2.31	2.70	3.10	3.49	3.88	4.04	4.20	4.35	4.51	4.67
35	8¾	Width	1.48	2.00	2.51	3.03	3.55	4.06	4.58	5.10	5.30	5.51	5.72	5.93	6.13
		Height	1.11	1.50	1.88	2.27	2.66	3.05	3.43	3.82	3.98	4.13	4.29	4.44	4.60
35½	8⅞	Width	1.46	1.97	2.48	2.99	3.50	4.01	4.52	5.03	5.24	5.44	5.65	5.85	6.05
		Height	1.09	1.47	1.86	2.24	2.62	3.00	3.39	3.77	3.92	4.08	4.23	4.38	4.54
36	9	Width	1.44	1.94	2.45	2.95	3.45	3.96	4.46	4.96	5.17	5.37	5.57	5.77	5.97
		Height	1.08	1.46	1.84	2.21	2.59	2.97	3.35	3.72	3.87	4.03	4.18	4.33	4.48

E.F., in inches: Stereo Lens	Motion Picture Lens		62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126
8	2	Width	28.02	28.92	29.83	30.74	31.64	32.55	33.45	34.36	35.27	36.17	37.08	37.99	38.89	39.80	40.71	41.61	42.52	43.42	44.33	45.24	46.14	47.05	47.96	48.86	49.77	50.67	51.58	52.49	53.39	54.30	55.21	56.11	56.57
		Height	21.01	21.69	22.37	23.05	23.73	24.41	25.09	25.77	26.45	27.13	27.81	28.49	29.17	29.85	30.53	31.21	31.89	32.57	33.25	33.93	34.61	35.29	35.97	36.65	37.33	38.01	38.69	39.36	40.04	40.72	41.40	42.08	42.42
8½	2⅛	Width	26.36	27.22	28.07	28.92	29.78	30.63	31.48	32.33	33.19	34.04	34.89	35.75	36.60	37.45	38.30	39.16	40.01	40.86	41.72	42.57	43.42	44.28	45.13	45.98	46.83	47.69	48.54	49.39	50.25	51.10	51.95	52.80	53.23
		Height	19.77	20.41	21.05	21.69	22.33	22.97	23.61	24.25	24.89	25.53	26.17	26.81	27.45	28.09	28.73	29.37	30.01	30.65	31.29	31.93	32.57	33.21	33.85	34.49	35.13	35.77	36.41	37.05	37.68	38.32	38.96	39.60	39.92
9	2¼	Width	24.90	25.71	26.51	27.32	28.12	28.93	29.73	30.54	31.35	32.15	32.96	33.76	34.57	35.37	36.18	36.98	37.79	38.60	39.40	40.21	41.01	41.82	42.62	43.43	44.24	45.04	45.85	46.65	47.46	48.26	49.07	49.87	50.27
		Height	18.68	19.28	19.89	20.49	21.09	21.70	22.30	22.91	23.51	24.12	24.72	25.32	25.93	26.53	27.14	27.74	28.35	28.95	29.55	30.16	30.76	31.37	31.97	32.57	33.18	33.78	34.39	34.99	35.60	36.20	36.80	37.41	37.71
9½	2⅜	Width	23.58	24.35	25.11	25.87	26.64	27.40	28.16	28.93	29.69	30.45	31.22	31.98	32.74	33.51	34.27	35.03	35.80	36.56	37.32	38.09	38.85	39.61	40.37	41.14	41.90	42.66	43.43	44.19	44.95	45.72	46.48	47.24	47.63
		Height	17.69	18.26	18.84	19.41	19.98	20.55	21.13	21.70	22.27	22.84	23.41	23.99	24.56	25.13	25.70	26.28	26.85	27.42	27.99	28.57	29.14	29.71	30.28	30.86	31.43	32.00	32.57	33.15	33.72	34.29	34.86	35.44	35.72
10	2½	Width	22.40	23.12	23.85	24.57	25.30	26.02	26.75	27.47	28.20	28.92	29.65	30.37	31.10	31.82	32.55	33.27	34.00	34.72	35.45	36.17	36.90	37.62	38.35	39.07	39.80	40.52	41.25	41.97	42.70	43.42	44.15	44.87	45.24
		Height	16.80	17.34	17.89	18.43	18.98	19.52	20.06	20.61	21.15	21.70	22.24	22.78	23.33	23.87	24.42	24.96	25.50	26.05	26.59	27.14	27.68	28.22	28.77	29.31	29.86	30.40	30.94	31.49	32.03	32.58	33.12	33.66	33.94
10½	2⅝	Width	21.33	22.02	22.71	23.40	24.09	24.78	25.47	26.16	26.85	27.54	28.23	28.92	29.61	30.30	30.99	31.68	32.37	33.06	33.76	34.45	35.14	35.83	36.52	37.21	37.90	38.59	39.28	39.97	40.66	41.35	42.04	42.73	43.08
		Height	16.00	16.52	17.04	17.55	18.07	18.59	19.11	19.63	20.14	20.66	21.18	21.70	22.22	22.73	23.25	23.77	24.29	24.80	25.32	25.84	26.36	26.88	27.39	27.91	28.43	28.95	29.47	29.98	30.50	31.02	31.54	32.06	32.31
11	2¾	Width	20.36	21.02	21.68	22.34	22.99	23.65	24.31	24.97	25.63	26.29	26.95	27.61	28.27	28.93	29.59	30.25	30.90	31.56	32.22	32.88	33.54	34.20	34.86	35.52	36.18	36.84	37.50	38.15	38.81	39.47	40.13	40.79	41.12
		Height	15.27	15.76	16.26	16.75	17.24	17.74	18.23	18.73	19.22	19.72	20.21	20.71	21.20	21.70	22.19	22.69	23.18	23.67	24.16	24.66	25.15	25.65	26.14	26.64	27.13	27.62	28.12	28.61	29.11	29.60	30.10	30.59	30.84
11½	2⅞	Width	19.47	20.10	20.73	21.36	21.99	22.62	23.25	23.88	24.51	25.14	25.77	26.40	27.03	27.66	28.29	28.93	29.55	30.18	30.81	31.44	32.07	32.70	33.33	33.96	34.59	35.23	35.86	36.49	37.12	37.75	38.38	39.01	39.32
		Height	14.60	15.07	15.55	16.02	16.49	16.97	17.44	17.91	18.38	18.86	19.33	19.80	20.28	20.75	21.22	21.69	22.17	22.64	23.11	23.58	24.06	24.53	25.00	25.48	25.95	26.42	26.89	27.37	27.84	28.31	28.79	29.26	29.49
12	3	Width	18.66	19.26	19.87	20.47	21.07	21.68	22.28	22.89	23.49	24.10	24.70	25.30	25.91	26.51	27.12	27.72	28.33	28.93	29.53	30.14	30.74	31.35	31.95	32.55	33.16	33.76	34.37	34.97	35.58	36.18	36.78	37.39	37.69
		Height	13.99	14.44	14.90	15.35	15.80	16.26	16.71	17.16	17.61	18.07	18.52	18.97	19.43	19.88	20.33	20.79	21.24	21.69	22.14	22.60	23.05	23.50	23.96	24.41	24.86	25.32	25.77	26.22	26.68	27.13	27.58	28.03	28.26
12½	3⅛	Width	17.91	18.49	19.07	19.65	20.23	20.81	21.39	21.97	22.55	23.13	23.71	24.29	24.87	25.45	26.03	26.61	27.19	27.77	28.35	28.93	29.51	30.09	30.67	31.25	31.83	32.41	32.99	33.57	34.15	34.73	35.31	35.89	36.18
		Height	13.43	13.87	14.30	14.74	15.17	15.61	16.04	16.48	16.91	17.35	17.78	18.22	18.65	19.09	19.52	19.96	20.39	20.83	21.26	21.70	22.13	22.57	23.00	23.44	23.87	24.31	24.74	25.18	25.61	26.05	26.48	26.92	27.13
13	3¼	Width	17.22	17.77	18.33	18.89	19.45	20.00	20.56	21.12	21.68	22.23	22.79	23.35	23.91	24.47	25.02	25.58	26.14	26.70	27.25	27.81	28.37	28.93	29.49	30.04	30.60	31.16	31.72	32.27	32.83	33.39	33.95	34.50	34.78
		Height	12.91	13.33	13.75	14.16	14.58	15.00	15.42	15.84	16.26	16.67	17.09	17.51	17.93	18.35	18.77	19.18	19.60	20.02	20.44	20.86	21.28	21.69	22.11	22.53	22.95	23.37	23.79	24.20	24.62	25.04	25.46	25.88	26.09
13½	3⅜	Width	16.57	17.11	17.64	18.18	18.72	19.26	19.79	20.33	20.87	21.40	21.94	22.48	23.01	23.55	24.09	24.63	25.16	25.70	26.24	26.77	27.31	27.85	28.38	28.92	29.46	30.00	30.53	31.07	31.61	32.14	32.68	33.22	33.49
		Height	12.43	12.83	13.23	13.63	14.04	14.44	14.84	15.25	15.65	16.05	16.45	16.86	17.26	17.66	18.07	18.47	18.87	19.27	19.68	20.08	20.48	20.89	21.29	21.69	22.09	22.50	22.90	23.30	23.71	24.11	24.51	24.91	25.11
14	3½	Width	15.98	16.50	17.02	17.53	18.05	18.57	19.09	19.60	20.12	20.64	21.16	21.68	22.19	22.71	23.23	23.75	24.27	24.78	25.30	25.82	26.34	26.86	27.37	27.89	28.41	28.93	29.45	29.96	30.48	31.00	31.52	32.03	32.29
		Height	11.99	12.38	12.76	13.15	13.54	13.93	14.32	14.71	15.09	15.48	15.87	16.26	16.65	17.04	17.43	17.81	18.20	18.59	18.98	19.37	19.76	20.14	20.53	20.92	21.31	21.70	22.09	22.47	22.86	23.25	23.64	24.03	24.22
14½	3⅝	Width	15.42	15.92	16.42	16.92	17.42	17.92	18.42	18.92	19.42	19.92	20.42	20.92	21.42	21.92	22.42	22.92	23.42	23.92	24.42	24.92	25.42	25.92	26.42	26.92	27.42	27.92	28.42	28.92	29.42	29.92	30.42	30.92	31.17
		Height	11.57	11.95	12.32	12.70	13.07	13.45	13.82	14.20	14.57	14.95	15.32	15.70	16.07	16.45	16.82	17.20	17.57	17.95	18.32	18.70	19.07	19.45	19.82	20.20	20.57	20.95	21.32	21.70	22.07	22.45	22.82	23.20	23.39
15	3¾	Width	14.91	15.39	15.87	16.36	16.84	17.32	17.81	18.29	18.77	19.26	19.74	20.22	20.71	21.19	21.67	22.16	22.64	23.12	23.61	24.09	24.57	25.06	25.54	26.02	26.51	26.99	27.47	27.96	28.44	28.92	29.41	29.89	30.13
		Height	11.18	11.54	11.90	12.27	12.63	12.99	13.35	13.72	14.08	14.44	14.80	15.17	15.53	15.89	16.25	16.62	16.98	17.34	17.70	18.07	18.43	18.79	19.15	19.52	19.88	20.24	20.60	20.97	21.33	21.69	22.05	22.42	22.60
15½	3⅞	Width	14.42	14.89	15.36	15.83	16.29	16.76	17.23	17.70	18.16	18.63	19.10	19.57	20.03	20.50	20.97	21.44	21.91	22.37	22.84	23.31	23.78	24.24	24.71	25.18	25.65	26.11	26.58	27.05	27.52	27.99	28.45	28.92	29.15
		Height	10.82	11.18	11.53	11.88	12.23	12.58	12.93	13.28	13.63	13.98	14.33	14.68	15.03	15.39	15.74	16.09	16.44	16.79	17.14	17.49	17.84	18.19	18.54	18.89	19.24	19.60	19.95	20.30	20.65	21.00	21.35	21.70	21.87
16	4	Width	13.97	14.42	14.87	15.33	15.78	16.23	16.69	17.14	17.59	18.05	18.50	18.95	19.41	19.86	20.31	20.76	21.22	21.67	22.12	22.58	23.03	23.48	23.94	24.39	24.84	25.30	25.75	26.20	26.66	27.11	27.56	28.01	28.24
		Height	10.48	10.82	11.16	11.50	11.84	12.18	12.52	12.86	13.20	13.54	13.88	14.22	14.56	14.90	15.24	15.58	15.92	16.25	16.59	16.93	17.27	17.61	17.95	18.29	18.63	18.97	19.31	19.65	19.99	20.33	20.67	21.01	21.18
16½	4⅛	Width	13.55	13.99	14.42	14.86	15.30	15.74	16.18	16.62	17.06	17.50	17.94	18.38	18.82	19.26	19.70	20.14	20.58	21.02	21.46	21.90	22.33	22.77	23.21	23.65	24.09	24.53	24.97	25.41	25.85	26.29	26.73	27.17	27.39
		Height	10.16	10.49	10.82	11.15	11.48	11.81	12.14	12.47	12.80	13.13	13.46	13.79	14.12	14.45	14.78	15.11	15.44	15.77	16.10	16.42	16.75	17.08	17.41	17.74	18.07	18.40	18.73	19.06	19.39	19.72	20.05	20.38	20.54
17	4¼	Width	13.14	13.57	14.00	14.42	14.85	15.27	15.70	16.13	16.55	16.98	17.41	17.83	18.26	18.69	19.11	19.54	19.97	20.39	20.82	21.25	21.67	22.10	22.53	22.95	23.38	23.80	24.23	24.66	25.08	25.51	25.94	26.36	26.58
		Height	9.86	10.18	10.50	10.82	11.14	11.46	11.78	12.10	12.42	12.74	13.06	13.38	13.70	14.02	14.34	14.66	14.98	15.29	15.61	15.93	16.25	16.57	16.89	17.21	17.53	17.85	18.17	18.49	18.81	19.13	19.45	19.77	19.93
17½	4⅜	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	4½	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18½	4⅝	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	4¾	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19½	4⅞	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	5	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20½	5⅛	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	5¼	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21½	5⅜	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	5½	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22½	5⅝	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	5¾	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23½	5⅞	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	6	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24½	6⅛	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	6¼	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25½	6⅜	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	6½	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26½	6⅝	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	6¾	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27½	6⅞	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	7	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28½	7⅛	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	7¼	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29½	7⅜	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	7½	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30½	7⅝	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	7¾	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32	8	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35	8¾	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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35½	8⅞	Width	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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		Height	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

EXAMPLE:—With a lens of 4" equivalent focus at a distance of 40 from the screen, the projected picture will be 8.98' wide x 6.74' high; at 50' with the same lens, it would be 11.25' wide x 8.44 high, etc. The size of the picture should be in proportion to the width of the theatre. In a picture 16 wide the figures are life size.

The decimal represents the fractional part of a foot, and in order to ascertain the exact number of inches, multiply by 12 and point off the decimal. EXAMPLE: 8.44 is equivalent to 8' 5⅜".

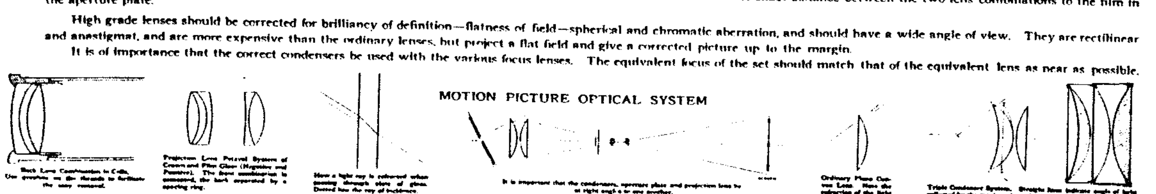
When the distance from the aperture plate to the center of the screen is longer than the above, use the following formula to ascertain the exact dimensions. Multiply the distance from the center of the screen to the film in the aperture by .906, then divide by the width of the picture desired. EXAMPLE: $\frac{\text{Distance} \times .906}{\text{Width}}$

The width of the aperture plate used on Simplex projectors is .906 wide x .680 high. The height of the picture therefore is always 75 per cent of the width. If only the height is known, multiply by 1.333 to ascertain the exact dimensions of the width. Equivalent focus means the center of the exact distance between the two lens combinations to the film in the aperture plate.

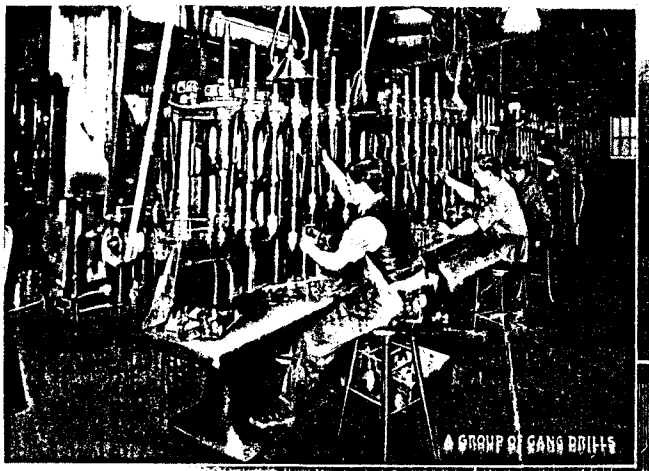
High grade lenses should be corrected for brilliancy of definition—flatness of field—spherical and chromatic aberration, and should have a wide angle of view. They are rectilinear and anastigmat, and are more expensive than the ordinary lenses, but project a flat field and give a corrected picture up to the margin.

It is of importance that the correct condensers be used with the various focus lenses. The equivalent focus of the set should match that of the equivalent lens as near as possible.

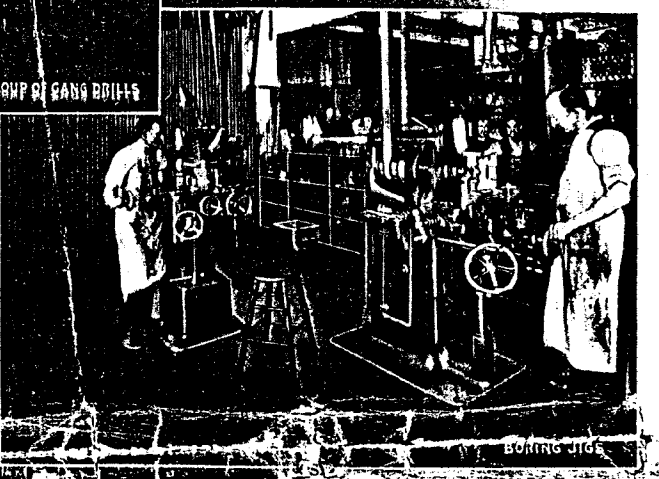
MOTION PICTURE OPTICAL SYSTEM



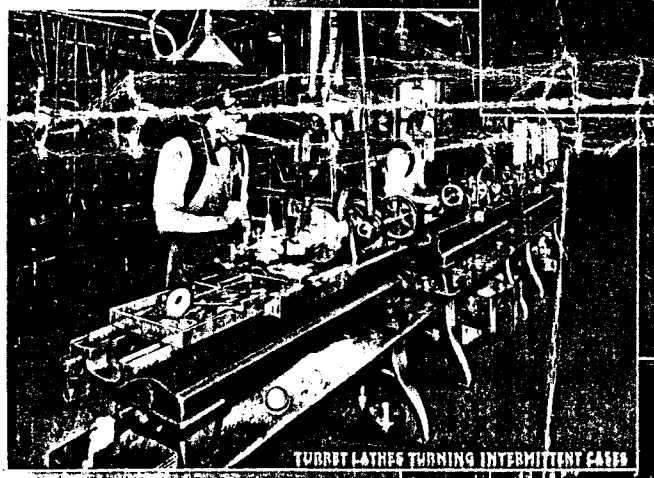
Use camel's hair brush to clean lenses. If oily use solution of one-quarter part grain alcohol and three-quarters part water, dry with a piece of soft linen or cotton.



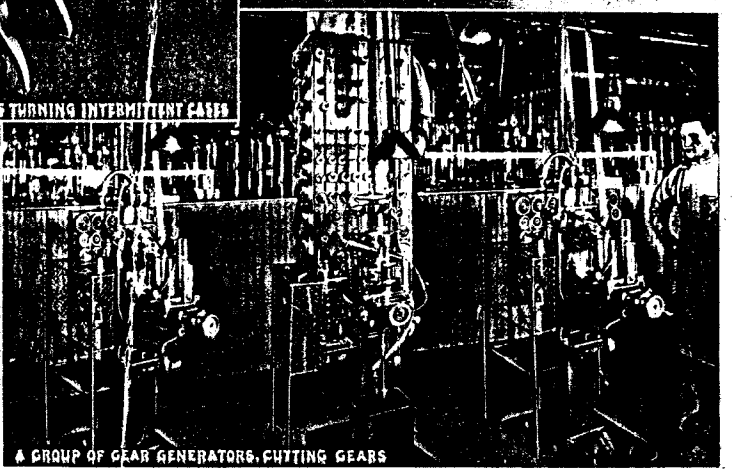
A GROUP OF GANG DRILLS



BORING JIG

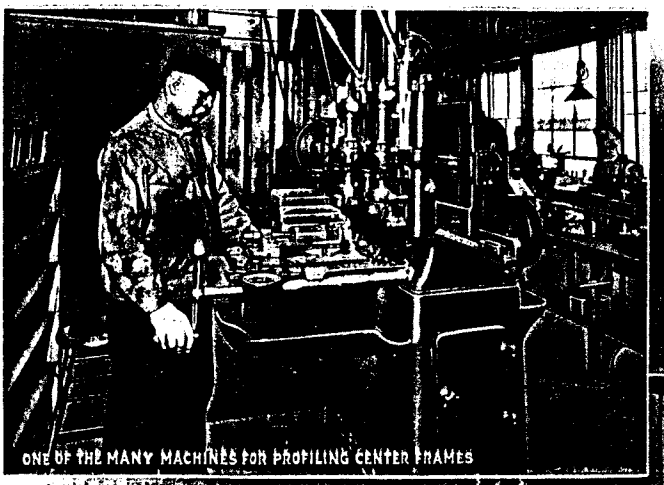


TURRET LATHES TURNING INTERMITTENT CASES

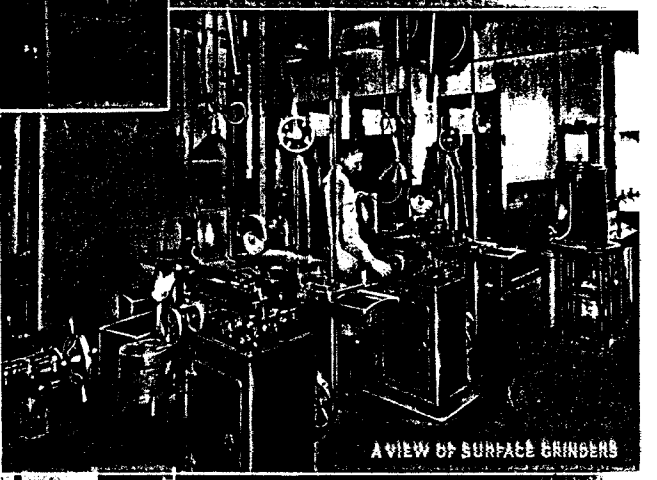


A GROUP OF GEAR GENERATORS, CUTTING GEARS

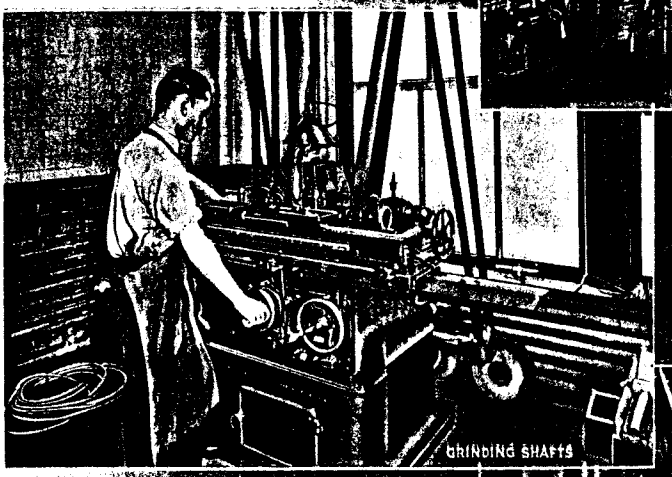
SIMPLEX PROJECTORS



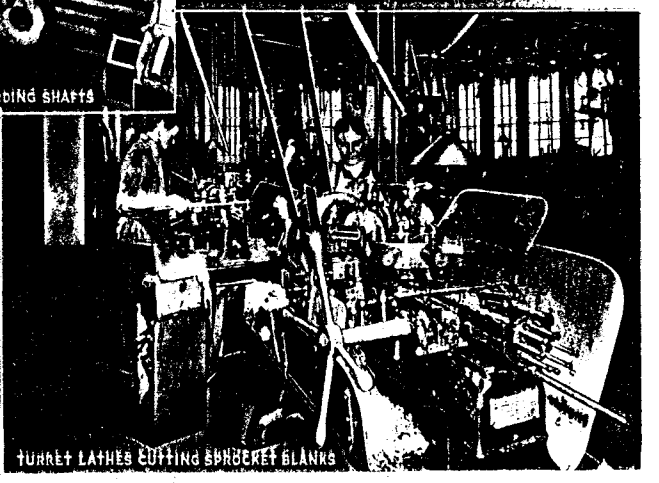
ONE OF THE MANY MACHINES FOR PROFILING CENTER FRAMES



A VIEW OF SURFACE GRINDERS



GRINDING SHAFTS



TURRET LATHES CUTTING SPROCKET BLANKS

Plate K1

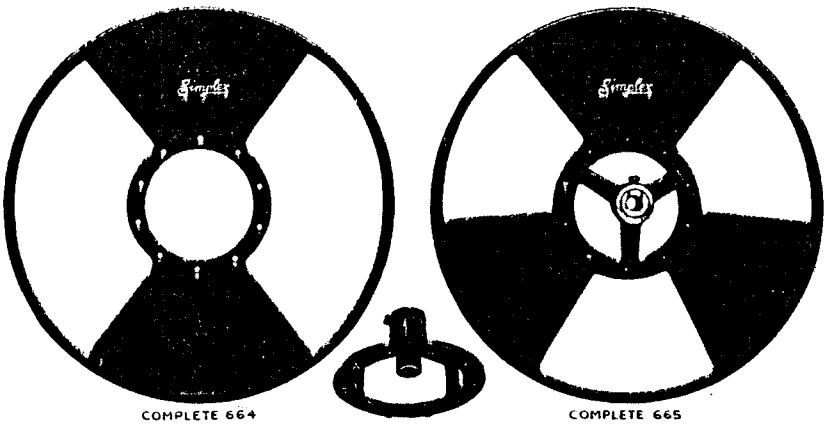
UNDER COURSE OF CONSTRUCTION

Making of the Perfect Projector

Revolving Shutter

THE revolving shutter is an important part of a projection machine, and is deserving of the most careful consideration.

We have given the shutter question a great deal of thought, and from time to time have experimented with various types, which have been placed in every conceivable position, from between the condensers and aperture plate, to its present position in front of the lens, as shown on plate H.



COMPLETE 664
LESS SPIDER 213½

639

COMPLETE 665
LESS SPIDER 210½

The shutter, when placed in this position, eliminates the sharp contrast between light and darkness, and has a tendency to tone the periods of exposure, as against the time when there is no picture on the screen—in other words, dark periods.

Both the 2 and 3-wing shutters, as furnished with Simplex projectors, permit a maximum amount of light to reach the screen with the least perceptible flicker when the machine is operated at the normal speed of 60 feet of film per minute.

The 3-wing shutter 665, illustrated above, is intended for use with direct current. It consists of one cut-off blade, the function of which is to obstruct the light while the film is in motion before the aperture, and two flicker blades or interrupters, which equalize the light periods while the picture is being exposed upon the screen. This type of shutter permits 50 per cent of the light to reach the screen.

The 2-wing shutter 664, illustrated above, is primarily designed for use with alternating current of 60 cycles or less, and it does not intercept the light periods in step with the alternations of the arc.

This type of shutter can also be used on direct current; but, having only one interrupter, it will not eliminate the flicker as well as the 3-wing. 65 per cent of the light is permitted to reach the curtain with the 2-wing type.

Should a 3-wing shutter be used on alternating current and revolved a little slower or a little faster than normal, the blades are apt to get into synchronism with the alternations of the arc and cause a wavy effect in the light similar to a bad flicker.

Both shutters 664 and 665 are 9¾″ in diameter, and can be used with lenses of any commercial diameter or focus.

The spider casting 639 is of a special design, made of aluminum, and holds the shutters securely, by means of ten machine screws.

It is important that the shutter be balanced and light in weight to lessen strain on shutter shaft, and avoid vibration of the machine; this is accomplished by using aluminum in the manufacture, the complete shutter and spider weighing only 6 ounces.

An exclusive feature of paramount importance to every operator and exhibitor is the fact that the shutter can be easily and quickly set while the machine is in motion, by turning the knurled knob which is located alongside of the framing handle, [illegible] H; thus eliminating travel

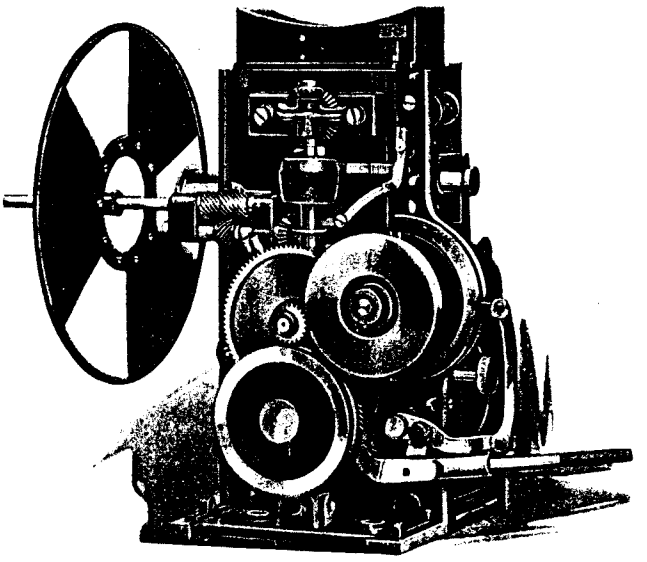


Plate H

Making of the Perfect Projector

Take-Up Device

FOR a projection machine to work properly, it is important that the take-up device be a simple, rigid design, that can be relied upon to rewind the film into the lower reel evenly, with a minimum tension.

Unlike other projectors, the take-up device used on the Simplex projector is not driven from the lower feed sprocket shaft, but from the main driving gear, thus balancing the entire mechanism and equalizing the strain on the main driving shaft. The well-known friction-disc type, belt driven, as shown on Plate K, is regularly supplied, details of which are illustrated on Plate K1.

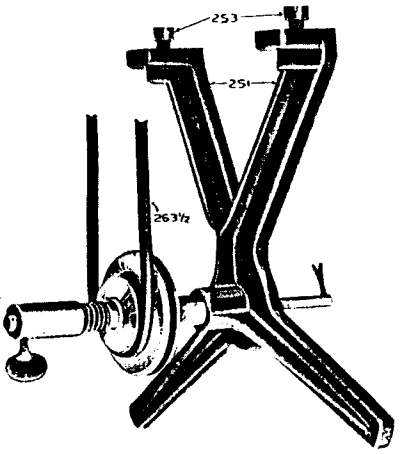


Plate K

Part 260, the driving side of the disc, is directly connected to the take-up shaft 684. Leather friction washer 262 is 3″ in diameter by ¼″ thick. It operates between friction disc 260 and pulley 260½, and equalizes the speed of the take-up reel. The take-up driving pulley 260½, driven by belt 263½, is forced to bear against leather washer 262 by spring 264, which is kept in place by a thimble 265 and set screw 266.

Take-up shaft 684 is made of cold-rolled steel and is 9⅛″ long by ⅜″ diameter; and, after turning, is carefully ground to insure accuracy. The end that carries the reel is reduced to $\frac{5}{16}$″ to accommodate the ordinary reel, this being the prevailing diameter of the bearings of reels in this country. This shaft is supported by a bearing on the spider casting 251, which is 2⅝″ long, as shown on Plates K and K2.

Another advantageous point of the Simplex projector, and a time saver, are the reel clips shown on Plate K1. Their duty is to hold the reel onto the take-up shaft, so that the pin on 689 engages the reel hub.

The take-up, which is primarily designed to reel up 1,000 ft. of film, cannot satisfactorily take up 2,000 or 2,500 feet. We have designed a take-up device to meet this situation, as shown on plate K2.

It is similar to the belt-drive, with the exception of a steel sprocket 691, Plate K2, 4½″ in diameter, which, combined with the use of the special Bell & Howell standard reels, with 5″ hubs, as illustrated on Plate K2, equalizes to a minimum the strain which would otherwise exist on the first 250 feet when re-winding, and the last 250 feet on the upper reel. This reel, when used in connection with the take-up driving sprocket, permits a slower speed than with the ordinary reel.

In order to obviate the chance of straining the belt connector we use a steel chain, which has proved far superior to a belt for driving reels of this diameter. It is ⅛″ wide and is guaranteed by the maker, Coventry, to withstand a breaking strain of 300 lbs. per inch. The blocks are hardened to eliminate wear and stretch. The tension of the chain on sprocket 691 is adjusted by take-up chain adjust bracket 690, shown on Plate K2.

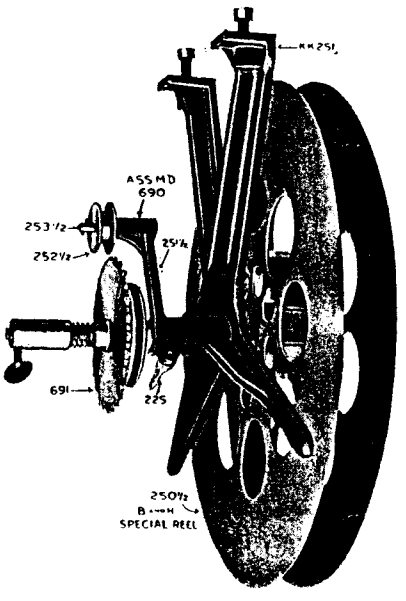
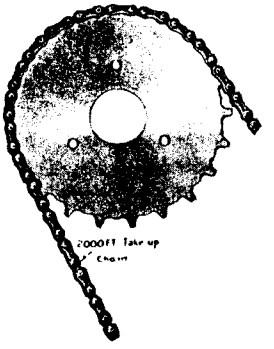


Plate K2



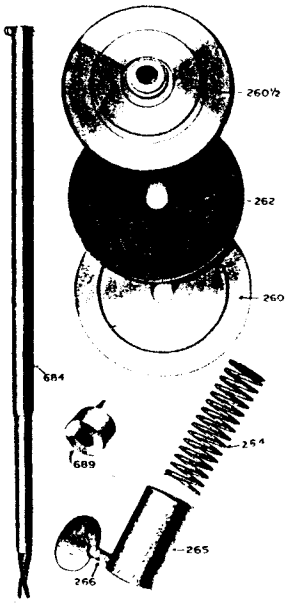


Plate K1

Making of the Perfect Projector

Simplicity of Threading

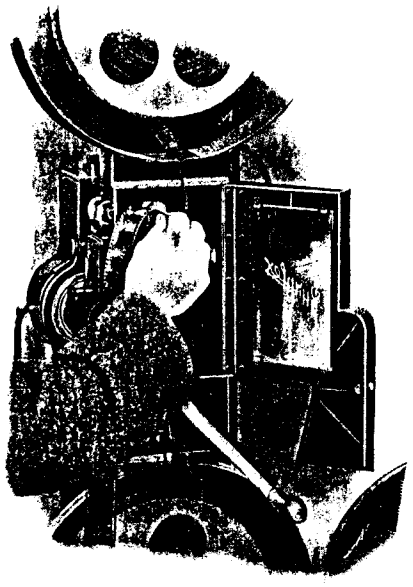


Plate 1

WITH the exception of the machine itself, nothing could illustrate more graphically the ease with which the film can be threaded in the mechanism, than the following four illustrations.

Simplicity of threading was borne in mind when this machine was designed and has been one of the primary reasons for the success of its sale to modern theatres. Consistent with this idea, a glance at the illustrations on page 19 clearly demonstrates that there is nothing to hinder the operator in making a quick change from one reel to another. It has often been said by expert operators that they can remove a reel of film from a Simplex machine and re-thread with another in quicker time than they can on any other projector. You will observe that the film can be removed from the machine without resplicing, as the valves are slotted.

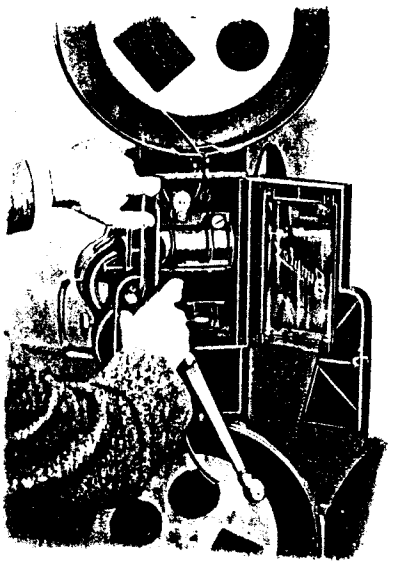


Plate 2

Figure 1 illustrates the method of inserting the film through the magazine valve and on to the top feed sprocket previous to forming the loop.

Figure 2 illustrates the threading of the film through the film trap by forming the upper loop with the first finger of the left hand and gripping the film below the intermittent sprocket with the thumb and second finger of the right hand and closing the film trap gate by tripping film trap trip lever 645 with the index finger.

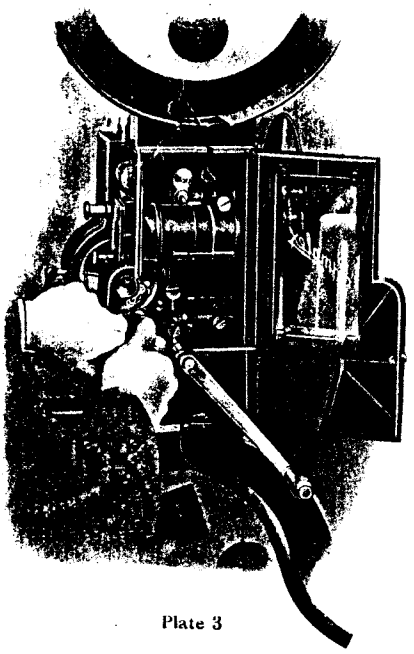


Plate 3

Figure 3 illustrates the method of forming the lower loop, threading the film over the lower feed sprocket and closing the lower feed sprocket roll arm by a downward pressure with the thumb of the right hand.

The film is then inserted through the fire valve by means of the slot in the base of the mechanism and is then fastened on to the lower reel so as to rewind to the right.

Figure 4 shows the machine completely threaded from the top reel to the feed sprocket through the film trap and on to the lower feed sprocket and the take-up reel.

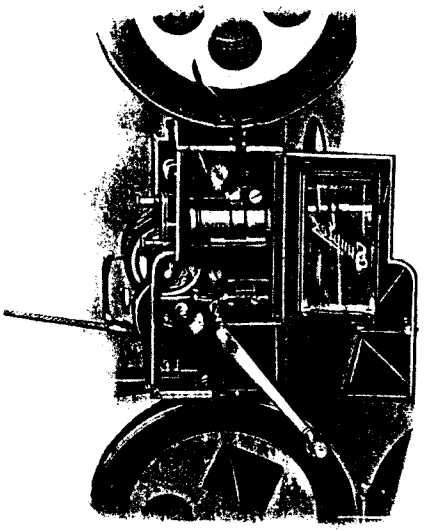


Plate 4

Making of the Perfect Projector

Completed Mechanism

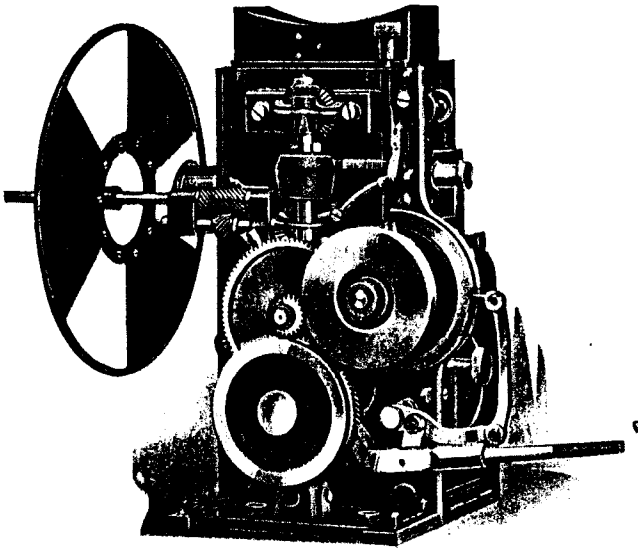


Plate A. Left Side. Dust-proof Covers Removed

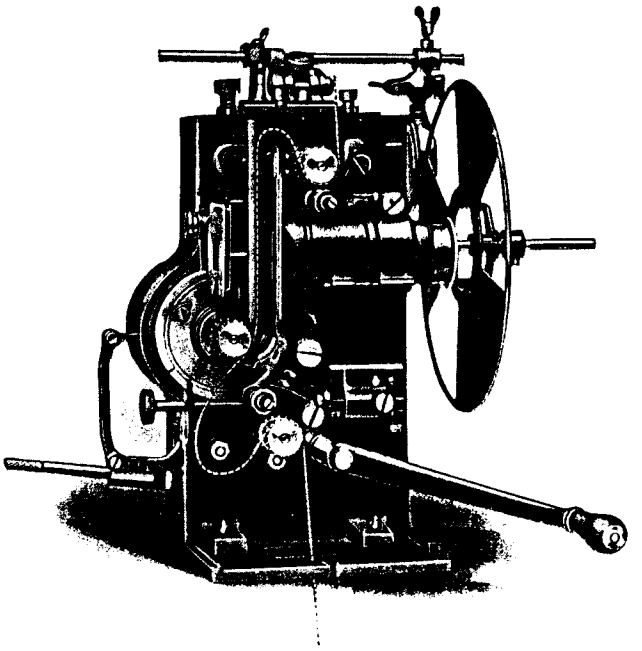


Plate AA. Right Side. Fire-proof Covers Removed

IT is not necessary to elaborate on the construction of the mechanism, as the various parts and their making have been fully explained in previous pages. They are illustrated here, completely assembled.

Plate AA shows the right side, with film covers and the upper magazine fire-proof valve, removed from the top. This valve consists of one large steel roller and two smaller ones which are set at an angle of 45 degrees. They bear against the film top and bottom, and should the film accidentally take fire from any cause whatsoever, they prevent any flame from entering the top magazine. Another advantageous feature is that this magazine cannot be placed out of alignment with the top sprocket, as it is securely held to the main casting by two set screws.

Plate AAA is a perspective of the completely enclosed mechanism showing the right and front sides only. It is absolutely fire and dust-proof. Should the take-up refuse to work or the film break within the mechanism, it cannot escape from the enclosure or come in contact with the light. Into the door on the right side is set a large plate glass which permits the operator to closely watch the operation of the film.

The chief claims for superiority of the Simplex projector consist in originality of design, extreme accuracy, durability of construction, absolute fire-proofness, simplicity of operation, brilliancy and steadiness of projection and silent operation.

It is the machine that is used in 90 per cent of the photoplay manufacturers' studios to test their films and project them for prospective purchasers.

Complete mechanism with stereo. attachment, less lenses and magazines, price complete (Code Equicmec) **$200.00**

Net weight, 47 lbs. Packed, 67 lbs.

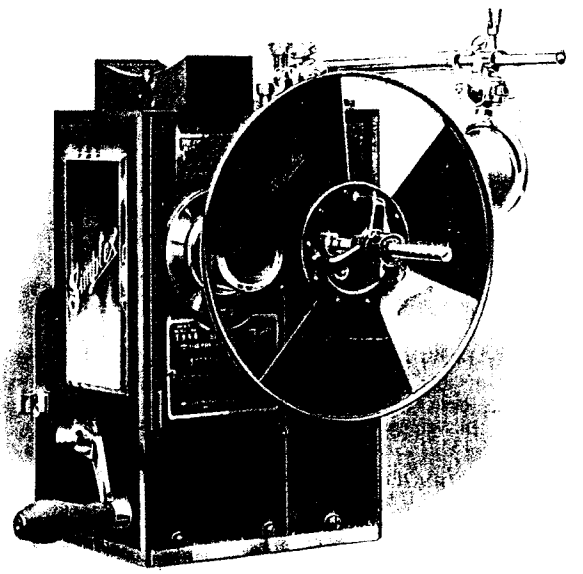
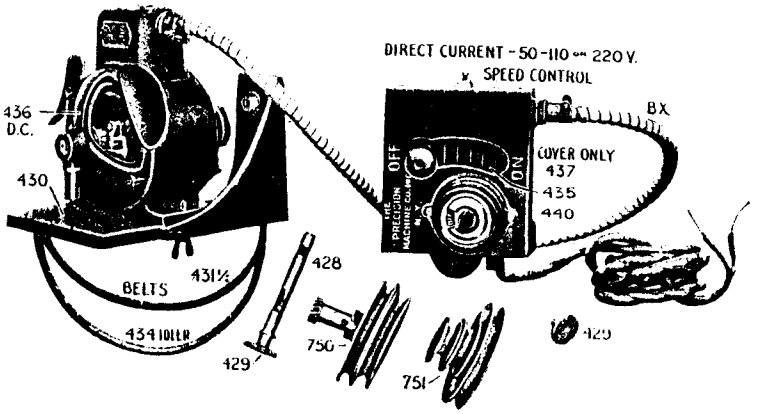


Plate AAA

Simplex Motors and Attachments



OVER 65 per cent of the motion picture machines sold today are equipped with motor drive.

The general construction and design of the Simplex mechanism make it especially suited for use with motor drive on account of its fireproof features.

At the first glance, inspectors and fire chiefs instantly recognize that "safety first" is one of the advantageous points of the Simplex projector.

Our motors and attachments are approved by Underwriters' Laboratories, Inc., National Board of Fire Underwriters, the Massachusetts District Police, Electrical Inspection Departments of New York, Chicago, Washington, D. C., Philadelphia and other principal cities of the United States and Canada.

Pedestals of Simplex projectors are designed for the easy attachment of the cast iron motor shelf 430, which fits into a milled slot on the left hand side, and is securely held by two bolts. The motors are attached to the pedestal by the wing screws, as illustrated.

Pulley 751 is an idler which fits over the stud on the center of the pedestal and is driven by the motor belt, which is connected to the large pulley. Motor drive pinion stud 428 is of steel, ½" in diameter, pack hardened and ground. It is securely held to the lower casting of the mechanism by set screws.

Motor drive pinion 750 meshes into the main driving gear of the mechanism and operates on stud 428.

The control of the speed is regulated by the resistance box, which gives eleven graduations, which, together with the two separate size pulleys, 750 and 751, permits a range of speed of from 10 to 24 pictures per second.

The alternating current motors furnished with the motor drive equipment are of a specially designed type, controlled by a speed regulator such as used on direct current; or, at the option of the purchaser, a repulsion type, the speed of which is controlled by shifting the brushes on the commutator.

On account of the low gearing and direct drive, the elimination of all frictional discs, springs, etc., vibration and noise are done away with.

The contacts of the speed regulator and motor binding posts are amply protected by a cast iron cover 437, on which is mounted a two-pole snap switch, which cuts off the line current.

The motors used in connection with the Simplex are of unusual efficiency, and the horse power rating is much in excess of the actual power required to operate the machine.

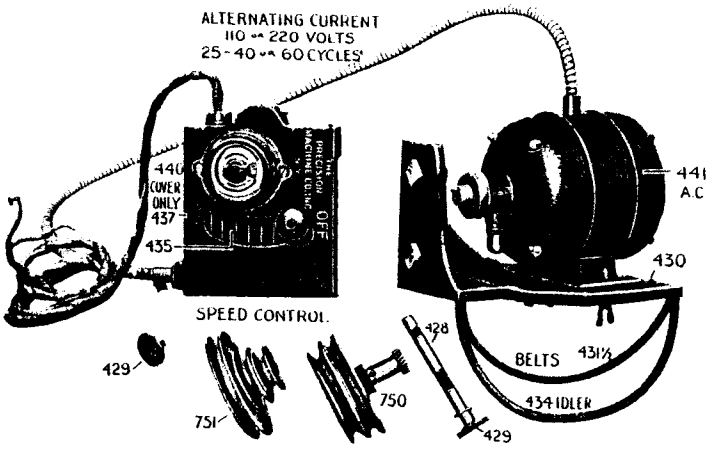
They are guaranteed by their respective makers and are encased, rendering them noiseless in operation and protecting them from dust, etc. The usual Simplex guarantee is behind every motor drive equipment.

A special spring switch attachment is necessary for use of the motor drive in Massachusetts. Spring hinges on magazines and lamp house doors are required in the city of Washington, and in addition for Chicago a special lamp house is necessary.

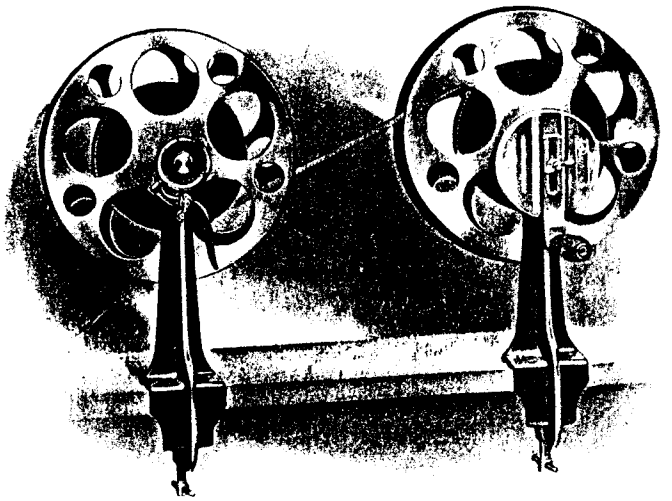
Weight, attachment only, net 13 lbs., packed 20 lbs. Weight, motor and speed control, net 34 lbs., packed 50 lbs.

Complete attachment, 110 or 220 volts 25 or 60 cycle A. C. . . . . $55.00 list
Massachusetts equipment, special 70.00 list

Including a direct or alternating current motor for either 110 or 220 volts (A. C. motors either 25-40 or 60 cycles).



Simplex Rewinder



THIS re-winder consists of two reinforced iron castings which may be clamped or screwed to a table or shelf. The workmanship and materials used are in keeping with the general construction of the Simplex projector.

The rewinding element has an adjustable handle, the length of which can be varied to suit the operator.

The main driving gear is of the internal type, which obviates chances of crushing the fingers or tearing the film, should it slip from the reel.

The dummy has a retarding brake, operated by a steel spring which holds the arm carrying the leather shoe against a frictional disc.

The pressure on the feed reel in process of rewinding can be varied at will of the operator by further pressure on the lever. This rewinder is regularly furnished with the Simplex equipment. It is also extensively used by the photoplay manufacturers.

Price of Simplex Rewinder, complete	**$6.00**
Price of Rewinding element only	**3.50**
Price of Dummy	**2.50**
Motor Driven, including 1-20 H. P. Motor (one speed)	**22.50**
Enclosed Rewinder with Fireproof Valves	**35.00**

Simplex Arc Lamp

THE simplicity of trimming the arc lamp is shown by the lamp being half removed from the lamp house. The lamp house and arc lamp, as furnished with the Simplex projector, are of the same massive construction as the balance of the Simplex equipment.

The lamp house is made of the best Russia iron and is of ample proportion to permit perfect ventilation and heat radiation.

The ventilating holes at the top and bottom of the lamp house are protected by metallic screens.

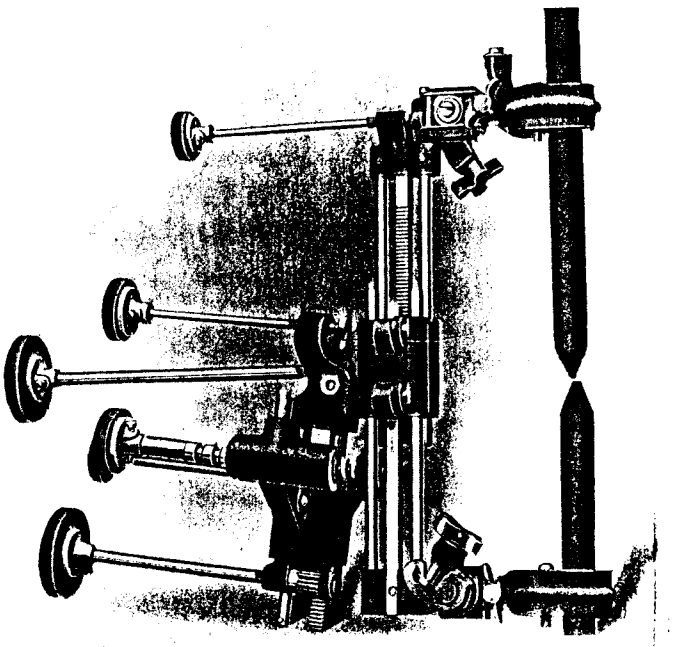
An important feature of the Simplex lamp house is the condenser mount which permits of expansion or contraction without danger of breakage and also enables the operator to adjust the distance between the condensers to eliminate the blue ghost or spot which frequently appears about the middle of the screen.

The carbon holders are furnished to accommodate carbons of ½″ to ¾″ diameter and 12″ upper and 6″ lower in length.

The carrying capacity of the arc lamp is 75 amperes.

There are eight adjustments to the Simplex lamp; six are accessible from the back of the lamp house; the remaining two, to alter the angle of the carbon, are from the inside.

A feature much appreciated by operators is the fact that the arc lamp can be withdrawn from the back of the lamp house so that all parts are readily accessible as shown at the bottom of page 22.



Regular Equipment

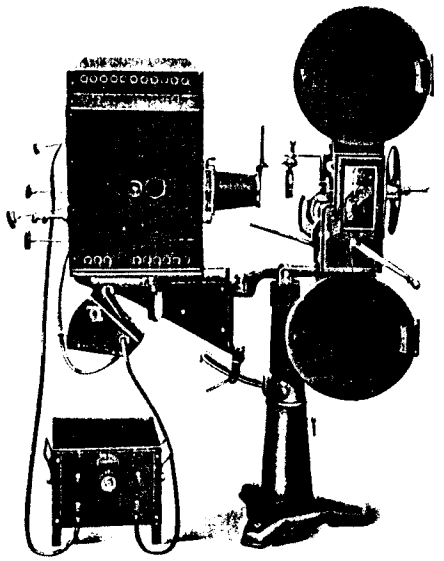
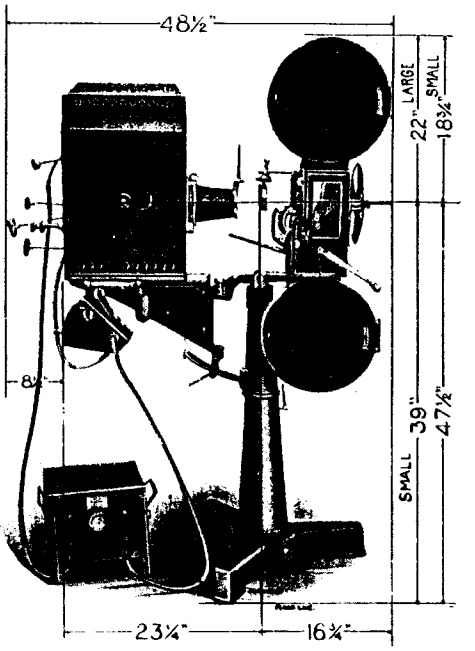


Plate 2—Illustrating the short pedestal base 39″ from floor to center of lens.

One enclosed Simplex mechanism, stereo. attachment, set of 14″ magazines with take-up, two 10″ steel reels, high grade motion picture lens, high grade single glass stereo. lens, lamp house, arc lamp, set of asbestos wire leads with lugs, two condensers, steel slide carrier, one 60-ampere D. P. knife switch enclosed in steel box, 45-ampere 110-volt adjustable enclosed grid rheostat, one Simplex rewinder, heavy adjustable cast iron pedestal complete with lag screws, either 39″ or 47½″ high (floor to center of lens).

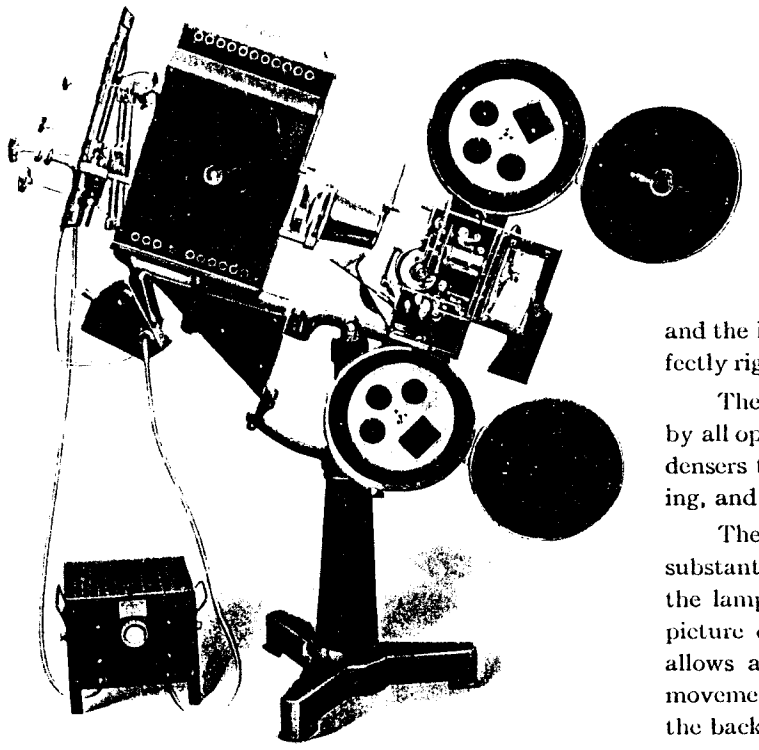


Specification Plate A

Size of case, 22″ x 25″ x 40″ Net weight, 111 lbs. Packed, 225 lbs.
Size of crate, 27″ x 43″ x 38″ Net weight, 176 lbs. Packed, 268 lbs.

Price complete (Code Equiby) . . . . . $300.00 list

Simplicity and Accessibility



The illustration at the left gives an excellent idea of the rigidity of the Simplex pedestal and shows the machine tilted to the maximum angle, 25 degrees. It weighs 136 lbs.

The center of the pedestal is pivoted so that the machine can be swung to the right or left. By careful calculation, we have determined the center of gravity of the stand, with the table support, the head and the lamp house, so that the machine is kept perfectly rigid and free from all vibration.

The condenser arrangement will be appreciated by all operators. Its construction permits the condensers to be easily and quickly removed for cleansing, and is shown in front of the lamp house.

The table for the lamp house is provided with a substantial swing movement, which instantly brings the lamp into optical center with either the moving picture or stereo. lens. This tilting arrangement allows ample adjustment and is governed by the movement of the support through the arc located at the back of the stand.

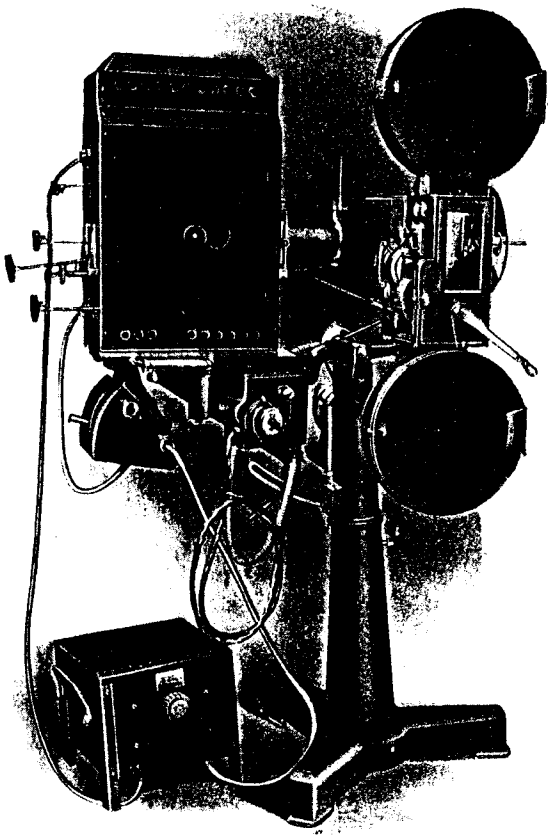


Plate B1

Motor Drive Equipment B-1

Same as regular complete outfit, model B, except furnished with complete motor drive either for 50, 110 or 220 volts, direct or alternating current, 25 to 60 cycles.

Case, net weight, 158 lbs.
Packed, 272 lbs.

Crate, net weight, 176 lbs.
Packed, 268 lbs.

Price, complete (Code Equibone) . . $355.00 list

Equipment C

Simplex enclosed mechanism, stereo. attachment, set 17″, magazines with special chain take-up and three 2500-ft. Bell & Howell 14¾″ reels with 5″ hubs, high grade single glass stereopticon lens, high grade motion picture lens, two condensers, set of asbestos wire leads, wire lugs, steel slide carrier, 60-ampere D. P. knife switch enclosed in steel box, 45-ampere adjustable, 110-volt enclosed grid rheostat, one special Simplex rewinder, arc lamp and lamp house, heavy adjustable cast-iron pedestal, either 39″ or 47½″ in height (floor to center of lens), complete with lag screws.

Case, net weight 136 lbs. Packed 250 lbs.
Crate, net weight 176 lbs. Packed 268 lbs.

Price, complete (Code Equicy) . . . . . $320.00 list

Equipment C-1

Same as Equipment C, except we furnish half size motion picture lens and either 110 or 220-volt D. C. or A.C. (25, 40 or 60 cycles) motor attachment.

Case, net weight 183 lbs. Packed 297 lbs.
Case, net weight 176 lbs. Packed 268 lbs.

Price, complete (Code Equicone) . . . . . $390.00 list

(For variations, additions or omissions to equipment, see page 25.)

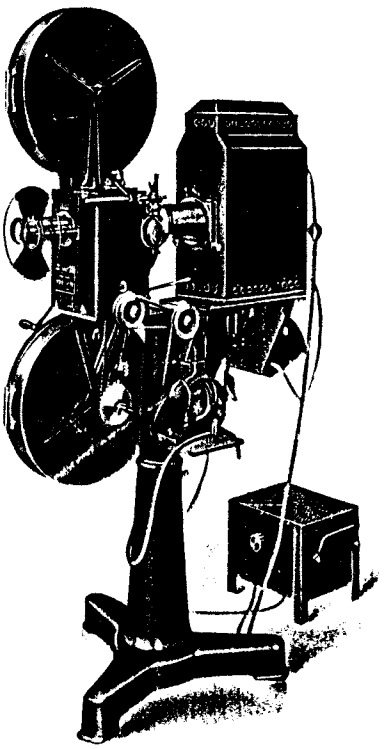
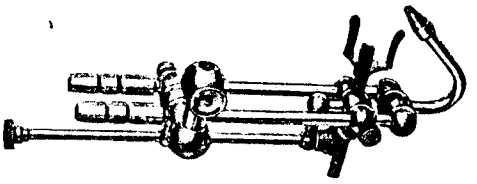


Plate C1

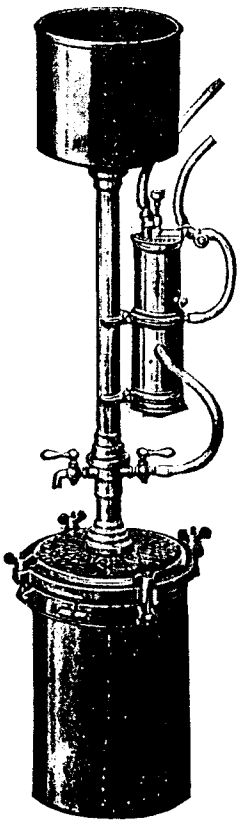
Portable Calcium Light Outfit, Model B



Calcium Light Burner

CALCIUM LIGHT is produced by burning, in combination, the proper proportion of Oxygen and Hydrogen gases, both of which are generated in the Model B outfit. The Oxygen gas is generated from the oxygen chemical compound, called "Oxone." The Hydrogen gas is produced by the vaporizing of a fine grade of Ether. Twenty-four cakes of Oxone and about ⅓ pound of Ether, is sufficient with a jet of medium bore for a one and a half hours' run.

It makes its own gas, there being no forced pressure, retorts, furnace or heat of any kind required. It can be used with safety. It can be easily carried. It can be used satisfactorily on short throws for moderate size pictures and gives approximately 700 candle power. This outfit is covered by our usual guarantee.



The Model B Calcium Gas Light Outfit, complete, without chemical or burner (Code Ogas)	**$35.00**
Extra Filler for Saturator, each	**.75**
"Oxone" Oxygen Compound, per box (24 cakes)	**1.35**
Limes, ⅞" diameter, per dozen	**1.00**
Sulphuric Ether, per pound	**.65**

Net weight, 35 lbs. Packed for shipping, 80 lbs.

Note

In is our desire that every user of our Simplex projection machine be satisfied in every respect. To accomplish this we have established a Simplex Service Bureau which we intend shall be all that the name implies.

For the benefit of the inexperienced exhibitors building new theatres, we will, for a nominal sum, have our Projection Engineer take full charge of the installation of the projection apparatus.

In this connection, in order to give you efficient service, it is necessary for your architect to consult us before the plans are drawn.

It is important that the operator keep the feed and intermittent sprockets (page 10), and the film trap shoes (page 11), free from gum and dirt. In running new film, the film trap shoes should be rubbed with a little beeswax or tallow to prevent the emulsion from sticking thereto.

Because of the high grade of steel and the exactness with which the shaftings fit into the bearings, nothing but the highest grade of light dynamo or sperm oil should be used, sparingly but often, to lubricate the moving parts.

In cleaning the mechanism, which should be done once a month, clean kerosene should be used, as the use of gasolene leaves a sediment.

The lenses should be kept perfectly clean. A good solution to use is one-quarter part grain alcohol and three-quarters part water. A soft piece of cambric should be used for the lenses and condensers.

Variations of Regular Equipments

Add to the List Price for

Motor Attachment, complete (see page 20)	$55.00
Gundlach Motion Picture Lens No. 1	5.00
" " " " (half size)	15.00
Simplex De Luxe Lens (highly corrected)	Prices on application.
" " " Anastigmat Lens (highly corrected)	
" " " Condenser Lens system	
Double Combination ½ size Stereopticon Lens	12.00
220-Volt Grid Rheostat (adjustable, 25 to 45 amperes)	20.00
Special 65-Ampere 110-Volt Grid Rheostat (adjustable, 35 to 65 amperes)	15.00
Extra Revolving Shutter, Complete	3.50
Chicago Approved Motor Drive Lamp House	5.00
Large Magazines, instead of regular size, with special chain take-up and three 2500-foot reels (Bell & Howell) with 5-inch hubs	20.00
Aluminum Pedestal (weight 48 pounds) instead of regular cast iron (weight 136 pounds), net price	25.00

Allowances for Omissions from Equipments

Deduct from List Price for

Rheostat	$10.00
Motion Picture Lens	5.00
Stereopticon Lens	2.50
Complete Rewinder	3.00
Condensers, each	.50
Reels, each	.25
Slide Carrier	.75
Set of Asbestos Wire Leads, with Lugs	1.25
Switch and Iron Switch Box	2.50
Arc Lamp, 75 amperes capacity	12.50
Lamp House (only), full list price	30.00

Miscellaneous Accessories

	LIST
Model B Calcium Light Generator	$35.00
Calcium Light Burner (see opposite page)	8.00
Gundlach Motion Picture Lens No. 1 (tube only)	12.00
" " " " No 2 " and Simplex Connector	21.00
Complete Intermittent Movement No. 622	30.00
110-Volt Grid Rheostat (adjustable, 25 to 45 amperes)	25.00
220 " " " " " "	30.00
110-Volt 65 ampere adjustable Grid Rheostat	45.00
220 " " " " " "	60.00
120 or 220 Coil Rheostats (adjustable up to 50 amperes)	40.00
2 or 3-Wing Aluminum Shutter Blades, each	1.50
Aluminum Shutter Spider Casting	2.00
Crown Lens Tubes	8.00
Single Glass Stereo. Lens	2.50
Condensers, each	1.00
Asbestos Wire No. 4, per foot	.12
" " No. 6, "	.10
Solderless Lugs, each	.25
Approved Two-Wire Stage Cable No. 6, per foot	.20
" " " " No. 4 "	.24
B. & H. Special Reels, 5-inch Hubs, 15½ inches or 14¾ inches, each	2.25
B. & H. Special 11-inch Reels, 5-inch Hubs, each	1.00
Large Magazine Equipment, complete with 1 chain and gear 6	35.00
Motors D.C. or A.C., 110 or 220 Volts, 25 to 40 or 60 cycles each	25.00
Motor Speed Controllers, 110 or 220 Volts, 25 to 40 or 60 cycles each	12.00
Motor Attachments, Less Motor and Speed Controller	18.00
Set of Bal Fibre Trunks, net	100.00
Complete Arc Lamp and Lamp House	55.00
Portable Muslin Screen, 12 feet 6 inches wide, seamless, any length, per running foot	2.00
Simplex Oil (per gallon can)	2.00

Transformers, etc. Projection Engineering Service. Prices on application.

Indorsements of the Simplex Projector

In 90% of the Photoplay Manufacturing Studios

Bell & Howell Company

Chicago, Feb. 28, 1914

GENTLEMEN:—The designer of the SIMPLEX avoided the patch work methods of earlier builders and produced a machine, new in all its essential features, which at once took first place as a means of motion picture projection.

Superiority of design and construction have combined to make the SIMPLEX simple, easy running, and durable under the most trying conditions. Its perfect film control, its even balance of action, insure rock steady, flickerless projection and its provision against fire danger is not one of the least important features—and these facts account in a large measure for the sales of over 500 of these machines in the Chicago district during the past eighteen months.

As we have been engaged in the motion picture business during the entire life of that industry and have established a world-wide reputation, we are certainly qualified to pass judgment on motion picture projecting apparatus.

BELL & HOWELL COMPANY

✦

All Star Feature Corporation

New York, U. S. A., January 26th, 1914

GENTLEMEN:—Recent use of projection machines, and in which matter we are at all times most particular and exacting, prompts our writing you in compliment and endorsement of the SIMPLEX projector.

The SIMPLEX qualities of reliability, long life and accurate projection are held in our highest esteem and we feel that the good which the SIMPLEX has done for our industry should not pass without our compliment.

Yours very truly,

ALL STAR FEATURE CORPORATION,

HARRY R. RAVER, *President*

✦

Vanoscope Company

New York, Dec. 15, 1913

B. F. PORTER:—I hand you herewith our order for one SIMPLEX projecting machine for immediate delivery. I have made a close investigation of every machine in the market and am convinced that the Simplex machine is made on honor.

We are going to show it alongside the Vanoscope optical projector, to demonstrate the contrast between intermittent and non-intermittent projection, so that no one can say that we have not selected a high grade, up-to-date machine as a comparison.

WILLIAM J. ROBINSON

✦

Moving Picture Machine Operators Local No. 225

DEAR SIRS: After Very Severe Tests of this Machine by members of the Moving Picture Machine Operators Protective Union, Local No. 225, they do hereby go on record as unanimously indorsing the SIMPLEX Projector as one of the best Moving Picture Machines in use in the State of Georgia today and predict a very bright future for it in this territory.

Yours very truly,

MOVING PICTURE MACHINE OPERATORS
LOCAL No. 225

H. EASON
W. P. RAOUL } *Committee*

Atlanta, Ga.

Expert Testimony

Washington, D. C., Feb. 24, 1913

DEAR SIRS:—I believe in the SIMPLEX. I am a machinist of twenty-two years' experience and have been operating five years, using all kinds of machines, and I think I know a good one when I see it.

W. H. MARSHALL

Chief Operator, Avenue Grand Theatre.

✦

A Competent Judge

New York, March 25, 1914

GENTLEMEN:—As the introducer of moving picture machines before the American public eighteen years ago at the Eden Musee, in New York, I have had considerable experience in motion picture projection apparatus, and I take great pleasure in endorsing the SIMPLEX Projector as positively the most satisfactory projecting machine built.

The first completed SIMPLEX machine was used at the Eden Musee three years ago, and is still in use in our projecting room.

EDEN MUSEE

R. G. HOLLAMAN

✦

Simplex Export Strength

New York, March 27, 1914

GENTLEMEN:—Our experience of shipping your wonderful SIMPLEX machines to almost every part of the world within the last two years, prompts us to write you and commend you in this manner, because we have never yet had a call from anyone for a spare part.

We have reports from all of Latin America, and have yet to hear of one dissatisfied user of a SIMPLEX.

UNIVERSAL FILM MFG. CO.

MR. A. VON KOENIG, *Export Mgr.*

✦

Famous Players Film Co.

New York, Jan. 27, 1914

GENTLEMEN:—I am glad to advise you that the new 17" magazine motor drive SIMPLEX machine which you installed in our laboratory is in perfect working order. I feel that I should compliment you on the construction of your machines, as the one which we have been running in our studio for over a year has given us no trouble at all.

It is gratifying to know that we can project all of our negatives on a SIMPLEX machine without having to worry about ruining same.

FAMOUS PLAYERS FILM CO.,

ALBERT A. KAUFMAN, *Studio Manager*

✦

The Royal Bioscope

Liverpool, August 19th, 1913

DEAR SIRS:—I have pleasure in certifying that the SIMPLEX machine is everything you claimed for it.

The first result on the Screen to-day is just as perfect as on the day we just used the machine in November, 1912.

I fully endorse the remarks of the RESE Film Company: "*For absolute perfection and precision coupled with extreme simplicity*, it is everything that can be desired."

In my opinion the SIMPLEX is it.

ANTHON BROWN, *Sole Director*

Used in the Main Offices of the General, Mutual and Universal Film Companies

Indorsements of the Simplex Projector

In the largest theatres in the world

From One Who Knows

Athol, Mass., August 3,1913

GENTLEMEN:—I find it to be far superior to any other machine now on the market. And I find it gives a fine, steady picture, better than the———ever thought to be. I hold a Massachusetts business 7 years and have worked on all makes of machines. But give me the SIMPLEX anytime.

FRANK R. CULBERT,
THE GEM THEATRE

✦

Graumans Imperial Theatre

San Francisco, Cal., March 22, 1914

PRECISION MACHINE CO.,
317 East 34th St., New York.

Our SIMPLEX machines are in perfect condition. Run thirteen months. Never renewed a part. Best house in town. Pictures only. Ten, twenty and thirty. Run continuous. Some record for you.

GRAUMANS IMPERIAL THEATRE
San Francisco

✦

Simplex Machines have been selected for the Strand, New York, the largest photoplay theatre in the world. Present manager said in Minneapolis:

May 20th, 1913

GENTLEMEN:—We have had two SIMPLEX machines in this theatre for nearly one year and I cannot help but write and tell you of the splendid satisfaction that they are giving us.

The character of this institution is such that we must at all times maintain a tremendously high standard, and we attribute our remarkable success mostly to our excellent projection for which the SIMPLEX is responsible. Surely any exhibitor after an intelligent comparison cannot fail but choose this machine.

SAXES-LYRIC
S. L. ROTHAPFEL

✦

Fichtenberg Enterprises

New Orleans, La., Jan. 9, 1913

GENTLEMEN:—I expect to open a new moving picture theatre very shortly and this will make six of my houses that have two machines in each.

I wish to advise that the two machines we have in our Alamo Theatre are now sixteen months old and are just as good as the day we put them in.

Very truly yours,
H. FICHTENBERG

✦

Secretary, International Exposition—Motion Picture Art

April 14th, 1913

GENTLEMEN:—While in London recently at the Cinematograph Exposition at Olympia, I interested myself in looking after the exhibition of the SIMPLEX machine.

Without doubt, it is the greatest and most solid looking projector exhibited at Olympia. In talking with exhibitors, it was generally conceded that the SIMPLEX led all other machines at the Exposition, and in all new theatres that were being installed the SIMPLEX was accepted as the up-to-date machine.

Yours very truly,
F. E. SAMUELS

Satisfies. No Upkeep Expense

Livingston, Mont., Jan. 12, 1914

GENTLEMEN:—The SIMPLEX machine I purchased about two years ago has given perfect satisfaction. I have used all the leading makes of the Motion Picture Machines and I would not trade my old SIMPLEX No. 217 for any other two machines, if I could not get another SIMPLEX.

During this time have not spent one cent for parts or repairs.

E. P. WHITE

✦

Its Perfect Protection

New York, March 3, 1914

GENTLEMEN:—The universal opinion of our patrons, as well as some of our competitors, is that we are not only projecting one of the largest pictures but the brightest, clearest and steadiest they have ever seen. The marvelous projection in this House speaks for itself.

AETNA AMUSEMENT CORPORATION
Olympia Theatre — 107th St. and Broadway

✦

Stands the Test of Time

Fort Worth, Tex., Oct. 25th, 1913

GENTLEMEN:—The two SIMPLEXES I am now running are No. 84 and No. 148. Have run one machine just about two years. Other will be two years in January, and have no trouble to complain of. They are just as good as new now.

LEON FRIEDMAN, P. O. Box 154

Member I. A. T. S. E. 126.

✦

Orpheum Circuit of Theatres

Duluth, Minn., December 4, 1913

GENTLEMEN:—I have handled every other standard machine, including the——, ——, —— and ——, also — —.

Guess you will agree that picture projectors are still far from perfect, but I honestly believe that your projector is the result of an anticipation far in advance of any other. Our machine was purchased through the Minneapolis General Film Company.

REX C. BROWN

✦

Motion Picture Exhibitors League of America

New York, July 1st, 1913

I called at the factory and was shown through the entire plant, seeing each and every modern department therein. I was indeed greatly surprised at the magnitude of the same, the modern up-to-date equipment, the vast corps of such highly intelligent master mechanics at work on SIMPLEX machines.

With sincerest wishes, I am,

Most respectfully yours,
CLEM KERR

✦

Praise from Australia

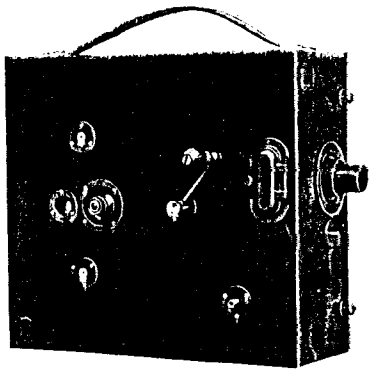
Goulburn, N. S. W., Australia

DEAR SIRS:—You will be pleased to know that when quite recently our machine was overhauled, it was found to be as good as when purchased, although it has had nine months or more solid running.

EMPIRE THEATRE,
WILLIAM J. NICHOLSON

Used in the Main Offices of the General, Mutual and Universal Film Companies

Simplex Motion Picture Camera



WHILE the Simplex Motion Picture Camera is designed primarily for the amateur camera enthusiast, explorer and the enterprising motion picture exhibitor who wants to be prepared to take on short notice incidents of local interest, it is expected that the simplicity, high class workmanship and handiness of the Simplex camera will appeal strongly to the professional camera man who will prefer it for much of his work.

It is replete with all necessary features, is thoroughly up-to-date and possesses many novel and individual ideas.

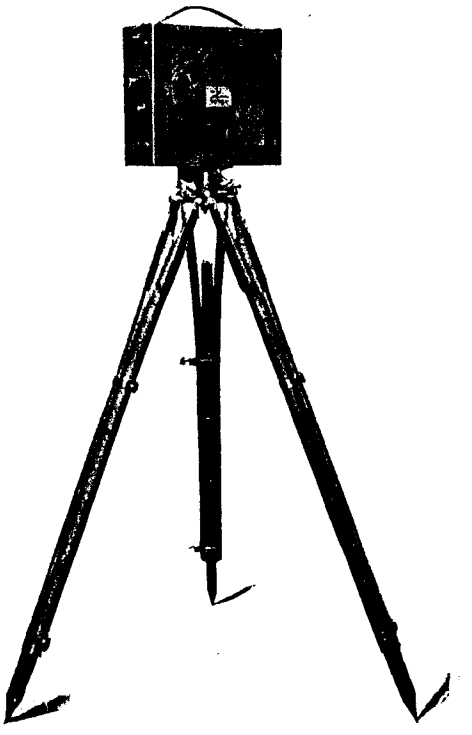
This camera is exceptionally light in weight, small in dimensions, readily accessible and simple to thread and operate.

The magazines have a capacity of 200 feet of film and one set is furnished with each camera.

The lens is of the well-known Bausch & Lomb Zeiss Tessar F 3.5, and either a 50 or 75 m.m. lens is supplied at the option of the purchaser.

Any lens can be furnished as desired. Prices on application.

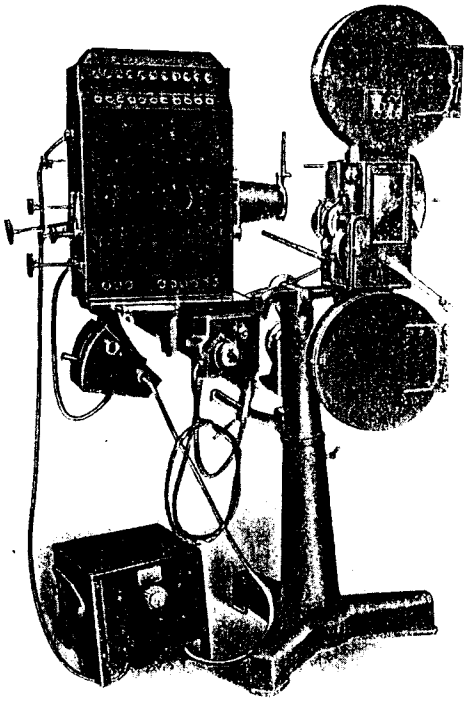
The tripod is of original design, of exceptional rigidity; a panoramic and titling head is a part of each outfit.



The price of complete camera, as listed above	$250.00
Camera only, including leather carrying case and B & L 50 or 75 m.m. lens	$225.00
Tripod complete . . .	50.00
Extra magazines each .	5.00
Extra B & L lens (when ordered with camera)	$30.00

1915 Revised Regular Simplex Equipment 1915

One set of new standard magazines drawn in two pieces from No. 18 gauge steel, inside diameter 16" accommodating 2000 ft. reels, with improved malleable iron strap hinges 7½" wide, self closing doors with spring latch (Underwriters' requirements for all motor driven machines) 3" x 4" x ¼" wire glass window in upper magazine; improved reversible takeup pulley, (permitting the use of regular reels or Bell & Howell special 5" hubs); two takeup belts; two 14" steel reels; **high grade single combination two lens achromatic stereopticon objective**; set imported optical glass condensers; at option of purchaser, **either No. 1 Gundlach or Crown "Special" motion picture objective**; enclosed 110 volt grid type Underwriters' approved rheostat, adjustable 25 to 50 amperes, and one enclosed fire and dustproof mechanism with hinged doors, adjustable stereopticon attachment; arc lamp and improved lamp house with double doors; set of asbestos wire leads with lugs; one 60 ampere double pole knife switch enclosed in steel box; one steel slide carrier; one Simplex rewinder; one heavy adjustable cast iron pedestal complete with lag screws; at the option of the purchaser, pedestal height either 39 or 47½" from floor to center of lens.



Net weight complete.....287 lbs.
Packed for shipment.....495 lbs.
Price complete as listed.....$300.00

EQUIPMENT B-1 (MOTOR DRIVEN)

Same as above with 110 or 220 Volt alternating or direct current motor and attachments as illustrated **$355.00**

EQUIPMENTS C and C1.....**Withdrawn**

ADD TO THE LIST PRICE OF $300.00 FOR THE FOLLOWING VARIATIONS.

Type "S" Arc Burner and Lamp House	$55.00
220 Volt approved grid rheostat, adjustable 25 to 50 amperes	12.00
110 Volt approved grid rheostat, adjustable 30 to 65 amperes	15.00
110 Volt approved grid rheostat, adjustable 35 to 90 amperes	37.50
No. 2 Gundlach lens with Simplex connector	11.00
Chain driven take-up in lieu of regular belt drive	4.50
110 or 220 Volt alternating or direct current motor and motor drive attachments, complete	55.00
Aluminum Pedestal in lieu of regular iron pedestal, add to net price	20.00

NOTE:—SIMPLEX PROJECTORS PURCHASED FROM UNAUTHORIZED DEALERS NOT GUARANTEED.

Simplex Type "S" Arc Burner and Lamp House.

The type "S" lamp represents the achievement of our exhaustive efforts to place at the disposal of the trade an arc lamp of massive construction with extremely high carrying capacity—one which is simple, rigid and accessible combined with numerous adjustments of the mechanism to afford the operator **perfect control of the arc.**

The entire lamp has a wonderful resistance to wear and is constructed of the best grey cast iron. The working parts are **carefully machined and are in accordance with the standard of excellence which has gained for the Simplex machine recognition as the Peerless Projector.** This lamp is not entirely new to the American and European trade as we have had several of them in use throughout this country and in Europe for the past year and a half.

In the technique of photography there are three qualities that are factors which the photographer must observe, high lights, half tones and shadows. In order to properly project the beauty and details of a photo-play the latitude of adjustment of the amperage at the arc should be wide. Obviously, therefore, a rheostat with a capacity for heavy duty should be available so that when projecting the candle power of the light can be varied to harmonize with the density of the film. If the reader will consider the ratio of magnification between the exposed film in the aperture plate of the machine (approximately ¾" x 1") to that of the projected picture and compare the proportionate size of the objects on the film to the projected images on the screen, the need for an extremely high candle power light to be centered on the film is manifest.

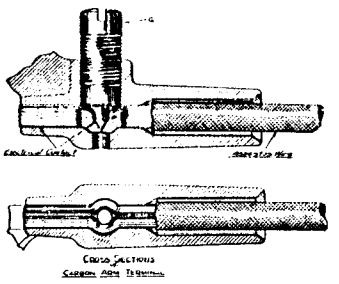


PLATE "A"

Electrical and Mechanical Construction Details of Burner and Lamp House

A careful perusal of the following should be of interest to the operator and exhibitor or to the prospective purchaser of a moving picture machine. Special attention is called to the mechanical and electrical features, also to the large, roomy lamp house: its accessibility, ventilating system, individual condenser mounts and the carbon holders.

The carbon clamps are a simple design of extremely high carrying capacity; and, on account of their massive construction, have low resistance. They are made from grey malleable iron, rigid in construction, of good conductivity, and the design of the jaws allows uniform carbon contact. The carbon holder arms are heavily insulated by three ¼" thick mica washers which are clamped between the holder and the bracket on the lamp by three screws. Clamping the carbon is accomplished by tightening the hexagon head nut "1" and "1-2", Plate "B", on the end of the carbon holder stud. A coarse pitch of the threaded portion permits quick and accurate adjustment.

The electrical terminal binding posts of the carbon holders are located 4½" from the carbon jaws. (Plate "B").

Plate "A" is a cross section showing the method of securing the lead wires by binding same against the long arm with the contact binding screw "G". The end of the terminal is bored large enough to permit entry of the asbestos covering of the lead wire which it properly supports and protects from abrasion. The use of lugs is avoided and burn-outs which frequently occur in most lamps through poor electrical contact are eliminated. The contact is much longer and the binding post is directly connected to the carbon arm. More than 150 amperes can safely be used.

Adjustments of the Arc Lamp Mechanism as illustrated on Plate B.

A—Carbon feed for actuating the carbon holders.
B—Longitudinal adjustment of the top carbon (1½").
C—Vertical adjustment of the entire burner used to raise the spot.
D—Transversal adjustment 2¾" of the entire burner used to center the light.
E—Transversal adjustment of the lower carbon.
F—Longitudinal adjustment of entire burner to or from condensers.
G—Contact piece connection screw for the lugless terminal.
H—One piece lamp house base (fits any Simplex pedestal).
I—Upper carbon holder clamp nut. Plate "C" CCN.
I—2 Lower carbon holder clamp nut. Plate "C" CCN.
J—Mica washers ¾" thick insulating carbon arms from brackets.
K—Sliding frame guide rod ⅜" diameter 3¼" apart.
L—Carbon feed screw (right and left thread).
M—Tapped holes in base for attachment to lamp house carriage.
N—Large steel spiral cut gears for adjustment of burner.
O—Universal joint. Inner side riveted, outer side cotterpinned for removal of rods.

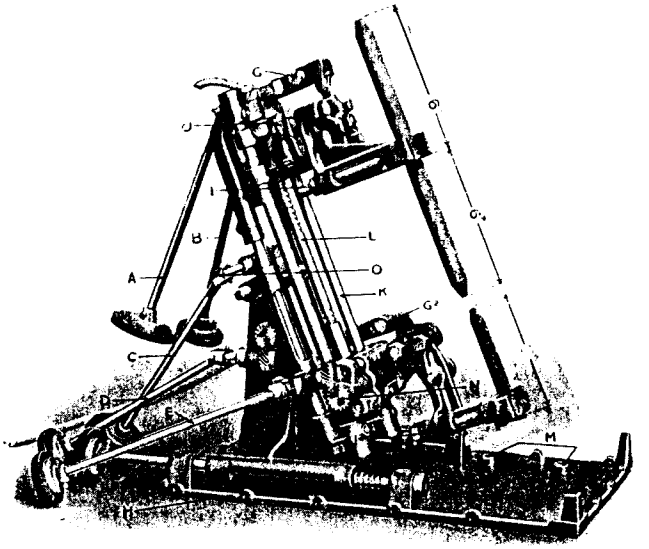


PLATE "B"

Upper carbon holder accommodates carbons from ⅝" to 1" in diameter and 12" in length. Lower ½" to ¾" in diameter and 6" in length.

The six adjusting rods that pass through the back of the lamp terminate in knurled discs of fibre 2½" in diameter x ¼" in thickness, and being non-conductors of heat remain cool and are easily handled at all times.

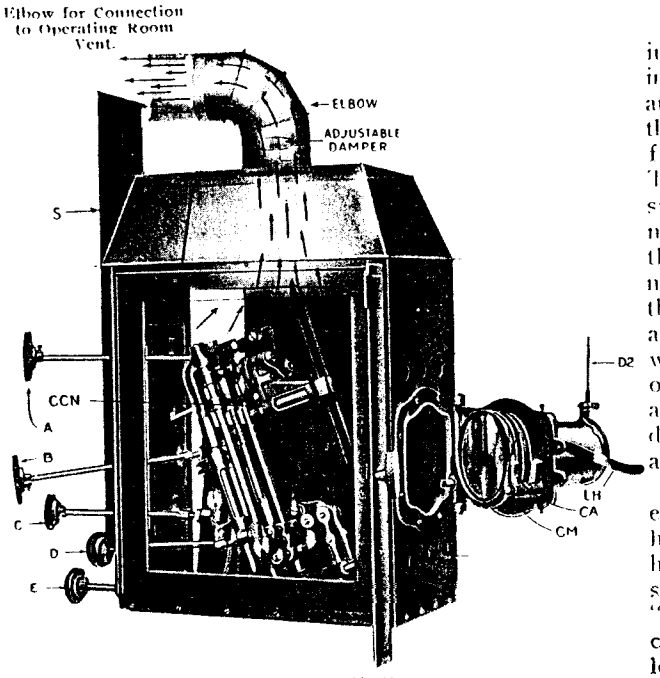
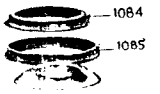


PLATE "C"



Condenser Mounts

The condensing lenses are held in individual heavy brass mounts which are made in two pieces (See 1084-1085, illustration above), and on account of their massive construction retain the heat thereby protecting the edges of the lenses from cooling as rapidly as they otherwise would. The **condensers are sometimes broken by being** subjected to sudden draughts of cold air, but in most cases **from inadequate air circulation** about them, and internal strain; that is, the edges cool more rapidly than the center. The method of holding the mounted condensers in the Type "S" lamp is an innovation. The individual rings are provided with a lip on one side which sets into the frame on the gate, thus insuring the lenses being held absolutely parallel. This serves to obliterate the double spot on the aperture plate which frequently appears when the lenses are out of alignment.

An important feature much appreciated by all experienced operators, especially those who have had occasion to use the Simplex, is the adjustable holders. This enables the operator to vary the space between the condensers by loosening screw "CA", **thus changing the equivalent foci of the combination to suit the focus of the projection lens.**

In the Type "S" lamp condenser combinations from 3¼" to 7" E. F. can be used.

Provided condensers of correct focal length are used the operator may then eliminate the blue ghost which frequently appears on the screen.

The entire lamp house cone carrying a slide carrier, light dowser (D-2) and the individual condenser mounts swings outward on a hinge similar to that of the breach of a gun. This facilitates the quick removal of condenser when necessary. It is held closed by locking lever "LH," Plate C.

Housing and Ventilation—Plate "C"

The dimensions are liberal, being 25½" high x 9½" wide x 20" long. It is constructed of the best sheet steel the gauge being much heavier than that used in the construction of the regular Simplex arc lamp housing. It is equipped with two doors 18½" x 16¾" and a movable slide in the rear 13" x 5¾", permitting easy access to the burner. The doors are double walled, one side consisting of perforated steel backed by a fine mesh. Between the perforated steel and the outer side of the door is an air space of ¾" allowing a circulation of cool air. The ventilation is such that when using 75 amperes at the arc the outside does not get warm enough to burn the back of the hand.

On top of the lamp house is a ventilating pipe 4" in diameter with a damper attached thereto to regulate the draught. With each lamp is supplied an elbow so that the operator may connect same with a piece of ordinary stock stove pipe to the vent from the operating room.

Poor ventilation of the lamp house causes the carbons to burn unevenly through the lack of oxygen and subjects the burner to enormous heat, impairs the insulation of the carbon holders, and causes condenser breakage and the deposit of carbon ash. The latter increases the temperature of the housing.

We are the first manufacturers to supply a vent pipe on top of the lamp house and it may be timely to remark here that same has been **approved by the National Board of Fire Underwriters and the Health Boards** of several of the largest cities. When the pipe is connected to the vent of the operating room it reduces the temperature, also that of the interior of the lamp, **lessens condenser breakage, and carries away the obnoxious gases emitted from the burning of the carbons, thereby removing the danger which impairs the health of the operator.** Furthermore, it not only protects the burner but **permits the carbons to burn at a more uniform rate,** due to the freer admission of oxygen.

The arrows on Plate "C" indicate the air circulation. Under and over the condenser mount are vent holes which permit a circulation of air, around the lenses. These are covered by perforated steel mesh and shields to prevent sparks and light escaping.

The Dun Automatic Arc Controller is easily fitted to the Type "S" burner.

PRICE complete with two condensers, two mounts, one carbon clamp wrench, one steel slide carrier, package of graphite, one elbow $110.00
When ordered with machine in lieu of regular lamp house 55.00

Miscellaneous Accessories

Stereopticon objective achromatic, new type, unmounted	$5.25
Stereopticon objective adapter rings, (new type) set (2)	.50
Simplex DeLuxe motion picture objective	35.00
Crown Special motion picture projection objective	15.00
Crown Special motion picture projection objective jacket	3.00
Gundlach No. 1 motion picture projection objective	12.00
Gundlach No. 1 motion picture projection objective jacket	3.00
Gundlach No. 2 motion picture projection objective, with Simplex connector	22.00
Type "S" Simplex new model Arc lamp and lamp house complete	110.00
110 Volt approved grid rheostat, adjustable 25 to 50 amperes	22.50
110 Volt approved grid rheostat, adjustable 30 to 65 amperes	37.50
110 Volt approved grid rheostat, adjustable 35 to 90 amperes	60.00
220 Volt approved grid rheostat, adjustable 25 to 50 amperes	34.50
220 Volt approved grid rheostat, adjustable 30 to 65 amperes	60.00
Magazine, 17", with attachments	Obsolete
Standard 16" steel magazine, upper, with bracket	12.00
Standard 16" steel magazine, lower, complete, with fireproof valve and improved reversible take-up pulley for belt drive 1000 or 2000 ft. reels	20.00
Mechanism main driving gear No. 6, belt drive	3.50
Mechanism main driving gear No. 600½, with sprocket for chain drive	3.50
Chain drive takeup shaft sprocket, 9 teeth, for small hub reels	.60
Chain drive takeup 29" driving chain for small hub reels	2.40
Chain drive takeup shaft sprocket, 27 teeth, for B. & H. 5" hub, 2000 foot reels	1.00
Chain drive takeup 37" driving chain for B. & H. 5" hub, 2000 foot reels	3.00
Bell & Howell 2000 ft. special 5" hub 14¾" reels	2.25
Bell & Howell 1000 ft. special 5" hub 11" reels	1.00
Regular 14" small hub reels	1.25
Regular 10" small hub reels, steel	.50
Takeup belts, leather, each	.25
Wire coupling for leather belts	.05
New pedestal pulley No. 751 B, motor drive, 6" diameter	1.80
Simplex oil in gal. and ½ gal. cans, per gallon	2.00
New combination reversible takeup pulley	2.00
New combination reversible takeup pulley friction washer	.50
Aluminum Pedestal (weight 65 lbs.), list.	75.00
Automatic Arc Controller, 110 or 220 volt, direct current	100.00
Bell & Howell, 110 or 220 volt 60 cycle "Inductor Compensator"	50.00

Transformers for other frequencies, and voltages,—on application.

PRICES GIVEN HEREIN EFFECTIVE JANUARY 1, 1915, SUPERSEDE THOSE ON PAGES 22, 23 AND 25; OTHERS REMAIN THE SAME.