

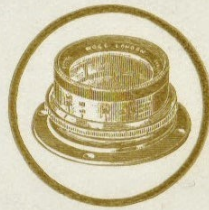
Show your Films  
through a Ross  
Projector







# *The* Ross Kinematograph Projector



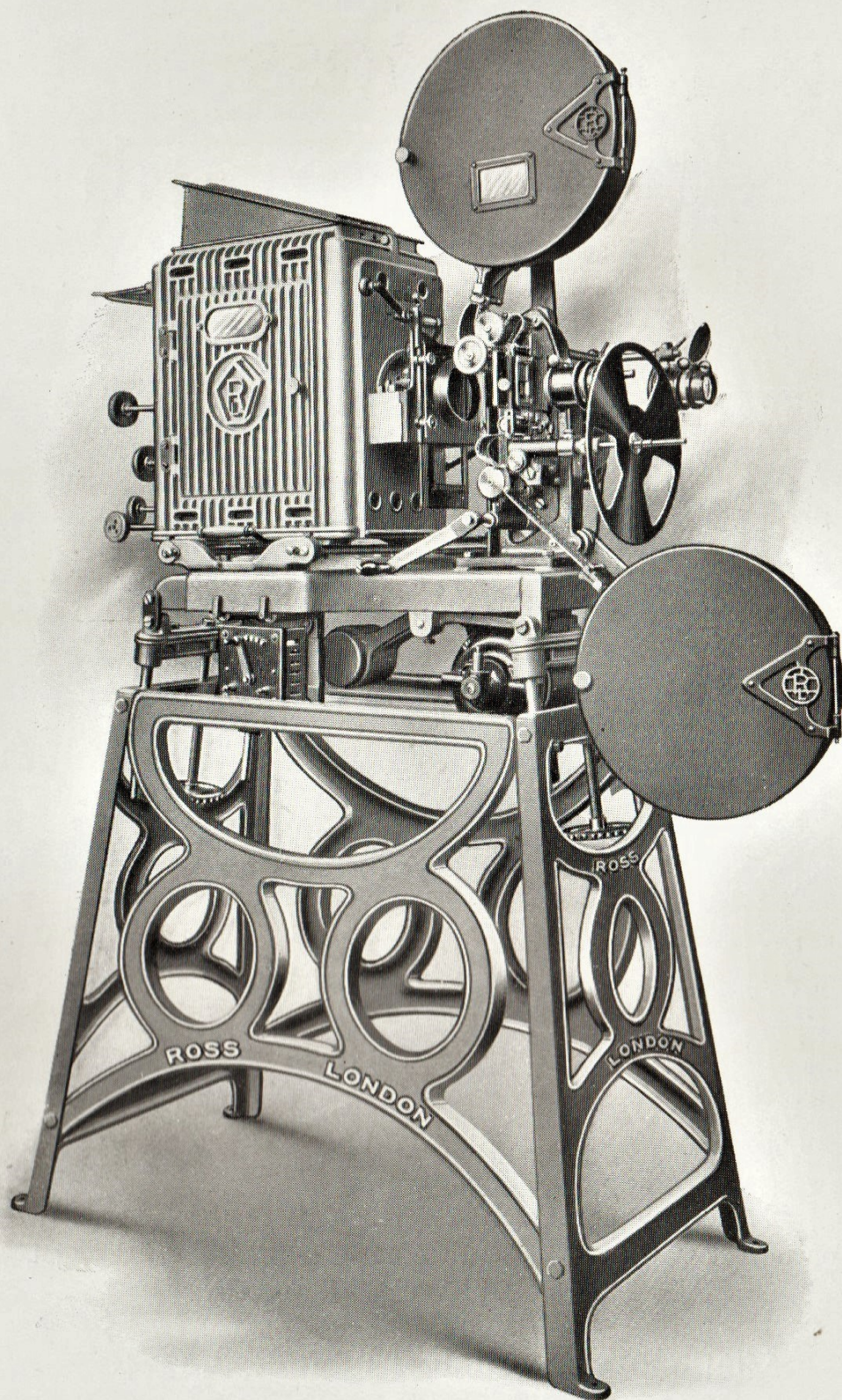
*Manufactured by* ROSS, LTD.

Manufacturing Opticians to His Majesty the King,  
Contractors to His Majesty's Governments, British and Colonial,  
Also to Principal Foreign Governments,

Clapham Common London, S.W.4.

West End Showrooms :  
13 & 14, Gt. Castle Street, London, W.1.







# INTRODUCTION

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IN introducing the latest product of the House of Ross few words are necessary. The Ross Kinematograph Projector, like all other of our products, is the result of the closest study of practical men well experienced in the production of Kinematograph Projecting Machines determined to produce a machine even better than any yet obtainable, and not only so, but the best for long to come.

A few moments' glance at the following pages will suffice to show that many new and valuable features have been introduced, making for efficiency and simplicity of working. No one of these has been adopted until after the most thorough testing and actual proof of its worth.

The Ross Kinematograph Projector can be installed with the utmost confidence, knowing that no claim made on its behalf cannot be abundantly supported, and that behind the machine itself and every single part of its mechanism is the House of Ross, famous for almost a century for the excellence of its products.



# *The* Ross Kinematograph Projector

## A SHORT DESCRIPTION OF THE MACHINE

**T**HE complete machine consists of the Projector Mechanism with Spoolboxes complete, Projection and Lantern Lenses, the Lamphouse with Condenser and Lantern Slide changing device, Arc Lamp, Stand with rising and falling movement and Swivelling Motor Bracket complete with Driving Motor.

**PROJECTOR MECHANISM.** The Projector is built on the fixed optical centre system, the whole mechanism being attached to a sliding inner frame working in long V slides carefully machined and fitted in the main frame of the Projector. The inner frame is carefully balanced by properly proportioned Spiral Springs, and is easily moved up and down by a Pinion with a large handwheel gearing into a rack attached to the inner frame—giving a movement of more than one whole picture for masking purposes. Inner frame has cast, integral with it, all the bosses and projections forming the bearings for the driving mechanism.

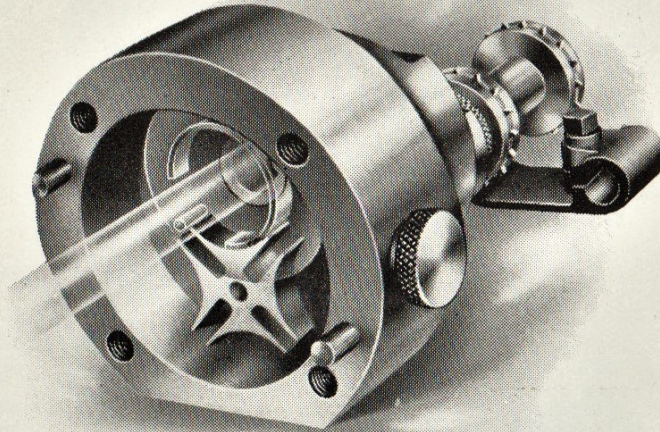
**BEARINGS.** All Bearings are phosphor bronze bushes, specially long and carefully lapped, and externally machine ground to very fine limits, which are then pressed into the bosses of the inner frame. They are easily removed if necessary to have them replaced when worn.

All spindles running in these bearings are made of specially heat-treated Chrome Vanadium Steel, and are made in one piece with their pinions. The Spindles, after hardening, are carefully ground and the pinions rectified.

**GEARS.** All Gears other than the pinions and the bevel gears are of specially selected iron and cut with spiral teeth to make the running of the machine noiseless. Long experiments have shown that hardened pinions running so together with cast-iron gears are immune from any wear and will keep their sweetness of running indefinitely.



## *The Ross* Kinematograph Projector



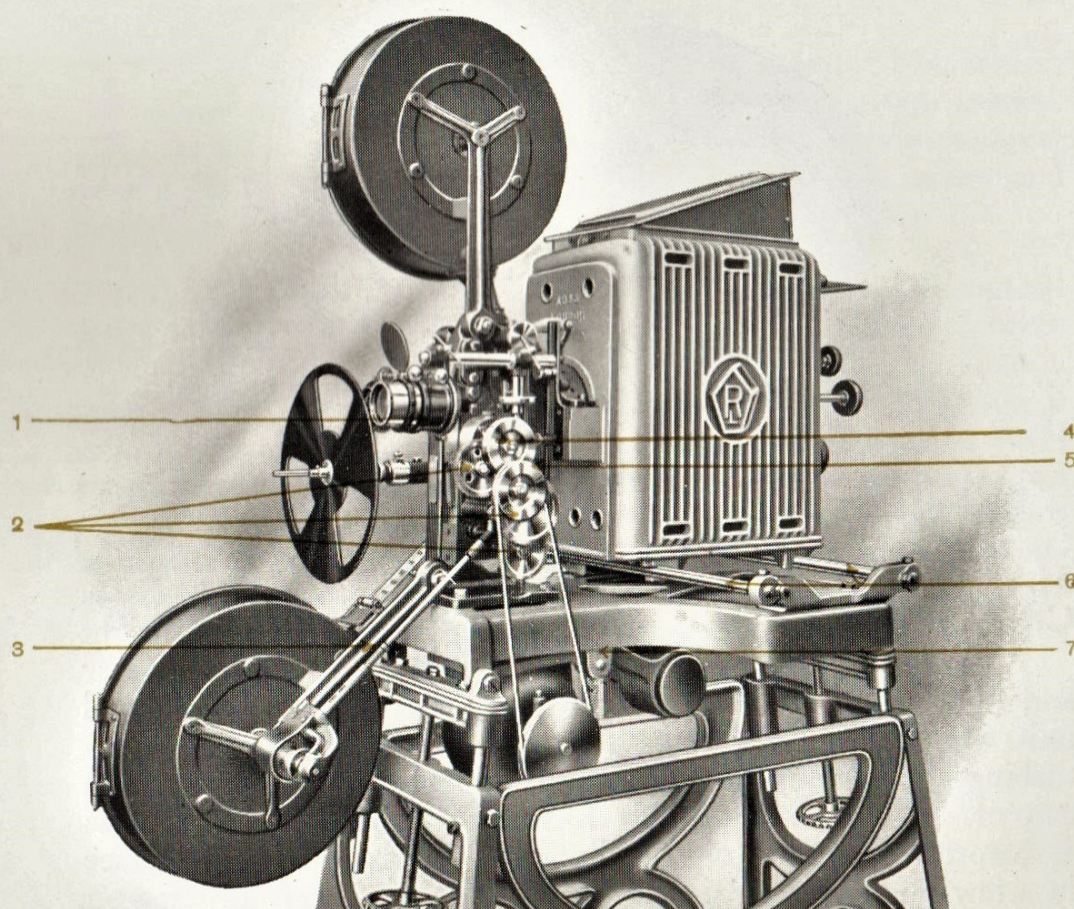
### **MALTESE CROSS.**

The inner frame also carries the Maltese Cross movement, which is enclosed in an oil-tight box, and which, together with an Idler Gear and Flywheel on the cam spindle, form an entirely self-contained unit. It can easily be removed from the machine without disturbing any of the vital parts, and be replaced by another. In case of a failure of this part, a Maltese Cross movement, kept as a spare for a number of machines, can be slipped into its place in a few moments. This method constitutes a great advance on the practice hitherto followed, and forms in itself a guarantee against breakdown of the installation.

The Maltese Cross, made in one piece with its spindle, is made of Chrome Vanadium Steel and accurately ground. The squareness of the Cross is tested optically to ensure exactly four equal movements for each turn. It runs in two long phosphor bronze bearings giving absolute steadiness, and is adjustable for side wear. The Cam actuating the Cross is made in one piece with its pinion and spindle, hardened, ground and carefully balanced; it carries on the pinion end a heavy flywheel which gives perfect steadiness and regularity in the turning movement.



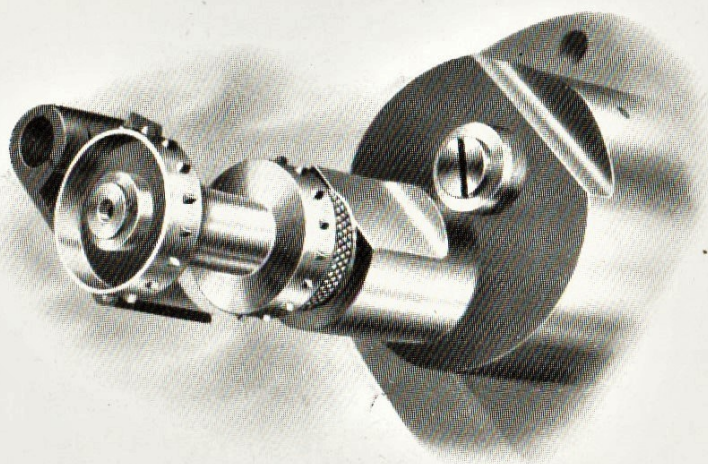
# *The Ross* Kinematograph Projector



1. Oil-tight Bath for Maltese Cross.
2. Gears.
3. Extensible Shaft allowing easy disconnection.
4. Heavy Flywheel on pinion end of cam.
5. Large Driving Pulley acting as Fly Wheel.
6. Adjustable Steel Runners to Lamp house.
7. Swivelled Counter-balanced bracket, holding motor.



## The Ross Kinematograph Projector



The centre distance between Cam and Maltese Cross is *not* adjustable. Experience has shown that this distance requires to be absolutely correct to ensure perfect steadiness of picture, and no adjustable distance will ever be exactly right.

This method of manufacture, *i.e.*, fixed distance between cam and cross, requires the finest machine tools and absolute accuracy, together with a construction that will ensure long life to bearings and spindles. Incidentally it is the most expensive method that can be selected—but the result warrants it.

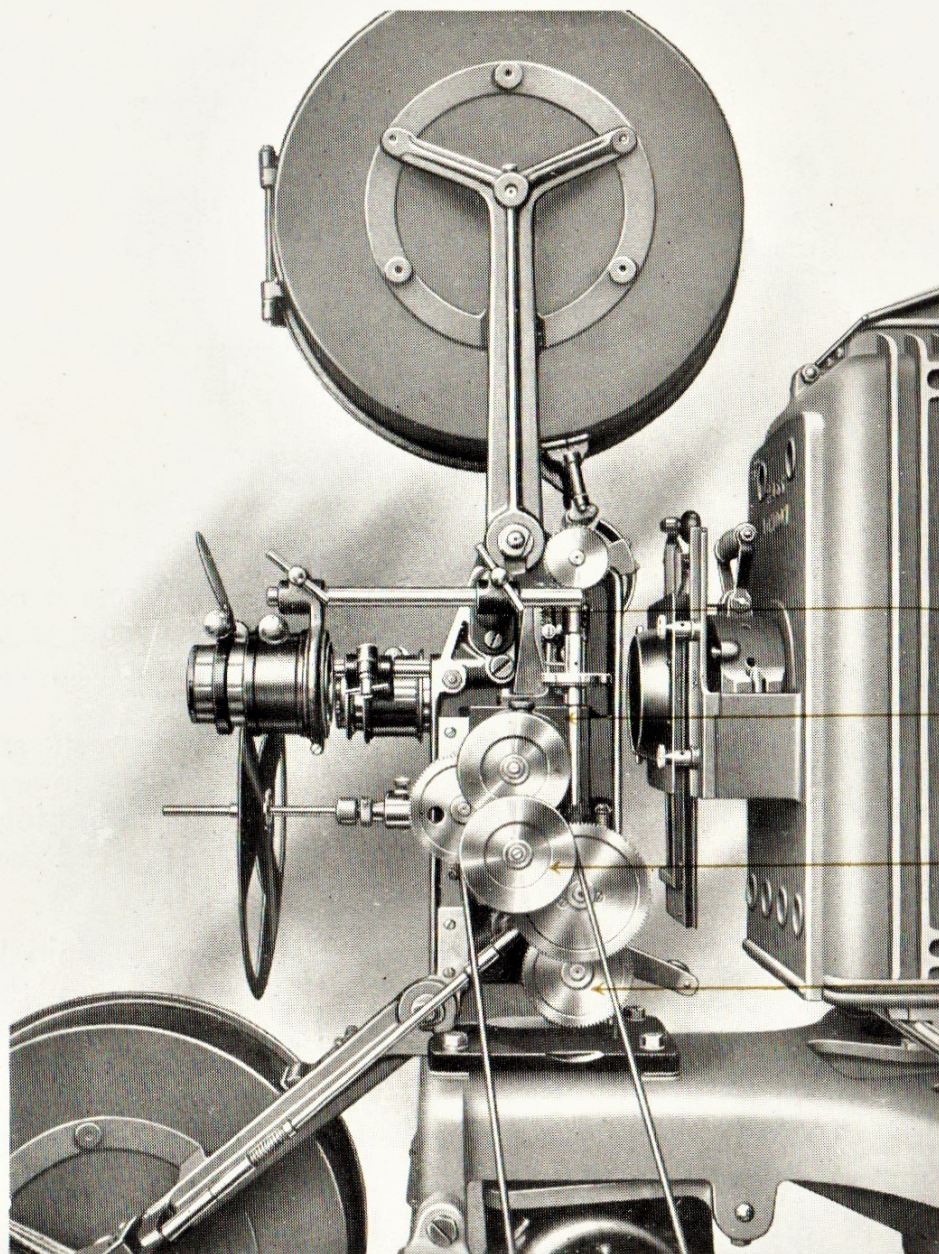
### **SPROCKET**

The other end of the Maltese Cross Spindle projects beyond the Box and carries the Sprocket. This Sprocket is made of specially hard steel, machined all over for perfect balance and lightness. The sprocket teeth are cut to a form which we have evolved, giving great strength at the root of the teeth, but allowing the film to leave the teeth with absolute freedom, even after long and hard wear, thereby making sure that the film does not roll up on the sprocket. The spacing of the teeth is carried out with great care on special machinery, and is optically tested for accuracy.

The attachment of the sprocket to its spindle is simplicity itself, but is carried out in such a manner that the Maltese Cross Spindle cannot be bent, whatever force may be applied in clamping the holding device.



# *The Ross* Kinematograph Projector



1. Rack and Gear for adjusting Mask.
2. Sliding vertical Spindle connecting Sprockets and actuating Cut-off.
3. Large Driving Pulley acting as Flywheel.
4. Hand Drive, geared 2-1, allowing sixteen pictures to each revolution.



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**GATE.** The sprocket is situate immediately below the gate, which latter is of cast iron securely bolted to the main frame. The running portion for the film is made of a steel stamping highly polished and secured to the gate casting. It can be interchanged with a new one should it become worn or badly scored due to ill usage. The gate aperture is formed in this steel stamping, and broached out to an absolute standard size.

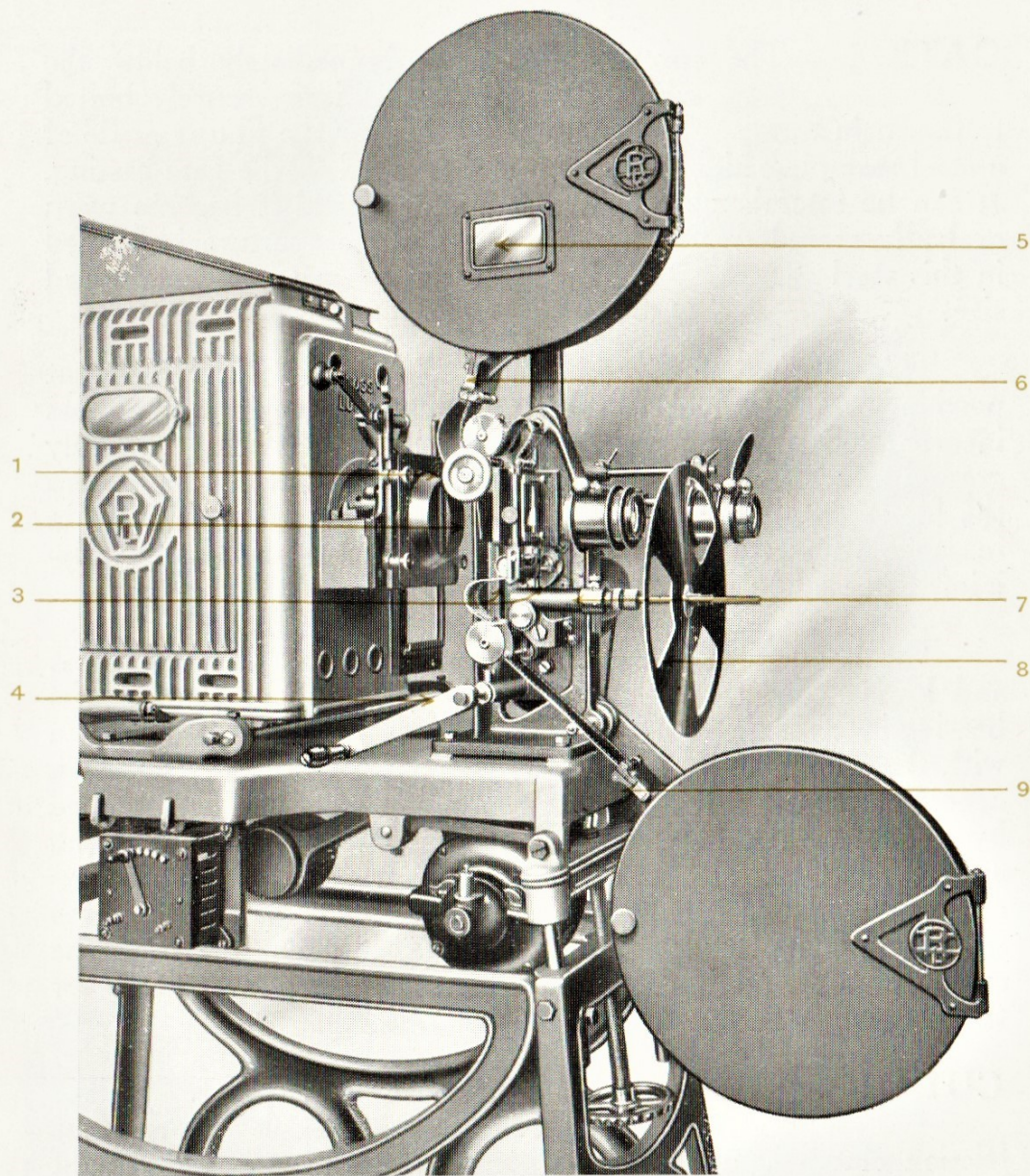
The opening of the gate is done by unlatching the front portion, which swivels on long gun-metal bearings, and has incorporated in it adjustable skates of hardened steel, carefully ground all over. The spring-tension of these skates, which press the film lightly against the back of the gate, is adjustable within reasonable limits, to keep the film flat, but still to allow the film joints to pass freely.

The large feeding sprockets for the film are at the highest and lowest corners of the machine. The top sprocket has its bearing in the main frame, while the lower one moves up and down with the sliding inner frame. This made a special construction necessary for the driving of both sprockets. They are connected by a sliding vertical spindle gearing into the bevel wheels, which are keyed to the end of the large sprocket spindles. Both sprockets are made from specially hard steel, machined all over and the teeth are cut on a similar plan to that explained in connection with the small sprocket, *i.e.*, great strength at the roots and freedom for the film when leaving the sprockets.

**CUT-OFF.** The sliding vertical spindle connecting the upper and lower sprockets also carries the friction clutch actuating the Automatic Cut-off. This is a light Steel Shutter which comes down in front of the gate aperture between the Condenser and the film immediately the machine stops running, to cut off all light and heat from the film. It also automatically opens when the machine has reached a certain speed after starting up. The friction of the clutch is adjustable by means of an enclosed spring. The whole mechanism is positive and sure in action.



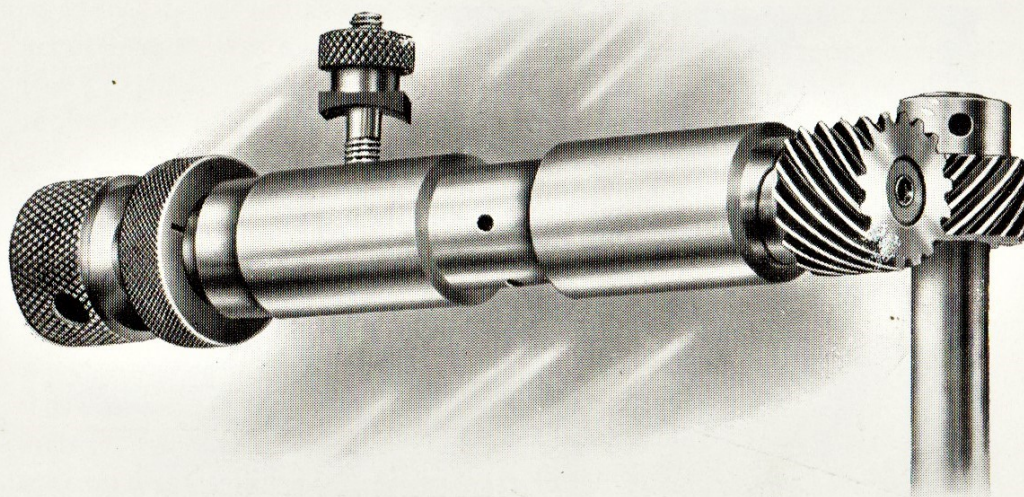
# The Ross Kinematograph Projector



1. Large Hand Wheel for adjusting Mask.
2. Automatic Cut-off.
3. Screws allowing easy removal of Maltese Cross movement.
4. Single Screw for fixing hand drive.
5. Mica Window.
- 6 & 9. Sure Fire-trap to Spool Boxes.
7. Shutter adjustment, allowing correction to be made whilst running.
8. Unique Shutter of equal openings.



## *The Ross Kinematograph Projector*



Spiral Gear and Screw Adjustment to shutter

### **ROLLERS.**

All Rollers which are Idlers and are driven by the travelling film are hardened, lapped and ground, and will stand long wear before they require renewing.

### **SHUTTER and DRIVES**

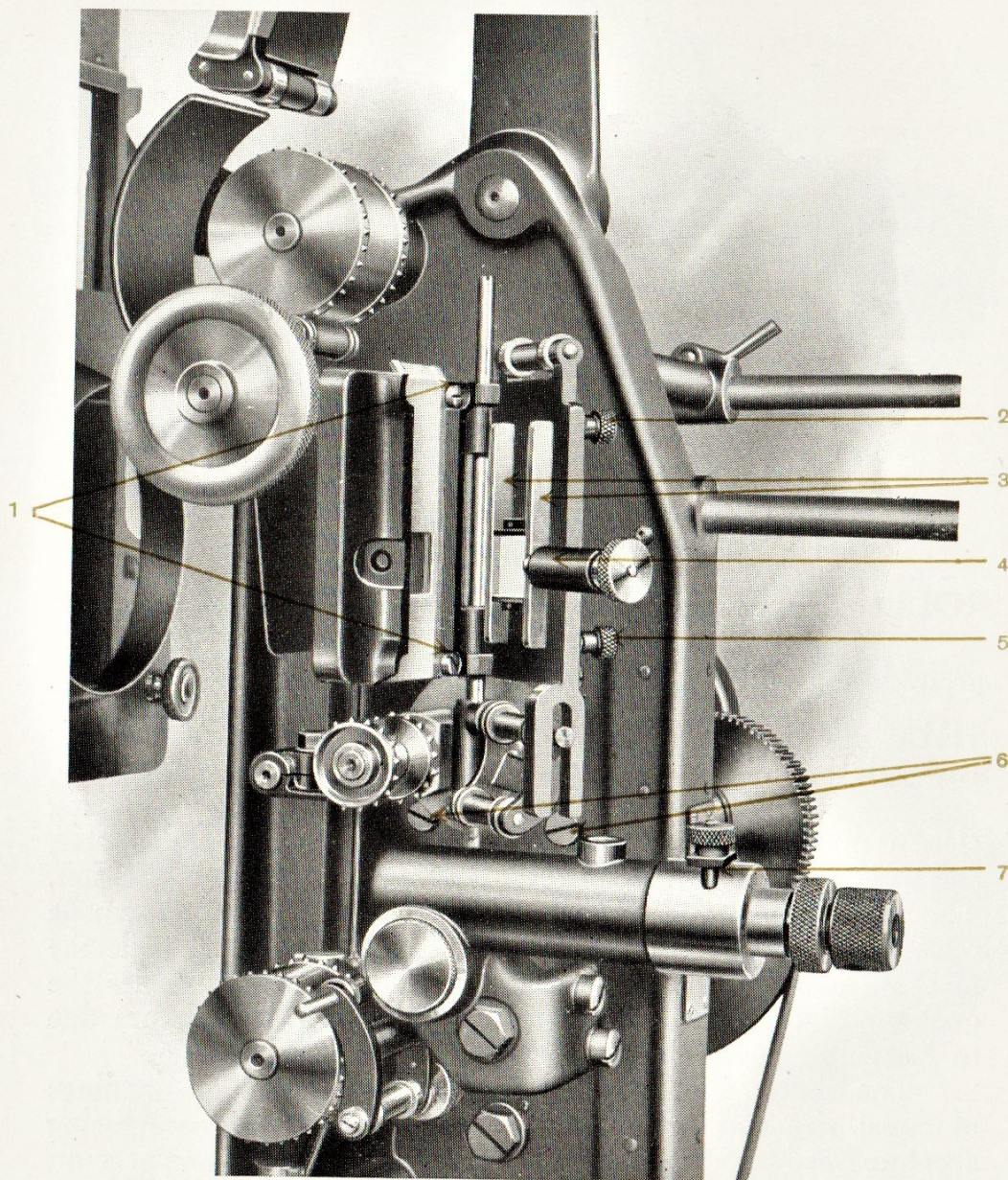
The Shutter Spindle is connected by a pair of spiral gears to the main driving spindle, which is supported by an outside bearing close to the driving pulley. The driving pulley is large in diameter, and heavy enough to act as a Flywheel to steady the motion. The pair of spiral gears are adjustable so that the shutter can be rotated round its axis relative to the sprocket motion, while the machine is running at full speed. This adjustment enables the operator to clear the last vestige of ghost from the picture due to inaccurate shutter setting.

The Shutter is of large diameter, and has three large openings of equal size and equally spaced, by this means guaranteeing absolute freedom from flicker and the maximum of light on account of the short time required in the Ross Projector for the Maltese Cross to turn over into its next position.

The main driving spindle is connected with the Maltese Cross movement by an Idler gear of large diameter. In this way any irregularity of the Motor drive is not directly communicated to the sprocket motion.



# *The Ross* Kinematograph Projector



1. Screw for removing polished Steel Running Plate.
- 2 & 5. Screws for adjusting Spring Tension of Steel Skates.
3. Steel Skates.
4. Gate Latch.
6. Screws allowing easy removal of Maltese Cross movement.
7. Screw adjustment for Shutter.



# *The Ross* Kinematograph Projector

**MOTOR.** The Motor is mounted underneath the machine on a swivelling bracket, suitably counterbalanced according to the motor used. The swivelling of the motor serves two purposes—first to enable the motor to follow the up and down movement of the inner frame when adjusting the picture in the gate, and secondly to give a uniform belt tension on the main driving spindle, which remains thereby constant, however much the belt may stretch.

**HAND-DRIVE** Where a hand-drive is preferred either for showing or starting up, a handle is supplied which only requires to be pushed on and fixed with a single screw. The hand-drive is geared down, so that to one turn of the handle, sixteen pictures pass through the gate. This is a new departure, and enables an operator to show an entire film without exertion or fatigue, should by any chance the motor break down.

**SPOOL BOXES and TAKE-UP.** The Spool Boxes are steel stampings of substantial gauge and are 14 inches in diameter. This enables the longest length of film permitted to be accommodated. Both spool boxes are fitted with a sure fire trap, consisting of two pairs of rollers separated by about 2 inches of narrow space through which the film must pass. It is impossible for the flame to travel through this trap.

The top spool box is fitted with a mica window to enable the operator to see how much of the film is on the spool.

The bottom spool box is fitted with the adjustable friction clutch drive for the spool, which rolls up the film after having passed through the machine. The friction clutch is easily adjusted to allow for the necessary slip of the drive as the winding diameter becomes bigger, according to the amount of film on the spool.

The connection between the bottom spool box drive and the projector mechanism is by two pairs of bevel wheels with extensible shaft between them, and two universal joints. The extensible shaft has on each end the male portion of the universal joints, and all that is necessary to disconnect the drive, or the bottom spool box, is to take out the extensible shaft.

**LAMPHOUSE.** The Lamphouse is a special feature of the Ross Projector. It is made of a large Aluminium Casting ribbed with radiating fins all round. The

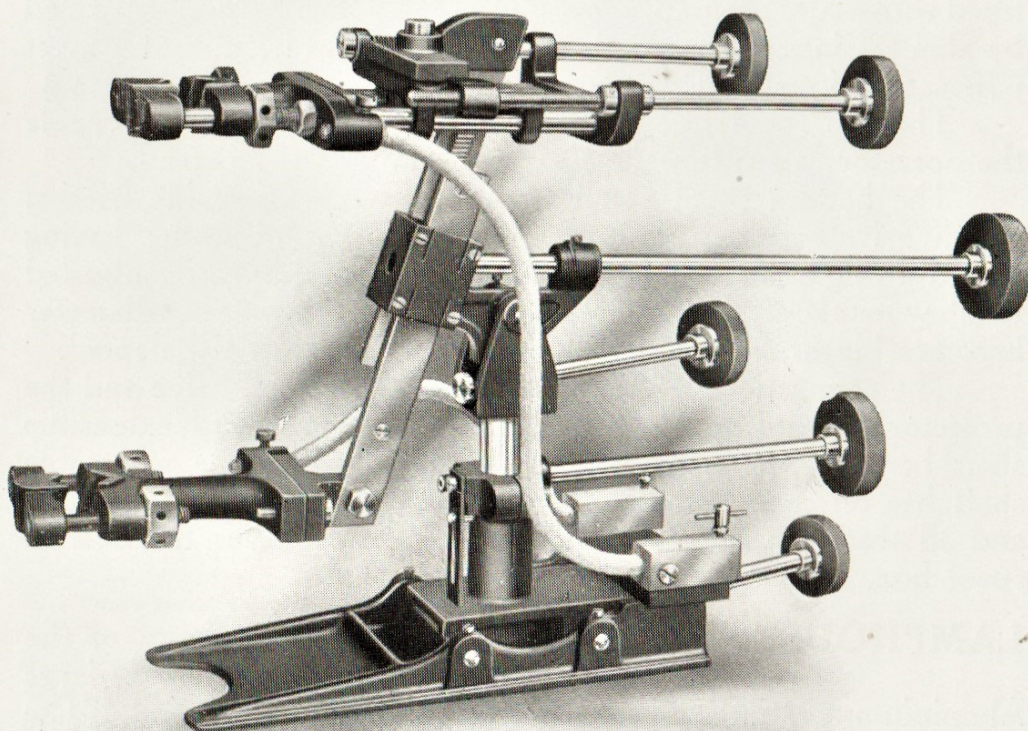


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front and base are of cast iron, the top, of sheet steel. This Aluminium Casting contains inside at a distance of  $\frac{3}{4}$  of an inch another Lamphouse of sheet steel, in which is housed the Arc Lamp. The effect of the whole construction is a clear ventilated air space right round the inner lamphouse, thus keeping the aluminium exterior quite cool, even after prolonged running at high amperage. The cast-iron front has bracket cast integrally with it, which carries the Condenser in its mount and the Lantern Slide picture changing device.

## CONDENSER and MOUNT.

The Condenser is specially computed and made of specially selected optical glass to give the maximum of light, and to be as heat-resistant as possible. The two lenses forming the Condenser are  $4\frac{1}{2}$  inches in diameter, one meniscus toward the arc, and a double convex lens toward the film, separated by a brass spring tube, and mounted in a heavy ventilated cast-iron mounting. To take out the lenses, it is only necessary to give the brass retaining ring a slight turn until it will pass over the three screws holding it in position. It will then easily come away, and both lenses with the spring tube can be withdrawn from the mount.





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**ARC LAMP.** The Arc Lamp is of improved design, having six movements, and of heavy construction, capable of being run at 80 amperes for any length of time. The Carbon Holders are of heavy cast-iron with V slots to accommodate carbons of various diameters.

**MECHANICAL TRAY.** If desired, the Arc Lamp can be supplied with a mechanical tray which enables the Arc Lamp to be moved easily and rapidly towards or away from the Condenser. The movement provided is 3 inches. The mechanical tray itself can be put in any position along the base of the Lamphouse—both base and arc lamp are guided in long slides to prevent displacement or shake.

**LENS.** The Ross Projector Lens is a new lens which has been specially designed for cinematograph projection. It is constructed of entirely new glasses, and wonderful accuracy of correction has been achieved in the formula.

It is difficult to select any special features of a lens which is particularly efficient in all respects, but its freedom from chromatic aberration and coma—two features which greatly affect the quality of the projected picture—are perhaps the most remarkable.

**STAND.** The Stand is a strong cast-iron frame with a substantial table casting carrying the projector mechanism and Lamphouse on the top, and the Swivelling Motor Bracket with counterweight underneath. The table is made wide enough to shift the whole lamphouse to one side of the projector mechanism, so as to come opposite the lantern lens. In this position, the whole machine can be used to throw titles or any other stationary picture on the screen. The runners for the lamphouse are adjustably arranged on the table and are formed by two cylindrical bars of steel truly ground straight and parallel. The Lamphouse will be found to slide with great ease along these runners.

The legs of the Stand are four cast-iron sections which can be easily dismantled for transport or packing. The Table is adjustable on two of these legs, both as regards height and tilt, once the proper position for the projector mechanism has been obtained, the adjustments are rigidly fixed by set-screws.

The whole machine when complete is of considerable weight owing to its heavy massive design, but this we consider is rather an advantage than otherwise. It ensures great steadiness when once the machine is set up.



# *The* Ross Kinematograph Projector

## RESUME OF THE SPECIAL FEATURES :—

Projector picture absolutely steady and free from the slightest flicker.

Silent running, easy running, reliable running.

Easy adjustment whilst running.

Long life with minimum of wear.

Fixed Optical Centre.

Entire Maltese Cross movement interchangeable.

All parts interchangeable and easily assembled.

Counter-Balanced Motor.

Fire and foolproof.

Special Condenser of Optical Glass.

Specially designed Projection Lenses.

Standard for Projection Lenses, 52.6 mm. with adapter for 42.6 mm. size.

## COMPLETE KINEMATOGRAPH PROJECTOR

CONSISTING OF :—

Ross Projector, including 14" top and bottom spool boxes.

Stand with Motor Bracket.

Cast Aluminium ventilated Lamp House.

Six-movement Arc Lamp.

Mechanical Racking Tray for Arc Lamp.

Motor complete with Rheostat.

4½" Double Condenser. Meniscus and Double Convex Lens.

Lantern Lens, any focus.

Ross Special Projection Lens, 52 mm. standard, any focus.

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