

fig. 1

**Automation
and rationalisation
by means of**

Solo-Automatic-Projector

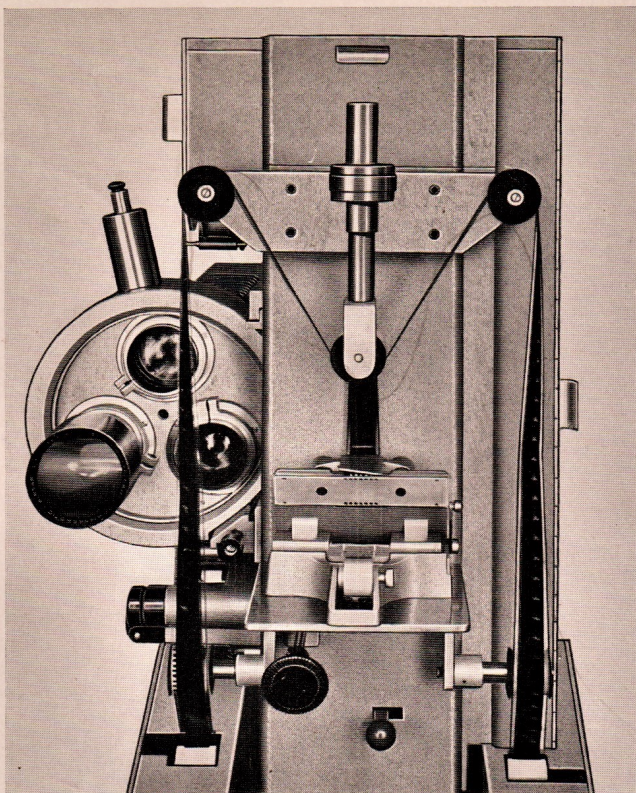


fig. 2

SENSE AND PURPOSE

The Solo-Automatic-Projektor, a new development of Kinoton GmbH in Munich, constitutes a further important progress in the field of 35-mm film-reproduction technique. Since the general introduction of safety film, some years ago, all the additional safety devices dictated exclusively by the easy inflammability of nitro-film, could be dispensed with and the projectionist could be freed from all his constantly returning tasks such as:

introduction and removal of film spools,
rewinding of films,
ignition of the projection lamp,
switching on and off the projectors,
change-over from one projector to the other at the end of the reel.

The really Solo-Automatic-Projektor offers the projectionist all the facilities resulting from the latest developments in the field of cinema and automation techniques. For the cinema proprietor, it signifies a reduction of nearly 50% of the cost of the installation and a considerable decrease of the exploitation costs, since it is no longer necessary for the operating staff to be present in the projection room throughout the performance, the automatic operation requiring only little manipulations and supervision.

Especially for the smaller and medium-sized cinemas, this signifies greater profits and less risk.

PRINCIPLES OF THE NEW CONSTRUCTION

Based on their experiences with automation in the projection room, Kinoton GmbH came to the conviction that the problem could only be solved completely by using only one projector instead of the usual two. The necessary switching operations would then really be reduced to a minimum, no change-over from one projector to the other being required. This would also be very favourable with regard to safety and reduction of wear.

To make one projector suffice, the projector has to satisfy the following demands:

- it should be possible to rewind the film after the performance easily and rapidly, therewith sparing it as much as possible;
- it should not be necessary to take the spools out of the projector, i.e. rewinding should be possible on the projector itself;
- automatic exchange of lenses and aperture plates when necessary;
- remote framing and focusing control;
- automatic operation of the curtains and of the hall lighting.

The accuracy of the performance, ensured by automation, as well as the facilities of framing and focusing from the auditorium make the high quality of the Philips FP 20 projectors, used for this purpose, show to full advantage.

Moreover, the omission of the second projector, makes the corresponding supply circuit, the rectifier and the further technical devices such as the change-over device, the anamorphic lens and the backing lenses superfluous. Neither are necessary a rewinder and its table. This not only reduces the purchasing cost of the equipment, but it also constitutes a saving of space and of costs for installation and maintenance. For these reasons, the acquirement of a Solo-Automatic-Projektor – even in conjunction with an automatic device for slide projection and with the remote-control devices – results cheaper than the purchase of a traditional equipment with two projectors or than the modification of an existing equipment for the use of new light sources and half-automatic operation, as known up to the present.

The Solo-Automatic-Projektor (fig. 1) can be equipped with film spools for 4000 m (about 13,500 ft) of film. The decision to construct films spools of such a size was taken based on the good experiences Kinoton GmbH had made with the three-film Cinemiracle, Cinerama and Kinepanorama systems. With these systems, three projectors and one sound reproducer are operating simultaneously; they are permanently controlled synchronously. With only one interval per performance, and per machine, 7200 to 7800 m (24,000 to 26,000 ft) of film with 6 perforations per frame are shown at a speed of 27 frames/s and with a 120–150 A projection lamp. Notwithstanding these enormous additional demands with respect to normal cinema operation, the installations must operate with great precision and reliability, because synchronous operation implies that each film rupture causes an interruption of at least 15 minutes. As, because of their special nature, the prints are very expensive, impeccable passage of the films through the projectors and careful take-up, should be guaranteed. Only after many three-film installations which Kinoton GmbH has placed in Europe and in Japan had proved during several years their perfect, film-saving operation – partially while showing daily 20,000 m (65,000 ft) of film – has Kinoton designed the Solo-Automatic-Projektor, which in several cinemas in Germany, has already proved its great merits and perfect reliability in practice.

The Solo-Projektor forms the starting point; by adding easily fittable units, it can be transformed into a Solo-Automatic-Projektor.

CONSTRUCTION OF THE PROJECTOR

The Solo-Projektor is derived from the PHILIPS FP 20 projector, whose rectangular casing, pressed from one piece of steel sheet, has a perfectly flat front plane, which is eminently suitable for use as a mounting plate for the additional mechanical parts.

The Maltese cross mechanism, manufactured with the highest precision and running in an oil bath, is driven by the

motor incorporated in the projector housing via a V-belt. The Maltese cross mechanism is either coupled rigidly with the pulse generator for the SPP-lamp – when this lamp is used as a light source – or, when a continuously lighting light source is employed, it drives the very efficient conical shutter via the main gear wheel.

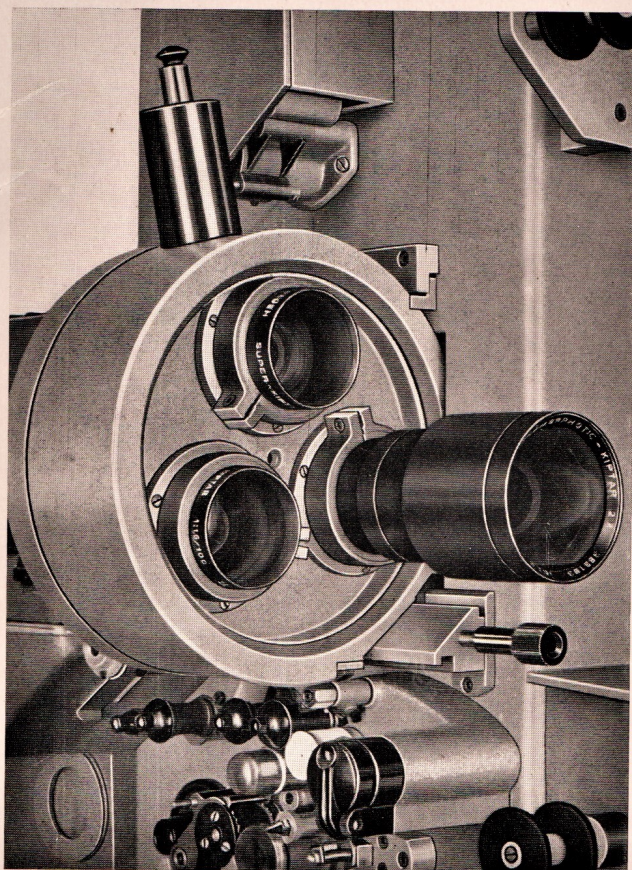
The curved runner plate, a long film guide-plate and the bilateral bearing of the Maltese-cross shaft guarantee faultless passage of the film through the projector and perfect steadiness of the projected picture.

POSITIONING OF THE SPOOL BOXES

As is usual, the take-up spool box is situated at the front of the projector underneath the runner plate. The take-off spool box, however, is not located in top of the runner plate but level with the take-up spool box at the rear of the projector. As therefore both spool boxes are situated directly above the floor, it is no longer necessary to lift a spool over a great height. Because of the increased film weight, the spool shafts have a diameter of 14.3 mm ($\frac{9}{16}$ "); they run in a carefully adjusted bearing. To facilitate the insertion of the spools, the end of the spool shafts is made conical. The spools are pushed against a driving disc provided with a driving pin by means of a small, resilient lever engaging into a slot: this excludes lateral oscillation of the spools during operation.

The spool boxes are suitable for spools with a diameter of 890 mm (35") to avoid vibrations; they are fixed resiliently to the projection housing. Whilst, up to the present, the spool boxes were provided with a nearly circular door supported by one hinge, the large spool boxes of the Solo projector are equipped with two half-circular doors which overlap each other in the middle.

fig. 3



FILM PATH

As the take-off spool is situated at the rear of the projector, the film, braked by the friction shaft, is pulled from the spool by a sprocket located above this spool. It is further transported by a second sprocket situated at the rear close to the projector head. After being deviated and twisted, it then reaches a twin guide roller mounted obliquely on the projector head and after being deviated and twisted again, it is further transported to the runner plate by means of the take-off sprocket. From the runner plate, it is conducted in the normal way to the take-up spool via the intermittent sprocket, the soundhead and the hold-back sprocket. The whole film path, the deviation over the projector head included, is enclosed, with the exception of the parts in the vicinity of the picture gate and of the soundhead; nevertheless, it is easily accessible. For scanning films with magnetic sound tracks, a magnetic soundhead is mounted between the projector head and the deviation device; it is simply fixed with four screws.

FILM SPOOLS AND REWINDING

The film spools are made of anodized aluminium; they are provided with flanges of weight-saving construction. For preparing the programme before the performance, detachable spools with a hole of corresponding diameter are used.

To rewind the film, the spools need not to be taken out of the projector. The film is simply taken from the sprockets and conducted over a resilient roller system located at the front of the projector (fig. 2). The take-up friction is decoupled and at the same time the rewinding motor in the projector head is coupled and switched on by means of a lever located also at the front of the projector. The take-off friction is constructed in such a way that it is not active when the film is running in the reverse direction through the projector. As the quantity of film increases, the rewinding speed is reduced automatically. After rewinding the motor is switched off and the take-up friction is coupled again in one sole operation.

In order not to lose frames when composing one continuous programme, the various films are spliced the one to the other by means of adhesive tape. For this purpose; a splicing device ensuring perfectly reliable splices is mounted on a support, also at the operating side of the projector. This saves much time when splicing or detaching the films.

REMOTE-CONTROL DEVICES

For half-automatic operation, remote framing and focusing control is desirable, for fully automatic operation, it is necessary. In both cases this problem has been solved in such a way that both manual control on the projector and remote control are possible.

Remote focusing control has the same effect as manual control; it takes place by means of a small motor mounted on the projector, which shifts the lens holder in either direction via a fine-adjusting screw in conjunction with a pressure-spring.

Framing in either direction is effected by means of another small motor via a friction device.

CHANGE OF ASPECT RATIO

The different lenses for normal, wide-screen and Cinema-Scope films are fitted in a disc-shaped lens holder (fig. 3) by means of focusing rings; they are pre-focused. The lens holder can rotate in a ring-shape cage; it is equipped with a toothed segment engaging in a gear wheel inside the

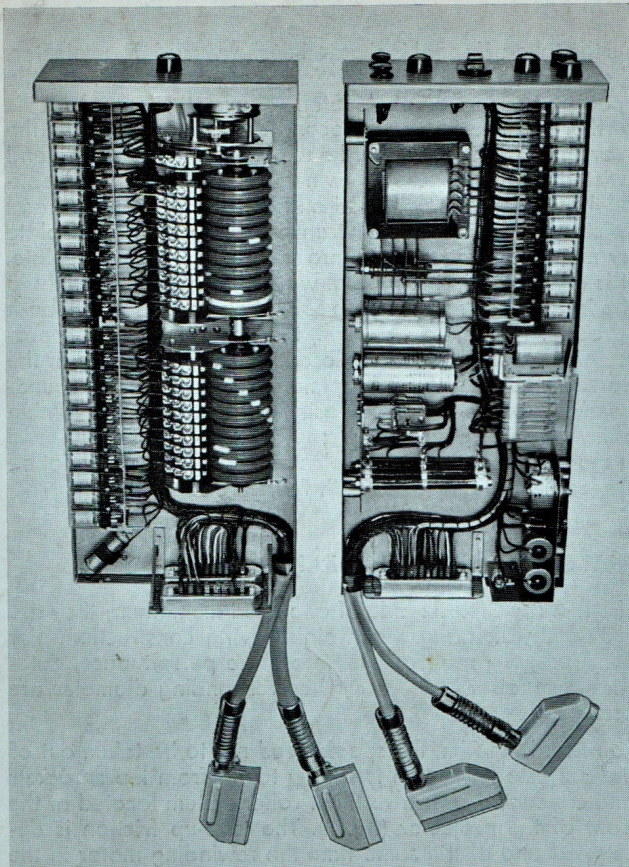


fig. 4

projector housing. In the housing there is a motor which, by means of one or more control pulses, brings the correct lens in front of the picture gate when changing over from one aspect ratio to another. The pulses are given by contact strips on the film.

The cage slides over a support fixed to the projector housing. It is shifted without backlash.

The three aperture plates are located as segments in the picture gate. They are shifted by the lens holder via a mechanical transmission and this is locked in the correct position by means of a lifting magnet.

ELECTRICAL DETAILS

The supply cables for the driving motor of the projector and for the control motors are connected to a terminal plate located in the base of the projector. All the required

control devices are housed in a control unit and connected to the projector by means of cables and plugs. This construction facilitates mounting and makes rapid exchange and extension possible.

An automatic device gives all the pulses required for fully-automatic operation. It has the same size as the control unit to which it is connected by means of plugs. It ignites the projection lamp, switches on the projector, opens the dowsers, switches on the sound, opens the curtains, dims the hall lighting and does the reverse at the end of the programme. (fig. 4)

LIGHT SOURCES

The Solo-Automatic-Projector can be supplied with a lamphouse for operation with the PHILIPS SPP 800 pulsed discharge lamp or with a lamphouse for the XENON high-pressure discharge lamp. In the first case the lamp is fed by a pulsator and in the second case by a rectifier. The different ignition devices are built in together with the automatic switching device.

SLIDE PROJECTION

For the projection of publicity slides, the lamphouse is equipped with the necessary device; the light is supplied by the same lamp as for film projection. With the aid of a PHILIPS tape recorder, slide projection can also be effected automatically. The projection time and the change of slides are controlled by pulses recorded on the tape. Change-over to wide-screen and to CinemaScope slides is also effected automatically, as well as the insertion and removal of the auxiliary mirror for slide projection and the start of the subsequent film programme.

SUMMARY

Starting from the PHILIPS FP 20 projector, a projector has been created which as a single installation is capable of handling the whole film programme of a cinema performance. As a light source are used a pulsed discharge lamp or a XENON lamp. Framing and focusing are effected by remote control from the auditorium. Slide and film programmes alternate automatically, so that the operating staff need to be present in the projection booth throughout the performance. The reduction of the purchasing, the exploitation and the maintenance cost enables also the smaller and the medium-sized theatres to modernize their equipment by acquiring the Solo-Automatic-Projector.

As this new equipment can be obtained by extending step by step the Solo-projector with easy manual operation, to form finally the Solo-Automatic-projector with automatic slide projection, it will certainly be received with great enthusiasm everywhere in the world.

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