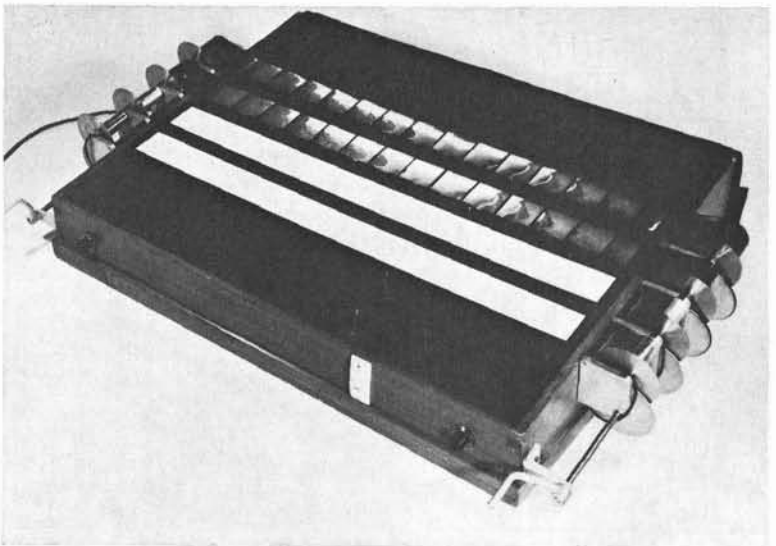

FIG. 1. General view of light box showing masking, perspex lid, switch and variable transformer controls, and roller mechanism. The top two roller assemblies carry matched transparency imagery. Bottom two assemblies empty to show illumination and thin masking strips on perspex lid.

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Viewing 70-mm Roll Film

Modest device allows viewing four rolls simultaneously.

(*Abstract on next page*)

INTRODUCTION

IN RECENT YEARS, many workers in ecology, forestry and agriculture have become increasingly aware of the advantages of using small-format aerial photography for the reconnaissance, sampling, inventory and mapping of various habitats and communities. In most applications 70-mm film has been used in such cameras as the Mauer or Vinten Reconnaissance types (Carneggie and Reppert 1969). In Australia the Vinten has been used almost exclusively for this work and, as the magazine of this camera is capable of holding 100 ft of film (approximately 500 frames of imagery), it is imperative to have some sort of facility for handling and viewing, particularly if film processed to positive transparency. Not only does such a device facilitate examination of the imagery, but it also provides adequate protection of the film itself. Some commercially manufactured light boxes are available, but they are very expensive, or rarely obtainable or both, and often do not conform to the particular requirements of individual workers. The unit described here has been designed to allow the transport of four rolls of film either singly or in any combination.

DESCRIPTION

Basically the unit is a wooden box 36×24 inches in surface area, between 6 and 9 inches deep, the surface sloping forward at a grade of 1 in 8 (Figure 1). This aspect may not suit particular uses or individuals and it is possible to incorporate into the unit an adjust-

ABSTRACT: *The use of 70-mm transparency and negative film for photo interpretation in ecological and agricultural studies has posed some problems in the adequate handling and viewing of this material. A unit was designed to accommodate up to four rolls of 70-mm film, incorporating four sets of manually operated rollers. The mechanism allows for the transport of each roll of film, either singly or together, through the action of four separate pulley systems using* Neoprene "O" *rings.*

ment to horizontal if required; many people find a sloping surface less fatiguing for long periods of scrutiny. The interior of the light box is painted with highly reflective white enamel and the light source is a bank of four evenly spaced 20-watt fluorescent tubes producing an approximate color temperature of 5,000°K. This is in conformity with a recent publication by the American National Standards Institute of a color temperature standard for the critical viewing of color transparencies (1969). Philips fluorescent tubes type TL47 have been found to have this standard specification and have been recommended by Eastman Kodak for use in light boxes.

Variable transformers are used to control the light intensity on each side of the box, each pair of tubes being separately controlled by its own transformer (Elcoma Type 2422 530 01407—see Figure 2). This allows the intensity of transillumination on each side of the light box to be reduced (or eliminated), and for the regulation of brightness according to the density of the film, or to suit the requirements of individual eyesight. Although the light intensity is reduced, there is no appreciable diminution of color temperature using fluorescent tubes.

The luminous surface is composed of two sheets of perspex, a clear $\frac{1}{4}$-inch sheet above an opalescent $\frac{1}{8}$-inch sheet. By using this type of surface, both luminosity and rigidity are retained. Over a large surface area such as this, heavy-guage material is required. Clear heavy-gauge glass often possesses color casts, whereas thick opal glass tends to reduce the light intensity; hence the use of perspex. A thin clear perspex lid is hinged at the back of the box and capable of lying flat upon the

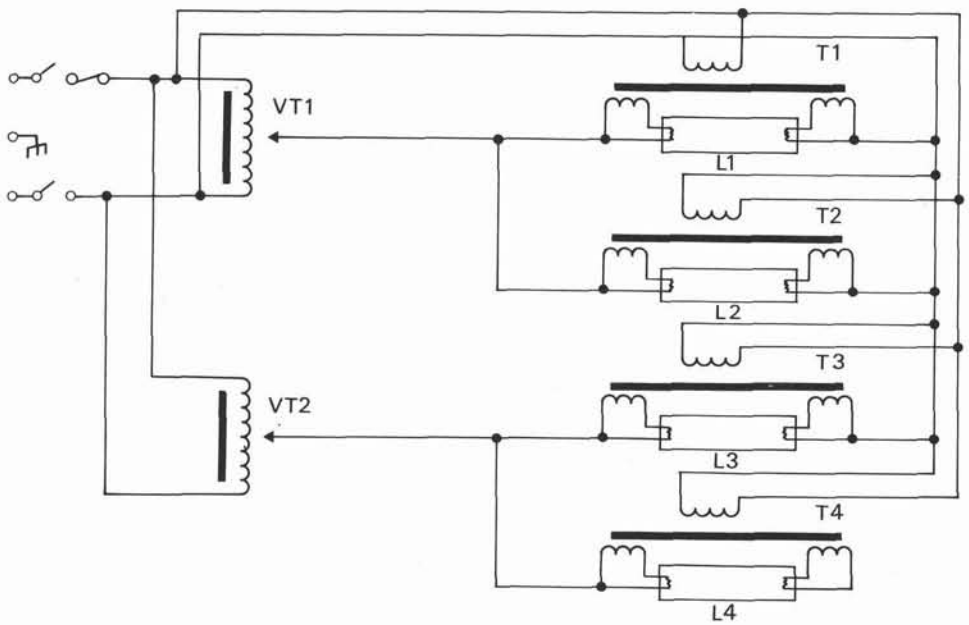

FIG. 2. The basic circuit diagram of the light box. *VT1, VT2*—variable transformers (Elcoma 2422 530 01407). *Tk, T2, T3, T4*—filament transformers (Ferguson). *L1, L2, L3, L4*—fluorescent tubes (Philips 20 watt TL47).

surface. This is essential both for the protection of valuable original film and for keeping it flat. Even if secured and tensioned on rollers, 70-mm film has a tendency to curl along its length.

Eyestrain is a particular hazard of working at a transillumination table, and precautions against this need to be seriously considered. Velvet cloth, which can be folded across the surface, has been attached along the back of the box. This can be used to mask off all extraneous light above the film strip or strips. Removable black card is used below the film for the same purpose. Opaque tape, $1\frac{1}{4}$ inches wide, has been attached to the perspex lid so that in position, the perforations of the film and the narrow gaps between each strip are neatly and effectively masked out. As set up, the only light visible is that through the imagery frames.

The Roller Transport System

An aluminum plate with integral roller supports is fitted at each end of the box (Figure 3). Each component supports four rollers, a manually operated drive system and four Teflon-coated guide rollers to protect the emulsion surface of the film from the edge of the box. The rollers have been constructed to accommodate a full 100 ft of film wound onto a Vinten film core, and fit into $\frac{1}{4}$-inch diameter slots machined into brass bushings within the supports. Film winding on each roller is achieved by the use of a Neoprene *O*-ring which runs between a small *v*-pulley integral with its roller, and a larger pulley fitted to the drive shaft. Consequently any one, or combination, or all of the rollers may be driven simply by engaging with the fingers the appropriate *O*-ring or rings. In winding from right to left, the left pulley ring (or rings) is engaged and the right disengaged. The roller support bushes are lubricated very lightly with powdered graphite. Each roller is slotted along its length to receive a Vinten camera film core, as this particular camera is used in our studies. However, film may be attached to the rollers by other means, e.g., adhesive tape, or other structural modifications can be be made for particular needs.

Conclusion

The comparison of transparency imagery is facilitated by the unit described above. Color and color-infrared photographs can be scrutinized side by side, and up to four side-lapping runs of stereo-cover photography can also be compared. Panchromatic and infrared negative film can be examined with equal convenience, and the unit can be used for the copying of imagery onto other photographic emulsions (in black-and-white usually, as

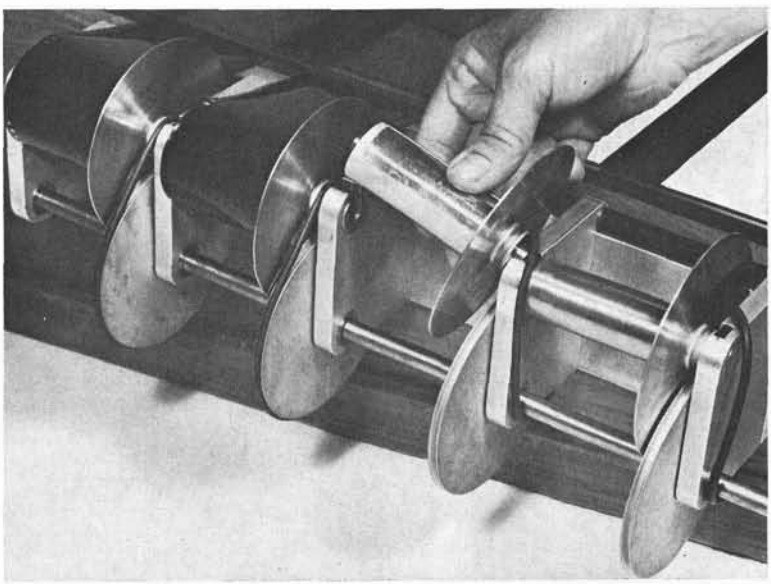

FIG. 3. Detail of roller mechanism, showing Neoprene *O*-rings, drive shaft with attached *v*-pulleys, rollers, bearing bushes, and small Teflon-coated rollers. The two left-hand *O*-rings are in driving position, the pair on the right are disengaged.

fluorescent lighting presents problems in color photography).

The unit has proved satisfactory in operation. In manufacture, end play for the rollers should be adequate as large rolls of film can wind unevenly onto the rollers and impinge slightly onto the roller supports. The extra friction can affect smoothness in transport of the film. The bearing slots should be cleaned and lubricated lightly with powdered graphite from time to time. Since perspex is easily scratched, even with careful handling, regular changing of the hinged lid is desirable.

The unit can be constructed economically and is well within the manufacturing capacity of the skilled scientific engineering shops attached to most universities and other research establishments. More construction details can be sent to interested readers if required.

ACKNOWLEDGMENTS

The authors thank their colleagues in the Division of Plant Industry, CSIRO, for their help and cooperation; Mr. Terry Hall and Mr. Alan Dale, for the provision of workshop facilities; Mr. Bruce Condon for his modifications to the circuitry to enable the inclusion of variable light intensity transformers, and Miss Sandra Haldane for her careful drawing of the basic electrical circuit. The photographs are my own (*C.T.*).

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