

## SECTION THREE

### CAMERA AND DARKROOM

#### **PROCESS CAMERA**

Process cameras are expensive pieces of equipment and will be needed only by units using printing machines larger than A3. They are used to prepare negative and positive film needed for the processing of pre-sensitized metal litho plates (Section 5). Most small printing units can operate very successfully without one. Nor is one necessary immediately a unit buys a larger printing machine: the negatives can be made by any other printing unit that operates a process camera.

There are four essential parts to any process camera: the copyboard, lighting, lens, and film holder. Any extras or refinements after this are governed by the needs of the printer and the funds available. It is not possible to operate with only those four elements, but it is essential that they are borne in mind when deciding which camera to buy.

#### **Vertical and Horizontal Cameras**

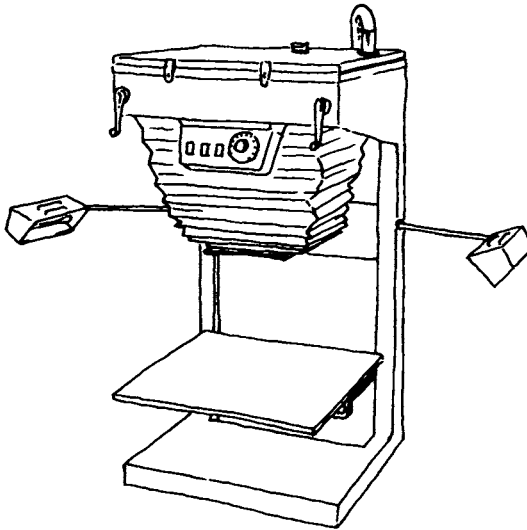
There are two basic types of process camera: vertical and horizontal. Most small printing units use vertical cameras. Their great virtues are compactness and economy of floor space. The operator can perform most of the working functions standing on one spot. They must be operated in a darkroom, but as a darkroom is necessary for processing the film, this is no drawback.

Horizontal cameras have very little to offer a small printing unit; and the following account therefore concentrates on vertical cameras.

## Main Features of a Vertical Camera

### The Copyboard

This must be capable of accommodating the largest size of artwork the unit expects to use. The method of holding the copy firm is important. Most of the cheaper cameras have a sheet of glass which is clamped over the artwork to hold it against the copyboard. For this method of fixing it is essential that the artwork is of the same thickness all over. Some cameras have vacuum beds which hold the copy firm, but this is a refinement that most small printing units can manage without.



*Diagram 9: Vertical process camera*

### The lens

The camera lens must be capable of projecting an image over the maximum film area, and must offer the required degree of

enlargement or reduction. Some cameras have a series of lenses that have to be changed manually, in which case ease of access is important. Where funds are available, the movement of the lens turret and the copyboard can be controlled by motorized aids, and the camera will have an automatic shutter. In cheaper cameras, the film is exposed either by taking off the lens cap for the required time or by switching the lights on and off. Both methods are a little rough and ready.

The required enlargement or reduction is obtained by focusing the lens. This is done by turning handwheels manually or by pressing a button. The first method is slow and depends on the skill of the operator. The second is fast and depends on the accuracy of the machine, but costs more.

#### The film

The film-holder must be large enough to accommodate the biggest piece of film that will be exposed. If the camera is to be used only for line work, then a film-holder with a spring clamp should suffice. Ideally however, the film-holder should have a vacuum back, and the better ones have a back to which the vacuum can be applied zonally according to the size of the film.

#### **Choosing the Camera**

Basically, the choice is between a simple, inexpensive camera, and a sophisticated, expensive one. In the first case the operator must be skilled in making the necessary mathematical calculations to get a properly-focused, clear negative with the correct contrast between the light and dark areas. In the second the operator must be skilled in setting the various built-in electronic and automatic devices.

The film produced by the camera can be developed by hand in the three-bath system, or, if a processor has been purchased for the headlining machine, the film from the camera can also be processed in it.

## Hints and Tips for the Process Camera

1. Do not contemplate the use of a process camera unless a proper darkroom can be established. Cameras are available which do not require a darkroom (daylight cameras) but these should be thoroughly investigated prior to the large capital outlay involved.
2. In the three-bath photography a certain amount of silver deposits are contained in the liquid chemicals. By use of a simple electrical device this silver can be recovered and sold rather than wasted.
3. Proper storage facilities must be assured for the expensive materials involved in the process.
4. Air conditioning in tropical climates is required, and refrigerated storage for film should be provided.
5. Films are available as negatives and positives. The positives are more expensive. When choosing films for use in the camera, ensure that they are the right size for the camera and the right size to fit the job on the copy board.
6. When purchasing films, ensure that they have not been kept in storage for a long period.
7. Films are available from many different suppliers. Each make of film needs to be processed by its own specified chemicals. If chemicals are obtained either ready-mixed or in powder form, they must be mixed according to the supplier's instructions.
8. To avoid pollution, arrangements for the drainage of highly toxic waste chemicals from the darkroom should be made at the planning stage when designing the darkroom. Arrangements for ventilation and fume extraction should be made at the same time. It may be advisable to seek expert advice on these matters.
9. Colour work is done with different film, and the darkroom operation is in complete darkness. Line and halftone work can operate with a red light.

### Supplies for the Darkroom

1. Thick dark cloth materials for use as curtains in a dark room.
2. Red and green safe lights outside the room.
3. Red and green safe lights inside the room.
4. Amber light inside the room.
5. In the event of not using a built-up sink with three compartments, three plastic trays will suffice.
6. Tongs with rubber grippers for handling films and to squeeze off excess solutions and waste.
7. Timer clock for controlling the developing process.
8. If a drying oven is not used, a simple hair-dryer will be sufficient to dry the film.
9. Cupboards for storing new films (which must not be fogged before use) and for processed films.