SECTION SEVEN

SILKSCREEN PRINTING

INTRODUCTION

The simplest way of describing silkscreening is to compare it
with stencilling. Both processes consist of ink penetrating
"holes" in a screen onto sheets of paper beneath.

Silkscreening is used mainly for making posters. It can also
be used for printing book covers. It is cheap and has the
big advantage of using opaque inks - thus allowing the silk-
screen printer to apply light-coloured ink to very dark paper
or card. Its main disadvantage is its slowness.

Silkscreening is a widely practised community craft in many
countries. If you want to see it in action, it should not
be difficult to find someone who makes a living from it. It
is most likely that he will be printing signs and designs on-
to plastics, wood, metal, ceramics or glass. None of these
materials presents problems for silkscreen printers.

The equipment does not have to be large or expensive. In
fact most items can be made by hand. No matter what the
cost of the equipment, it must have three basic elements -
the silkscreen frame, the baseboard, and the squeegee with
which the ink is pushed through the screen.

THE FRAME

This consists of four lengths of wood securely fastened
together to make a rigid rectangle. It should stand about
3 inches high. Its function is to act as a support for the

silk and it must also be strong enough to allow the silk to
be stretched over it without distortion. It can be made in
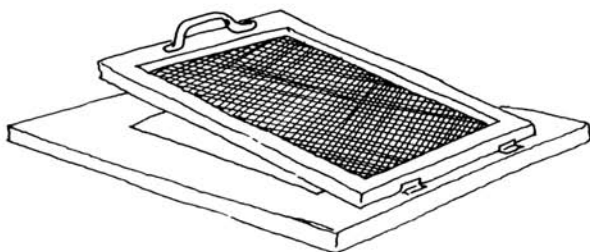any woodwork shop by a carpentry technician.

Diagram 17: Screen printing frame

Various sizes of frame are a good investment: the largest
should be big enough to allow for printing over the whole
area of the largest sheet of paper or card you envisage
using; the smallest should be about a quarter of the size of
the largest.

THE SCREEN FABRIC

Any porous fabric can be used for the screen itself. The
coarser the weave, the more ink will pass through. If the
mesh is too coarse it will use too much ink. If it is too
fine it becomes difficult to force the ink through. The
three main fabrics in use for making screens are silk,
organdy and man-made fibres such as nylon and terylene.

Silk is the best fabric to use. It is the most expensive but
will last longer than either organdy or man-made fibres. If
the screen fabric is cleaned thoroughly after each printing,
it should be possible to use it time and time again. Organdy
quickly becomes floppy and once this happens it must be re-
placed. Man-made fibres come between these two extremes in
both performance and cost. They will last almost as long as
silk and are slightly cheaper to replace.

Stretching the fabric on the frame

The frame should be placed on a strong, flat bench or table to allow the fabric to be correctly stretched. Ordinary carpet tacks can be used to fasten the fabric to the frame. The four corners should be tacked temporarily to hold the fabric in place. One side at a time should be stretched, beginning with a long side. The tacks must be driven in at 2-inch intervals. When this side is completed, the frame can be turned round and the opposite side done in the same way. After this, the two short sides can be stretched and fastened. When using tacks to fasten the fabric, make sure they are hammered well in so that the heads sink in level with the wood. Another method is to staple the fabric to the frame with a staple gun. It is just as efficient and much quicker. It is always easier if two people work together to stretch the fabric, one stretching it over the frame, the other doing the fastening. To assist in obtaining tension on the fabric, it is best to dampen it before stretching.

There are various tools that can be bought to help in getting tension on the fabric, the simplest of which is a specially adapted pair of pliers.
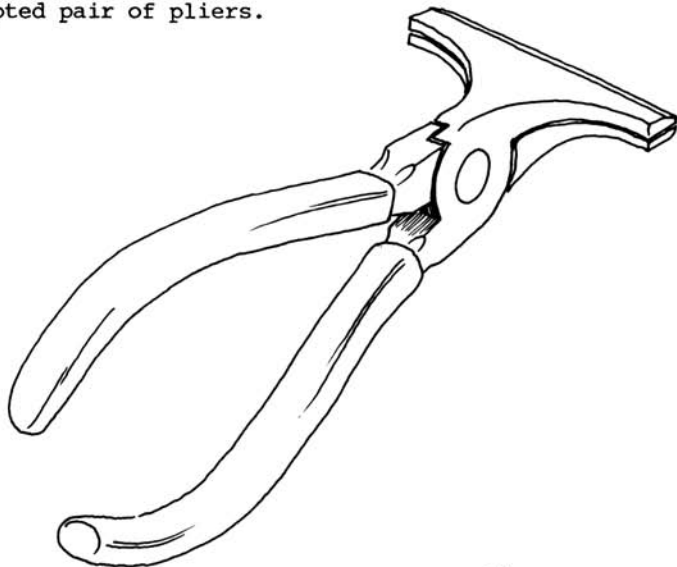
Diagram 18: Screen pliers

The next stage is to seal the edges to prevent ink from seeping between frame and fabric. Gummed brown paper about 2 inches wide is stuck to the frame and the fabric to cover the tacks or staples. Another strip is gummed on the inside of the frame, half of it on the wood and the other half on the fabric. A further strip is now stuck on the fabric slightly overlapping the previous piece.

THE BASE

This must be flat, very smooth and solid enough to stand varying amounts of pressure, yet still remain rigid. An ideal surface is a laminate such as formica mounted on thick plywood or blockboard. It is easy to keep clean, does not warp and is very smooth. Thick plywood or blockboard alone could be made usable with two or three coatings of shellac to seal the surface and give a finish that is easy to clean.

The base can be portable or be fixed to a table top depending on the amount of use to which it will be put. It should be larger than the largest frame if possible.

Attaching the frame to the baseboard

The frame must be fastened to the baseboard in such a way that it will move up and down and always fall back into exactly the same position on the baseboard. In addition it must be easy to detach from the baseboard for cleaning the screen.
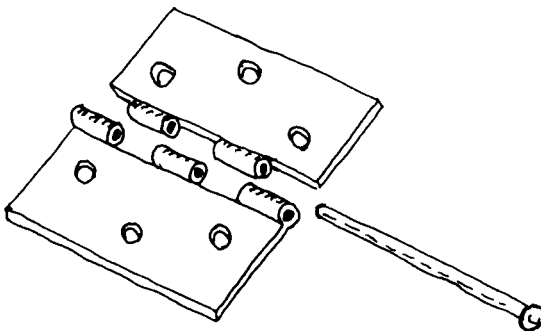

Diagram 19: Hinge and pin assembly

The simplest method is to screw two half hinges onto one side
of the baseboard. The other halves of the hinges are secured
to one side of the frame so that the hinge pins can be
slipped in and out. This method has the advantage of allow-
ing different frames to be put into use very quickly.

THE SQUEEGEE

This piece of equipment is used to force the ink through one
screen onto the paper below. It consists of a straight-
edged flexible blade, usually made of rubber or some form of
plastic. It should be firm but pliable. The stiffer it is,
the more force is needed to push the ink through the screen.

The material for the blade can be purchased from a dealer in
silkscreen supplies, or improvised by someone with experi-
ence. It must be sandwiched between two pieces of wood or
metal. If possible it should be made in such a way that
both sides of the blade can be used.

The length of the squeegee depends on the width of the frame.
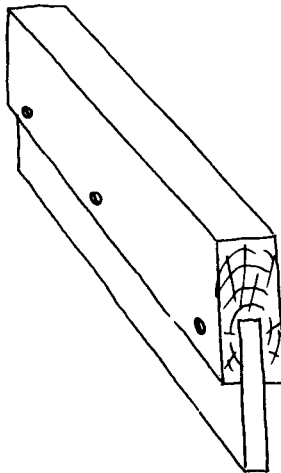For each width of frame a corresponding squeegee will be
needed.

Diagram 20: Squeegee

The blade must always be kept perfectly straight and level. Any distortion will fail to give sufficient pressure to force the ink through the screen and will leave blank areas on the print.

Maintenance of the squeegee is most important. Care should be taken to keep the blade sharp and not allow it to become rounded. There are gadgets on the market to assist the printer in this, but a cheap and quite efficient method is to glue a strip of coarse sandpaper to a flat board and clamp it to a bench. As the edges of the squeegee begin to round off, stroke the blade firmly and evenly along the sandpaper for its whole length. By having this type of block available, the blades can be sharpened after each printing if necessary.

STENCILS

The stencil is the essence of the silkscreen process. Its purpose is to cover part of the screen and so prevent ink from getting through. For example, if you want to print a letter A, you must find a way of preventing the ink from penetrating the mesh of the whole screen except for the letter A itself.

Different kinds of stencil material can be used, each having a distinct use and giving a distinctive result.

Paper Stencil

Paper makes the simplest stencil. Always at hand and easiest to use, it has quite a wide range of possibilities. The paper should be thin enough to be cut with scissors or a scalpel. Very fine work is not possible, but large letters suitable for a poster can be cut with a scalpel.

The paper stencil is fastened to the screen by the first inking sweep of the squeegee. The cut paper is placed on the baseboard, the screen lowered onto it and the ink squeegeed over the screen: this will result in the ink sticking the paper to the screen. The main drawback of this type of

stencil is that it has only a short life - seldom more than 20 or 30 prints. In addition, it is not possible to clean a screen with a paper stencil and run a different colour.

Liquid Stencil

Liquid exists which can be painted or sprayed onto the screen. Wherever it is applied, it fills up the mesh. On drying it prevents ink from being squeegeed through.

It is essential to use a liquid stencil that will not be soluble in the inks that are used. Thus, if a water-based ink is to be used for the printing run, then a spirit-based filler must form the stencil.

The silkscreen printing of posters and book covers is always done with a spirit-based ink. It is therefore necessary to use a water-based liquid to block out the mesh. The best is manufactured under the name "blue filler".

Application can be by various methods: the liquid can be sprayed on (aerosol cans are sold containing the filler), dabbed on with a sponge or painted on with a brush. Only by experiment will the various effects by seen, and only experience will tell when they should be used.

Hand-Cut Stencil Film

Many designs are unsuitable for paper or liquid stencils. They may be too complicated, or require long runs or changes of colour. In such cases special films are available. They last longer and can be cut with accuracy into complex shapes.

Each sheet of film is made up of two layers of material held together with a temporary glue. One of the layers is a transparent backing sheet, often of plastic. The other is a thin stencil material, usually coloured and almost transparent.

To use the film, lay the design to be cut on a hard surface, then fix the stencil film securely on top with the part of the film that has to be cut uppermost. The design will be

visible through the film. Using a sharp scalpel, trace the design carefully so that only the top layer of the film, and not the backing sheet, is cut away. The underneath layer is there as a backing sheet to hold all the parts of the design together. The pieces of the stencil material that are not needed can then be peeled off and thrown away. These are the parts of the design that will print. Left on the backing sheet are the parts of the design that will not print.

Place the stencil on a flat surface with the stencil layer uppermost. The screen is placed on top and a wet sponge applied, working over the whole area. The water will loosen an adhesive in the film. Any excess water left must be removed. A good way to do this is to lay sheets of old newspapers on it and, using a handroller, gently press over the area of the screen until all the water is soaked up. Alternatively you can use an electric iron. Lay a sheet of paper on the backing sheet and iron over it. Later you can peel off the backing sheet.

The screen must now be dried, either in the sun, by a radiator, or possibly with the help of an ordinary hand-held hair-dryer. After about 20 minutes, it should be possible to remove the backing sheet from the stencil and, after covering the edges of the screen, start printing.

DRYING RACK

If only a small number of sheets is to be printed, it is possible to lay them out on benches or to hang them on lines to dry. But when the length of run increases, this method is not quite so feasible and a drying rack may be needed.

This consists of a number of wire shelves, usually 50, hinged to a frame and fastened one above the other with about one inch of space between. It will give drying room for possibly as many as 100 posters.

ADDITIONAL POINTS

A silkscreen workshop should have a plentiful supply of water. Most of the stencils are soluble in water, so water

is necessary for cleaning the screen when printing has
finished.

The skill required is in proportion to the type of stencil
being used. Experience in handling the equipment, especially
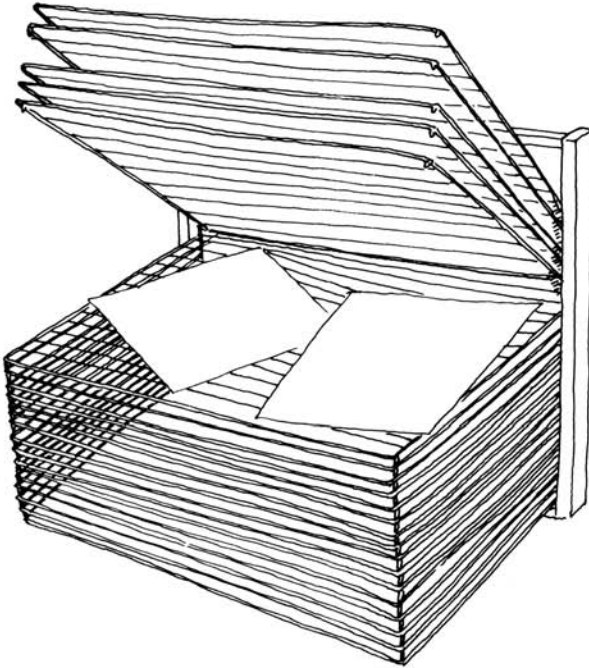the squeegee, is the most important need for the operator.

Diagram 21: Drying rack

The number of copies that can be produced will vary according
to the type of stencil being used. For short runs, paper
stencils will be adequate if fine line work is not needed.
Longer runs will be accomplished better with handcut or
photostencils. Photostencils are extremely sensitive to
light and can only be made in a darkroom. If a darkroom is
not available it may be possible to have the photostencil
made by an outside agency.

The output of the operator will be determined by the size of
the poster or other object being produced, the amount of ink
that has to be pushed through the screen, and the drying
facilities. An experienced operator can produce about 100
copies an hour. This number can be increased if two tech-
nicians work together: one to lay paper on the bed and print,
the other to take the finished print and lay it out to dry.
The number of copies printed, however, will not necessarily
be doubled.