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Silk Screen Printing

Silk screen printing is a simple, inexpensive method of producing multiple copies of attractive visual aids, posters, and other materials, including typewritten pages.

A squeegee forces very thick paint through those parts of the silk screen that are exposed by the stencil onto paper placed underneath the screen. The silk-screen

process presented here is used for educators and trainers who must prepare their own training materials. It would require considerable upgrading of equipment and materials to be appropriate for commercial painting operations.

BUILDING THE SILK SCREEN PRINTER

Tools and Materials

Hinges, about 2.5cm x 7.5cm (1" x 3")

Wing or regular nuts

Squeegee

Trigger support

Wood for frame

Baseboard or smooth table top

Silk or other sheer cloth

Thumbtacks

Silk screen paint

Paper for copies

Water-soluble paint, e.g., finger paint

(Oil-soluble paint also works well,
but a solvent is needed to clean it off the screen.)

1. Build a frame (see Figures 1 and 2), using 1.9cm x 5cm (3/4" x 2") plywood

fg1x4050.gif (437x437)

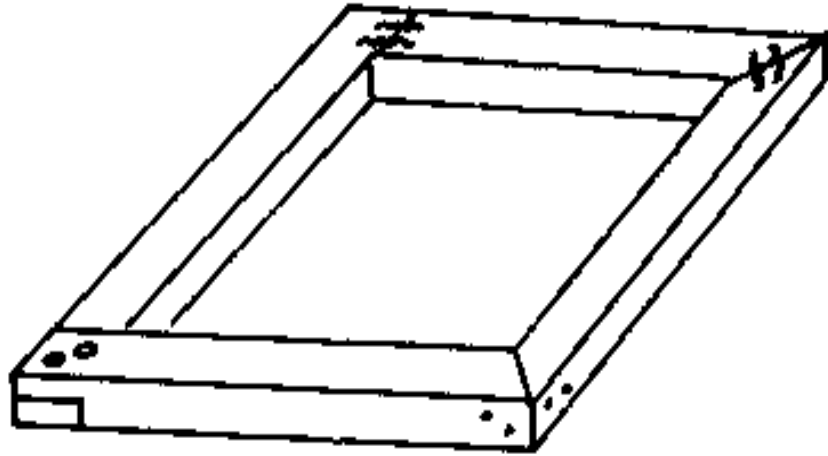


FIGURE 1. MAKING THE FRAME OF THE SILK SCREEN. DIFFERENT JOINT CONSTRUCTIONS ARE SHOWN AT EACH CORNER; ANY ONE OF THESE MAY BE USED FOR THE JOINTS OF THE FRAME.

or other wood. The frame should be big enough for the largest prints to be made. Average inside frame dimensions would be 38.1cm x 50.8cm (18" x 24"). Make sure that the corners are square and the frame lies flat against a flat baseboard or table top. The baseboard can also be made of 1.9cm (3/4") plywood. A few coats of shellac on the wooden frame will make it longer lasting and less apt to warp.

2. Stretch the silk very tightly over the underside of the frame, using tacks every 2.5cm (1"). Make sure that the threads of the silk run parallel with the edges of the frame, pull the silk over the outside bottom edges and tack

the silk around the outside of the frame (see Figure 2).

fg2x406.gif (600x600)

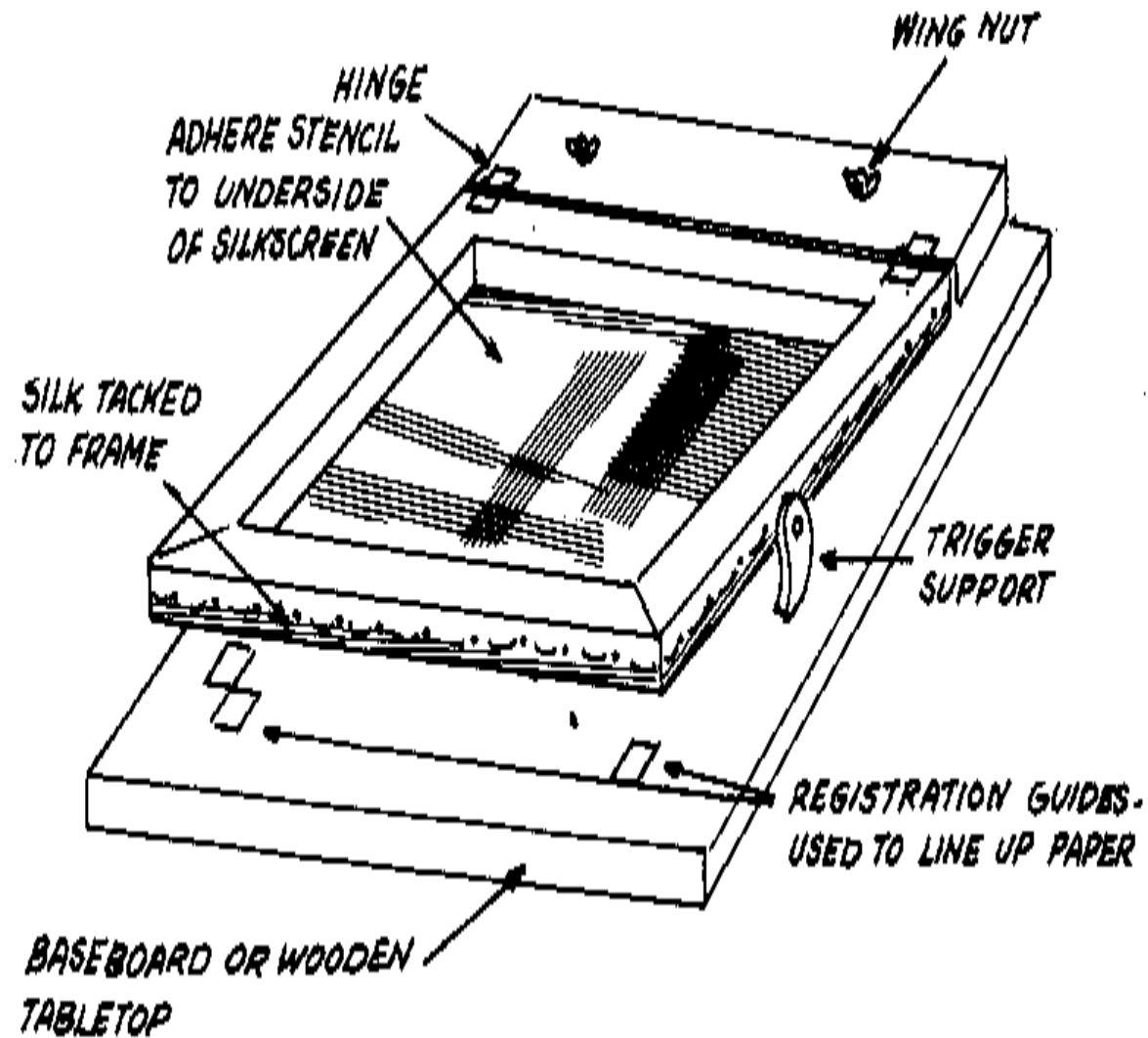


FIGURE 2. BOLT THE HINGED END OF THE FRAME TO A FLAT
BASEBOARD OR WOODEN TABLE TOP.

3. Make a squeegee (see Figure 3).

fg3x406.gif (486x486)

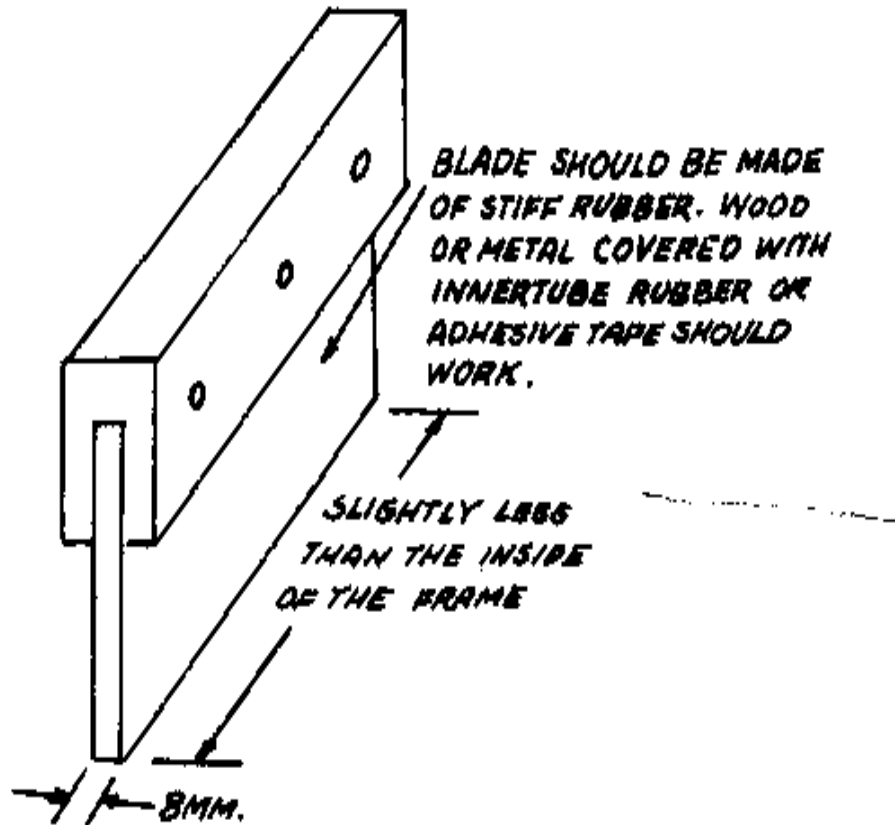


FIGURE 3. A SQUEEGEE CAN BE MADE SIMPLY IF NONE ARE AVAILABLE.

PRINTING

1. Cut the stencil and attach it to the screen (see "Preparing a Paper Stencil").

2. Place the paper or cardboard to be printed under the screen and stencil. Draw about 10ml (2 teaspoons) of water-soluble paint (for example, finger paint) in a line along the edge of the silk just inside one end of the frame. The paint should be thick, about like auto transmission grease, so that it will not just fall through the screen without being pushed by the squeegee.

3. Using an edge of the squeegee, pull the paint across the surface of the silk. This squeezes the paint through all the open areas of the paper stencil. Lift the screen and remove the print, replacing it with the next piece to be printed. Pull the paint back in the opposite direction for this print. The correct technique is to put an amount of paint on the screen that will, combined with the right pressure on the squeegee, produce a good print with one stroke of the squeegee. <see figure 4>

fg4x407.gif (437x437)

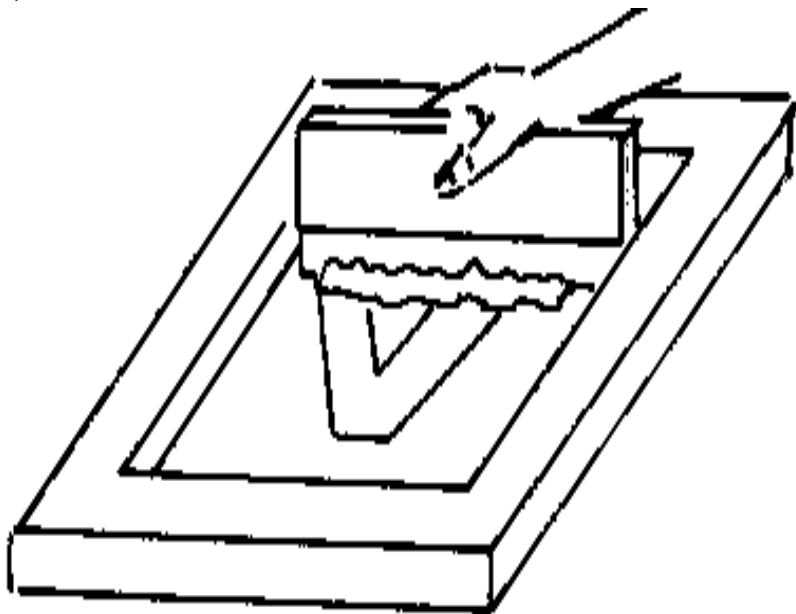


FIGURE 4. THE SQUEEGEE IS USED TO DRAW THE THICK PAINT ACROSS THE SILK SCREEN.

Make sure that the paint contains no dried paint particles. They could damage the screen.

4. When a printing is completed, pull the stencil off the screen. Remove the wing nuts and wash the frame under running

water.

5. The pieces to be printed can be registered (lined up so that the printed image appears in exactly the same place on each piece). Registration guides can be made of thin cardboard or several layers of tape (see Figure 2).

fg2x406.gif (600x600)

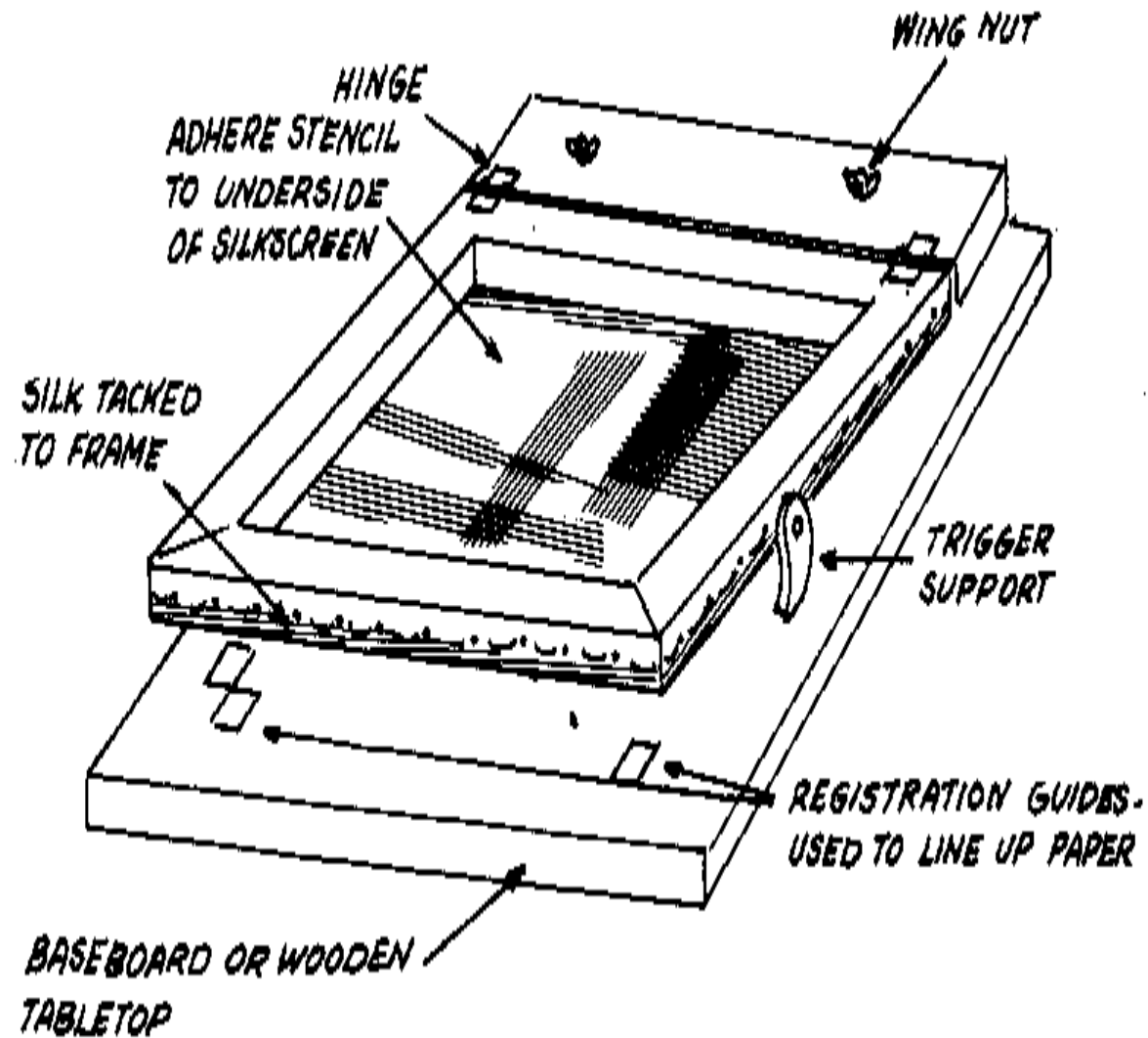


FIGURE 2. BOLT THE HINGED END OF THE FRAME TO A FLAT BASEBOARD OR WOODEN TABLE TOP.

Thicker guides could break the silk when the squeegee presses the screen against them. The guides should be taped on the baseboard at the edges of

three sides of the sheets to be printed.

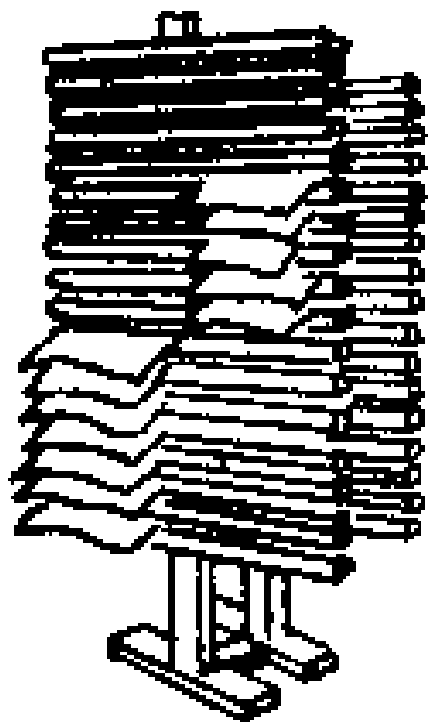
6. If more than one color is to be printed, registration becomes very important. The procedure to follow is this:

- o Print the first color, using registration guides.
- o Wash the screen as in Step 4 above, and attach the next stencil.
- o Place a piece of waxed paper or thin translucent paper under the second screen to be printed, and tape this paper on one edge.
- o Print an image of the second screen on this paper.
- o Raise the screen.
- o Slide a sample of the first printing into position beneath the taped paper. Adjust the sample so that the second image will appear in the right place on the pieces already printed.
- o When the sample is lined up, carefully hold the first printing sample in position and remove the wax paper.
- o Tape new registration guides on three sides of the sample.
- o More colors can be printed by returning to Step 6.

7. Several colors can be printed over one another if transparent paints are used.

8. A drying rack (see Figure 5) is helpful when many prints are to be dried.

fg5x408.gif (600x600)



**FIGURE 5. A SIMPLE DRYING RACK
CAN BE MADE FROM 5CM. X 5CM.
UPRIGHTS WITH 2.5CM. X 2.5CM.
CROSSBARS ABOUT 2.5CM. APART.**

Source :

John Tomlinson, VITA Volunteer, Rochester, New York

PREPARING A PAPER STENCIL

This method of preparing a stencil for silk screen printing is more versatile for some effects than the usual stencil technique: for example, the letter "O" can be formed without connecting lines to hold the center in place. But the method has these limitations: Images must be bold and simple designs. The stencil will last for only a few hundred impressions; will not hold up with water-base paint; and cannot be stored.

Tools and Materials

Stencil paper--Somewhat-transparent white bond paper works well. Commercial stencil paper can be used, but the edge of the printing may be fuzzy. Thick paper

leaves a thick layer of paint when the squeegee draws the paint across the screen.

Mimeograph stencils can be used to reproduce typing.

Stencil knife

A small-blade knife with a handle about as thick as a pencil.

To prepare and use the paper stencil, follow these steps:

- o Place the stencil paper over the image to be reproduced and fasten both to a hard level surface, like the baseboard of the silk screen.

- o Trace the design and then cut around the areas where one color is to be printed. Press just hard enough to cut through the stencil paper without cutting the original. Do not strip the cut-out parts away yet; leave the stencil intact.

- o Put a pad of newspaper on the baseboard of the silk screen so that when the screen is lowered it will hit the stencil firmly.

- o Place the stencil on this pad in the position desired. Slip several pieces of tape, sticky side up, under the edges of the stencil; this will tape the stencil to the screen when the screen is lowered. Mask the open areas of the screen beyond the edges of the stencil.

- o To make the stencil stick to the screen, draw paint across the screen with the squeegee.

- o Remove the cut-out parts of the stencil.

- o At the end of the printing run, peel the paper stencil and masking from the screen. Clean the screen.

A mimeograph stencil is prepared as it would be for a mimeograph machine. Attach it to the screen the same way a paper stencil is attached.

Source:

Mrs. Benjamin P. Coe, VITA Volunteer, Schenectady, New York

MAKING SILK SCREEN PAINT

The paints described here for silk screen printing should have a shelf life of several months when they are stored in jars with tight-fitting lids. The recipes have been tried successfully in a temperate climate. Paints colored with powdered tempera are more brilliant than those colored with food colors or ink. Other water-soluble dyes can probably be used also.

Materials

Starch or cornstarch

Soap Flakes

Gelatin (optional)

Coloring matter (food color, tempera powder, ink, or a dye of some sort that is water soluble)

Recipe #1

Linit starch (not instant) 115 ml (1/2 cup)

Boiling water 345ml (1 1/2 cup)

Soap flakes 115ml (1/2 cup)

Mix starch with enough cold water to make a smooth paste. Add boiling water and cool until glossy. Stir in soap flakes while mixture is warm. When cool, add coloring.

Recipe #2

Cornstarch 57.5ml (1/4 cup)
Water 460ml (2 cups)
Soap flakes 29ml (1/8 cup)

Bring water to a boil. Mix cornstarch with a small amount of cold water and stir the two together. Bring, to a boil and stir until thickened. Add soap flakes while warm. Color.

This recipe produces paint that seems quite lumpy but this does not affect the printing quality.

Recipe #3

Dissolve 115ml (1/2 cup) cornstarch in 172.5ml (3/4 cup) cold water

Dissolve 1 envelope gelatin (15ml or 1 tablespoon, unflavored) in 57.5ml (1/4 cup) cold water

Heat 460ml (2 cups) of water, pour in cornstarch. Add dissolved gelatin. Boil, and stir until thickened. Cool and add 115ml (1/2 cup) soap flakes. Color.

NOTE: Adding 5 to 10ml (1 to 2 teaspoons) of glycerine to any of these recipes will make the paint easier to use.

Never let dried particles of paint get mixed into the paint or fall onto the screen

because they may puncture the silk during the printing. A small hole in the silk can be repaired with a small drop of shellac.

Source:

Mrs. Benjamin P. Coe, VITA Volunteer, Schenectady, New York
Inexpensive Rubber Cement

Inexpensive rubber cement can be made easily with ordinary gasoline and raw sheet rubber.

Imported pastes are often expensive. Many of these are not good for mounting pictures and similar materials; they soak through the paper and wrinkle both the picture and the mount.

Rubber cement does not wrinkle the pieces to be joined. It has another advantage:

if it smears, it can be rubbed off with the fingers when it is dry.

Tools and Materials

Ordinary gasoline: 250cc (16 ounces)

Raw sheet rubber in one piece:

5gm (115 ounce)

Jar with lid

Stirring rod

Brown bottle

(*) Tin can

(*) Charcoal

(*) Small pieces of cloth

(*) Needed only if gasoline is colored.

* * * CAUTION * * *

Gasoline will burn and explode, and the vapors can be a health hazard. Be careful when mixing or applying the cement. Do not inhale the gasoline vapors. Make the rubber cement in a well-ventilated place.

The rubber to be used should be a translucent, light-brown sheet. Any brand of gasoline can be used. Some gasolines are highly colored. This coloring should be removed so that the rubber cement will not stain when it is used. To remove the coloring, pour the gasoline over common charcoal several times (see Figure 2).

Use a clean tin can with a hole in the bottom. Put a small piece of cloth in the bottom of the can to keep the charcoal from falling into the filtered gasoline. You may have to change the charcoal several times before the gasoline is clear.

Put the 5 grams (1/5 ounce) of raw sheet rubber in a jar and pour in the 250cc (16 ounces) of ordinary

gasoline (see Figure 1). Cover the jar.

It takes about three days for the rubber to dissolve completely in the gasoline. Stir the mixture several times during this period, especially when the mixture becomes thick. If some of the rubber does not dissolve, more stirring will break it up. When the rubber is dissolved, you will have a smooth, milky-colored cement.

To store the rubber cement, it is best to use a brown bottle because the cement will become thin if it is exposed to sunlight for a long time.

Mark the bottle:

**DANGER: EXTREMELY FLAMMABLE,
HARMFUL OR FATAL IF SWALLOWED**

The cement should be kept in a ventilated cupboard when it is not being used.

To make a handy dispenser for the cement: Cut a hole in the cover of the jar, large enough for the handle of a 2.5cm (1") brush (see Figure 3). Push the handle through the hole and leave the brush in the jar. This should be airtight because the cement hardens quickly when exposed to air.

Source:

Bunyard, Robert J. "Rubber Cement in a Tropical Climate," The Multiplier, Vol. 2, No. 6, July 1956.