MAKING SMALL PAINT BRUSHES

PRACTICAL ACTION
Technology challenging poverty

technical brief

There are three types of paint brush suitable for small-scale manufacture, each using similar materials and similar techniques.

Materials

The bristle for brush manufacture comes from many parts of the world and the basic type appears to be wild boar bristle. This is available in various degrees of stiffness, depending on the climate from which the material is obtained. Known sources of this material are: France, India and China.

Adhesives

All adhesives used must be insoluble in water, and in any solvent likely to be encountered in use. Phenolic resin adhesives appear to be the most suitable, but the two-part epoxy adhesives, such as Araldite are also used.

Tying Materials

For tying the various types of brush, hemp is commonly used and also strong thread.

Tools

All tools used in the manufacture of the three brushes to be described are simple, with the exception of the crimping tools used for the fairly large-volume production of ferrule-type brushes.

Type A - Fitch Brushes

For a given size of brush, the correct amount of bristle is selected from pre-cut lengths of bristle. The length of bristle is determined by the length of exposed bristle for painting plus the length of bristle required for securing to the ferrule.

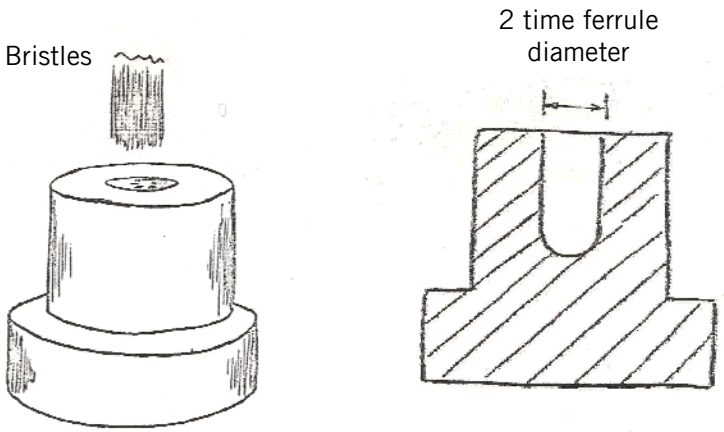
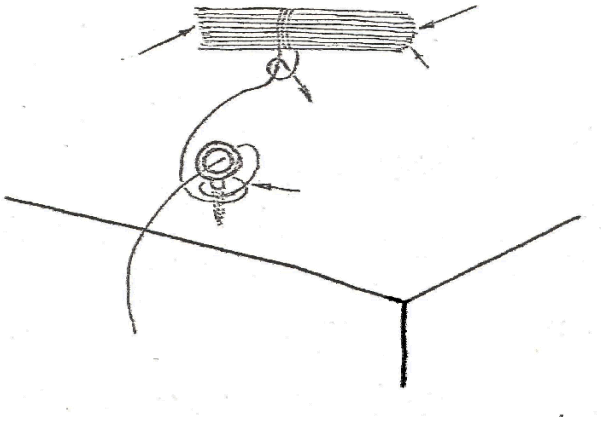


Figure A1: heavy metal "Cannon"

The quantity of bristle required may be selected a) by hand, using practical experience as a guide to the quantity, or by using a metal cannon (Fig. AI) as a guide to the quantity and also as an aid in tying the bristles, in addition to giving an approximate shape to the end of the brush.

Practical Action, The Schumacher Centre for Technology and Development, Bourton on Dunsmore, Rugby, Warwickshire, CV23 9QZ, UK
T +44 (0)1926 634400 | **F** +44 (0)1926 634401 | **E** infoserv@practicalaction.org.uk | **W** www.practicalaction.org

The collected bristles, when tied, form what is known as the 'knot', this term being common throughout the methods to be described for the other two types. In order to free both hands for tying up the bundle of bristle, a screw-eye is secured to the table-top immediately in front of the operator. The tying thread is led through the eye and two or three turns are made on the eye body to secure. This leaves the operator's hands free to bind the bristles and to tie off, as shown in Fig. A2.



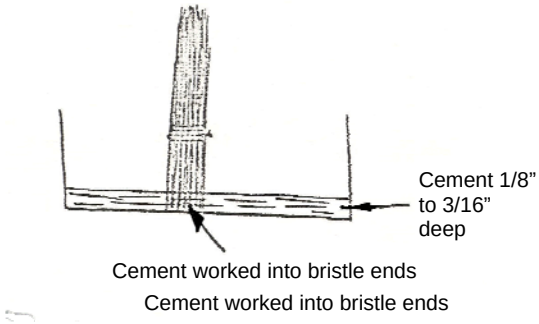


Figure A3: Cementing the “knot”

The cement is held in a metallic container to a depth of 1/8" to 3/16". The pre-tied knot is dipped into the cement and the cement worked into the bristle ends (Fig. A.3).

Two types of ferrule are used: for round brushes a tapered ferrule is necessary and for a flat a straight, plain ferrule is normally used.

For round brushes, the taper of the ferrule is used as an aid to fitting the bristle. The tied knot is pushed through the wide end of the taper and a wooden pusher may be used to determine the position of the bristle and to make this a constant. When correctly inserted, the bristle is held in position by a small quantity of adhesive poured into the wide end of the ferrule, (Fig. A4).

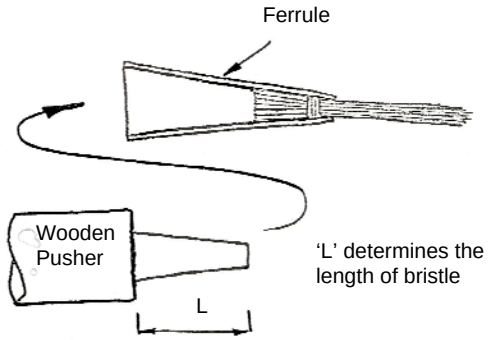


Figure A4: Fitting the “knot” to the ferrule

When the adhesive has set, the completed brush head is fitted to the handle. This is commonly carried out using a pair of crimping dies (Fig. A5). One half of the die set is fixed, the other being movable, with a mechanical means of applying a load in the direction of sliding. A simpler means of producing a satisfactory crimp would be to use the proprietary wire crimping tools available in the electrical industry.

These have the advantage of being both cheap and versatile, in that they are capable of crimping more than one size.

Once the brush head has been crimped to the handle, the unit is complete, except for final trimming of the bristles, if necessary.

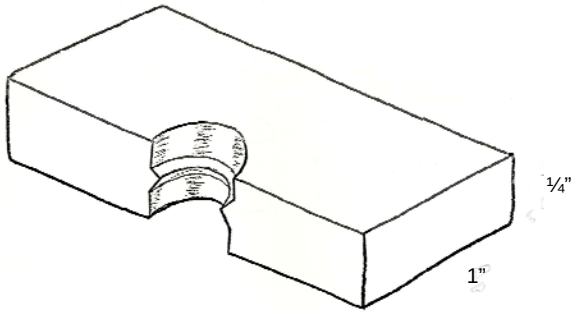


Figure A5: Crimping die (one of two)

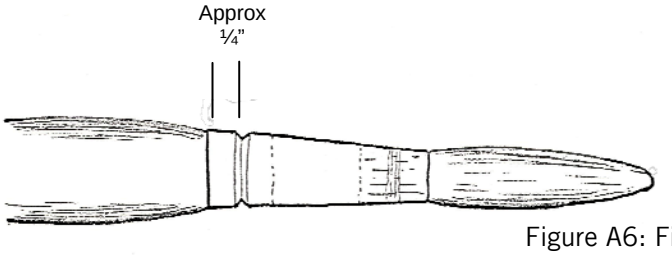


Figure A6: Fitting handle to ferrule

Type B - String Sash

The second type of brush, the string sash, has certain advantages over the Fitch-type brush in that it does not require a ferrule. A handle of the standard form is slotted at one end (Fig. B1) to receive a standard knot which is then fixed by adhesive and by binding, (Fig. B2). The material used for binding is again hemp or strong thread and if the binding' technique shown in Fig. B3 is applied there are no loose ends or ties at the end of the process.

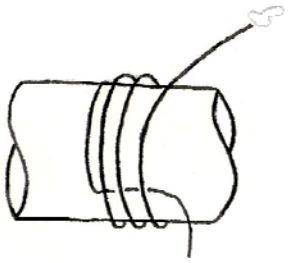


Figure B3a: Start of binding

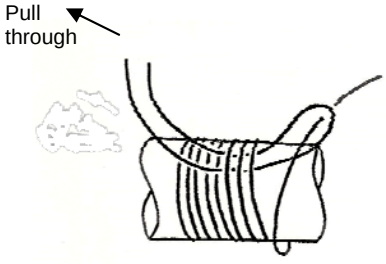


Figure B3b: Finish of binding

This process is also suitable for brushes of quite large diameters, for example 1" +, and for arduous duties an extra long bristle can be used with a secondary tie, or bridling, fitted half way along the bristle. As the bristle wears in use, the bridling can be removed, the brush re-trimmed, thus extending the life of the whole unit, (Fig. B4).

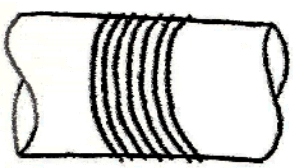


Figure B3c: Finish binding (no loose ends or ties)

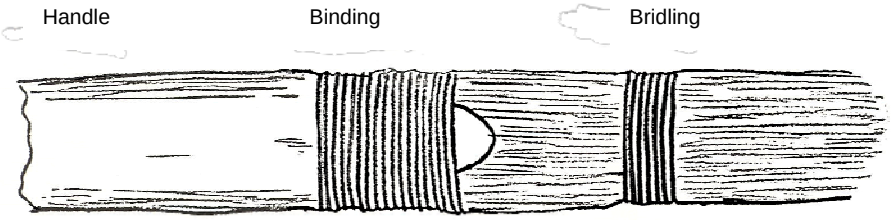


Figure B4: String sash with bridling

Type C - Pre-formed Knots

This method of manufacture probably represents the simplest form of assembly available. Two basic pieces of tooling are required: 1) a former consisting of a metallic tube whose centre hole is of the size of knot required, with an overall length of between 1/4" and 5/16"; 2) a guide is used to make for ease of assembly of the bristles into the former and consists of a small, funnel-shaped device which fits over one end of the former (Fig. C2).

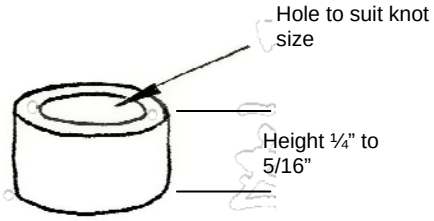


Figure C1: Former

The bristles are fed through the guide and into the former and allowed to project by about 3/16". The projecting bristles are then dipped into suitable adhesive and pressed on to the bench to push the assembly back inside the former. The excess cement is removed and the adhesive cured on a hot plate. It is essential to note that with this method of construction the adhesive must not adhere to the material of the former. For this reason the phenolic resin adhesives are recommended and some experiment is required before production to ensure that the adhesive can be pressed out of the former.

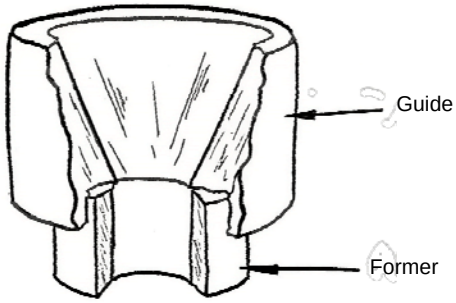


Figure C1: Former

When the adhesive is cured, the pre-formed knot is pushed from the former and stored. By using a number of formers it is possible to produce brush heads on a batch basis and for final assembly to be carried out along the same lines.

The handle, which is of the standard type, has a hole drilled in the end to a fixed depth, into which the pre-formed knot is fixed with adhesive.

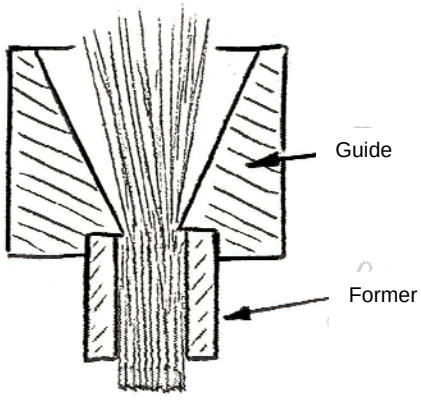


Figure C1: Former

There are no further operations, and when the adhesive is cured, the brush is complete, (Fig. C4).

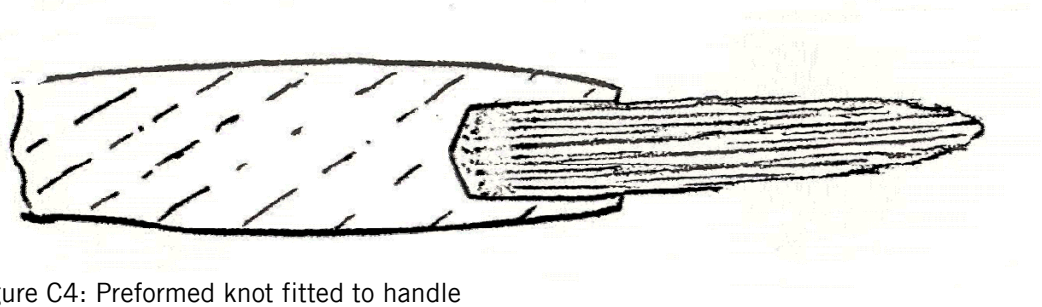


Figure C4: Preformed knot fitted to handle

These are the traditional methods of manufacturing small paint brushes. There are many other techniques available, mainly using a high degree of acquired skill, and which are used for more sophisticated brushes. The three processes described were chosen for their suitability for small-scale production and for the fact that minimal capital equipment is required to establish a moderate production volume.

This technical brief is based on a document written by R W Spencer for ITDG (Practical Action) August, 1976.

Practical Action
The Schumacher Centre for Technology and Development
Bourton-on-Dunsmore
Rugby, Warwickshire, CV23 9QZ
United Kingdom
Tel: +44 (0)1926 634400
Fax: +44 (0)1926 634401
E-mail: inforserv@practicalaction.org.uk
Website: http://practicalaction.org/practicalanswers/

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