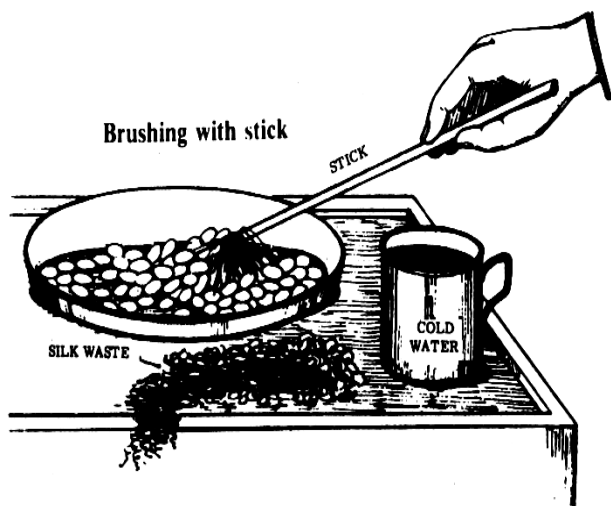


Cocoon Brushing

After the cocoons are cooked either for the floating system or the sunken system, the cocoons have to be brushed for removing the surface floss layer of cocoons. The floss layer of the cocoon is entangled and coarse and does not yield silk for reeling. Further it obstructs reeling of the clear bave and so its removal ensures high standards in raw silk. The floss layer is removed by a process known as brushing.

Generally in preparing cocoons for the floating system of reeling, cooking of cocoons & brushing them for removal of floss from twin operations conducted in the same basin and by the same operative. The only system in which there is a departure from this practice is in the three-pan type of cooking, which also cooks them for the floating system of reeling only. In this type the cocoons are only boiled and passed on for brushing to the cocoon brushing section or with the aid of a brushing device provided at one end of the reeling basin, the reeler does the brushing of the cooked cocoons supplied to him. Generally when the cocoons are prepared for the sunken system of reeling, cooking is always separated from the brushing bath which may have a collective brushing device or a mere soft fibre automatic brush provided for the brushing part of the reeling basin. The popular methods and equipments used for brushing are described below:

(1) Stick Brushing:



A single flexible, thin, soft stick is frequently used for removing the floss from boiled cocoons. The operative holds one end of the stick and with the other end carefully removes the floss from the cooked cocoons in the basin by dextrously working the stick in a series of figures of eight among the cocoons in the basin, (Fig.) in such a way that the stick comes lightly in

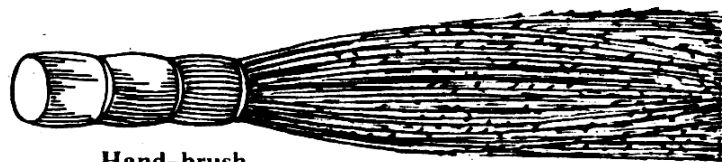
contact with the surface of the cocoons and catches and draws off the flossy waste. When sufficient quantity of floss has been taken off the cocoons and wound round the end of the stick, it is lifted up from the cocoons and in the process draws up the baves from the floss layer

attached to the lump of the waste on the stick. The stick is then removed and the operative takes hold of the lump and lowers it towards the cocoons, gathering in the process the

released floss threads. Then holding the collected lump close to the cocoons, several side to side movements are given with the object of further loosening the small quantity of floss that would be still remaining on the cocoons. The lump of waste is then lifted up to about 25-30 cm above the cocoons and the released baves from the cocoons drawn up along with the lump waste are caught and separated from the waste at the point of contact of the baves and the lump of floss waste. The waste is kept aside for further cleaning and drying. The cocoons with their released reelable baves are transferred to the reeling basin in a perforated ladle taking care to twist the loose ends of the released baves.

Sometimes instead of a single piece of stick a prong made of two pieces of sticks or twigs is used. The operative gently taps the surface of the cocoons repeatedly with the prong in several parts of the cocoon group in the basin and every time the prong is lifted, filaments from the floss layer are drawn up. These are gathered in the hand of the operative till sufficient quantity has been collected. Then in the manner already described above, the rest of the floss is removed. The stick or prong method may be used successfully when handling multivoltine cocoons having much floss layer which easily gets caught by the prong. These methods are popularly used in the Charka system and other older types of reeling in the cottage reeling sector. But the equipment is not suitable for hard-crustured univoltine cocoons with a thin layer of closely clinging floss. An important point for consideration in the use of the stick is that it should not be too roughly used, as otherwise the silk bave in the shell is likely to be damaged and the pupae in the shell ruptured. Also, as the stick does not have enough catching surface a comparatively longer time is taken for brushing the cocoons and, the cocoons therefore have to remain for a prolonged period in very hot water which is detrimental to reelability. These deficiencies have been overcome fairly effectively by using soft, long-bristled brushes.

(2) Hand Brushing:

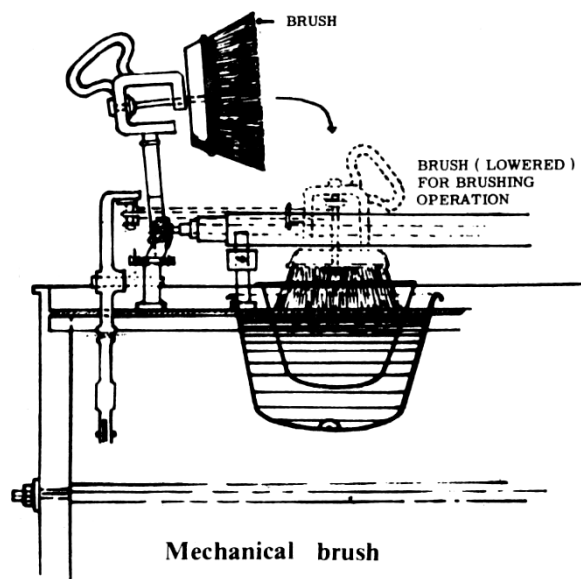


Hand-brush

This brush is generally made of fairly thick and long fibres tied like a broom. The brush is made of fibre bristles which are thick and flexible and not too stiff. They are generally made from a strong vegetable fibre like Khus-Khus grass or sometimes from paddy straw. The brush is about 15-20 cm long and has a flat, circular brushing surface about 6-8 cm in diameter. The handle end is tied into a close pack (Fig.) to afford the brushing operative a good grip. The softened floss of the cooked cocoons in the basin is gently brushed

by circular movements of the brush lightly touching the surface of the cocoons. The brush is then lifted up and the floss waste removed in the manner described above. As the brushing surface of the hand brush is large with hundreds of bristles, brushing of floss is done quickly and more efficiently. Due to the flexibility of the bristles there is no risk of injuring the bave or rupturing the pupae. In filature reeling machines, the cooking basins are invariably provided with mechanical brushing devices. Hand brushing has been completely replaced by mechanical brushing.

(3) Mechanical Brushing



When the cocoons have been put into the cooking basin and ladled a few times with the object of boiling the cocoons, the automatic brush is lowered into the basin. Immediately the brush commences to make fairly brisk clockwise and anticlockwise rotary movements with three-quarters of a turn in each direction, alternately. After a definite number of rotary movements (generally 20 to 24) the brush is lifted out of the basin either by the cooking operative or automatically (Fig.).

It is important that the required temperature of the water is obtained even before the brush is lowered. When the outer layer of the cocoon has thus been well brushed, it comes off easily drawing with it most of the reelable ends of the bave of all the cocoons.

The operative carefully collects the teased outer floss and draws off all the baves until they unwind cleanly from the cocoons without any of the floss layers still sticking to them. This process done in continuation with the brushing operation is called clearing the bave. The cleaning of the bave is mostly done by the cooking operative but occasionally it is also done in a separate basin adjacent to the cooking basin, so that when the baves of the cooked cocoons are being cleared in this basin, a fresh lot can be put into the vacant cooking basin for boiling and brushing. Sometimes when superior cocoons are being reeled at high speed and supplies of cooked, brushed and prepared cocoons have to be brisk, the clearing of the bave is done in a specially designed oval basin by a separate operative. The brushed and

prepared cocoons are transferred to the reeling basin either in a wooden tub or a perforated dipper or a ladle with the bave ends of the cocoons twisted and tied to the hook.

Precautions to be taken in this system of machine brushing are:

- (i) Cocoons should be thoroughly well sorted and should be of uniform size and build.
- (ii) Only one layer of cocoons should be on the surface of the water and the water level should be constant and maintained at such a level that all the cocoons in the basin touch the brush and are effectively brushed. In some machines, special arrangements are made for automatic maintenance of water level in the basin.
- (iii) The steam supply should be stopped when the brush is lowered into the basin to avoid over-cooking of cocoons during brushing.
- (iv) The brush should always be kept clean and free from clogging by silk waste and other extraneous matters released by cocoons.
- (v) When unyielding cocoons are returned from the reeling basin they should not be cooked again with fresh cocoons but should be treated separately. In some machines separate basins are exclusively provided for this purpose.

A modified form of mechanical brushing is provided in the modern multi-end reeling basins. Where the brushing device is not provided for the cooking basin it is provided for each reeling basin itself. The reeling basin has a suitably designed compartment or chamber at one end exclusively for brushing the cocoons supplied from the cocoon boiling machine. As the technique adopted in the modern multi-end reeling machine is the sunken system of reeling, the cocoons sink in the cooking basin instead of floating. The brushing device is very similar to the previously described automatic brush but instead of being one large brush, it has a number of small brushes protecting from the main brush holder. Thus then the brushing device is lowered for operation, the several brushes plunge into the basin with cocoons and each brush starts making rotary movements. Since the brushes dip into the group of cocoons and brush the cocoons surrounding them thoroughly, there is no need for the cocoons to be only in one layer. This arrangement enables the reeler himself to brush and prepare the cocoons.
