

cut to correspond with a crown exactly; but this is a matter of taste, and must be left to the operator. The base may be now looked upon as finished, and it contains five separate pieces. The parts may be screwed together or fitted with plain fittings, but screws should always take precedence of plain fittings, and this for very many reasons, one of which has just come forcibly under my notice; for one rather elaborate piece of work has come to grief through plain fittings, from the material shrinking or the cement giving. While being moved by the servant the body fell off, and broke away much of the ivory. I need scarcely say how annoying this is, and, therefore, as a preventive recommend nothing but screws to put any work together with.

We now come to the stem, which is cut with the aid of the spiral apparatus, and as it is a simple specimen of this class of work, it forms an excellent lesson in the production of the so-called Elizabethan twist. In setting about this part, the ivory should be placed in a box-wood chuck of small diameter, so that it will not in any way interfere with the working of the apparatus. It will be seen that there are in this piece three strands, which indicates really that there are three starting points, and these adjustments must be effected with the spiral chuck, which, having a wheel of 96 teeth, must be divided into three parts. The ivory having been turned to a perfect cylinder with the slide-rest, remove the fixed tool and place the drilling instrument in the rest with a round-nose drill. The wheels used to produce the twist were—on the chuck 120, on the arbor 36 and 60, and on the slide-rest a pinion of 24. Being long and slender, it is not one of the easiest parts to do, and will require great care, and as the material is gradually cut away with the tool, it naturally becomes more susceptible to vibration. In cutting spirals in ivory, I would here suggest that it is always better to let each and every finishing cut end in the same direction. I have heard many amateur turners argue that there is no grain in ivory to matter; but this is a great mistake, and experience would soon verify the fact that there is a great deal to contend with in this respect; therefore, if the cuts are all finished in the same direction, it will save a deal of trouble in finishing off the work. As stated, there are three different cuts in this particular stem, but as they all terminate differently to each other at the bottom, to finish them it must take three consecutive tools, but the round-nose drill will do for all to clear away the rough material; this done, the same drill may be set to a fine cutting edge, and one of the cuts finished out with it. The next, it will be seen, although perhaps not very distinctly, from the nature of the engraving, is cut with a drill of the same shape but about three-hundredths larger, and the third has two distinct hollows in the bottom; but here, as in many cases, a little deviation from the illustration will not much matter, and it is very often that, having a pattern to look at, the turner may suggest an improvement in his own mind; however, the three spirals being cut and finished at the bottom, it may be seen that the top of each has been cut with a bead tool. To do this the drill-stock must be removed, and the universal cutting frame substituted, in which a bead tool the desired size is placed, and the cutting-frame must be then set to an angle to correspond as near as possible with the pitch of the screw, or twist that is being turned. I think I have mentioned before that in all cases I prefer to use the universal cutter where most convenient, but sometimes the drill is of great assistance, especially for step patterns; when all the material is cut away from the centre of such a piece of work as this, it will be, as I saw, subject to much vibration, and will, in some cases, necessitate the support of a slender guide. There are several kinds of this instrument; but the one which is of most service is that which is fitted to the front of the slide-rest, and in order to better explain it I give an engraving of the same. This, then, being fixed to the rest, travels with the tool; the consequence being that the resistance is equal to the pressure throughout the whole distance of the work so traversed. It will be obvious that something of this kind is absolutely needed in long and slender work. It may occur to many of our readers that the guide being made of steel is likely to injure the work; but it does not if the correct amount of pressure and no more is brought to bear on it. At the same time, there is no reason why the rubber should not be made of ivory just where, it bears upon the work; but if properly used no harm will come to the work.

I will now leave the spiral part, for anyone trying such a thing to have a little practice, and I should strongly recommend such to be upon box-wood, or with many failures it might be deemed expensive. On the top of this stem I have made a

ball-and-socket joint, so that the photo or mirror, whichever is fitted to the frame, may be placed in the most convenient position. With the base and stem finished to satisfaction, great progress may be said to have been made, and it brings us to another class of work—viz., that of oval turning, and as the frame mounted upon this is a simple specimen, it will also form a good subject for this class of turning, and a gentle reminder of what has been before said upon the same subject. A piece of ivory cut from a well-selected hollow will, of course, be the best, and this glued to a sound beechwood chuck with a metal back may be faced over, and the recess for picture or glass turned out. When done so far, it must be removed from the chuck and reversed by the fitting on to another, where it should also be held with glue. I will take the opportunity of referring to the fact of the necessity of not moving the sliding ring of the oval chuck, and to prevent this I now add to the ring a small set-screw, so that if it is necessary to remove the ring for any purpose, by fixing one of the screws the ring may always be placed back in its original place. When I say that this idea was suggested to me by so efficient an amateur turner as General G. C. Clarke, it will be sufficient guarantee of its efficacy. This point, then, being well looked to, there will be no difficulty in turning the second chuck to fit the recess turned in the ivory. To proceed with the turning and ornamentation of the oval frame: the first thing will be to rough it all over, and determine the shape of the front moulding, which for this is a simple ogee; the pattern was cut with one large drill of the same shape, which I made for the purpose. There are 96 cuts, and although there is a difference between these at the two axes, it is not very noticeable in a pattern of this nature. We now come to the beads on the front of the frame, and these are what we call compensated; that is, all the same relative distance apart. This I effected with the segment apparatus. There is a small apparatus called the "compensator" for the oval chuck, but it is rather an expensive tool, and I think I can explain how to effect its purposes without its aid. The present beads, at all events, were so done. It is simply to set the bead tool each time with the aid of the segment wheel, and, by a little careful testing, the beads or hollows, whichever are being cut, may be brought to a correct termination. So far, then, the front of the frame is finished, and it only remains to ornament the edge, and all is done connected with this specimen. The pattern on this part is what I call the honeycomb pattern, and is produced in the following way. Have in the drillstock a sharp, clean cutting, round-nose drill; set division at 96, cut round at every hole; move the slide-rest two whole turns forward; adjust the index peg one hole forward, and cut round again; return the index to same hole used at the start; move slide-rest again two whole turn forwards, and so on. I have a massive ivory box cut with this pattern which is most effective, and it is a most simple one to do. It involves only a considerable amount of patience. This forms a conclusion to the frame, and it only remains to mount it on the ball of the universal joint. This I did by fixing a cross piece of ivory on the back of the frame, held to its place by two small screws. The whole of the back is covered with a piece of white velvet. The stand, as finished, makes a very pretty specimen, and is as useful as most things produced as specimens of ornamental turning.

JAPANESE LACQUER.

The Japanese lacquer is laid usually upon articles of wood, and not upon articles of *papier maché*, as many suppose. It is produced by the saps of the *Rhus vernicifera*, which is taken in its natural state into a large wooden tub or vat, and then stirred in the sun with a large spatula, until its excess of water is evaporated. In some cases the varnish so produced undergoes careful straining; in others, it is mixed with sulphate of iron, with vermilion with red oxide of iron, or with indigo; oil is sometimes employed, likewise powdered stone. Into some inferior varnishes, a sort of paste made of rice enters in considerable proportion. There are a dozen methods of employing the various varnishes, differing according to the nature of the object to be produced. In the best lacquer numerous coatings are applied, dried, and polished successively. The first polishings are done with a stone named *tsu shimada* (suitable for hones), the latter by means of water and a charcoal made from *Andromeda ovalifolia*, and the last with pulverized stag's horn. All the polishings are effected by the hand. When gold is used in smooth surface lacquers, where it is not to be in relief, the process is as follows: The design to