



CLEAVING.

POLISHING ON HORIZONTAL WHEEL.

HAND CUTTING.

flat face called the table on top. Below the girdle is the collet. If properly cut, this shape brings out the fullest possible brilliancy of the gem. So important is this quality, that it was deemed advisable to recut the Kohinoor diamond to develop its brilliancy, although many karats were lost in the operation.

Cleaving consists in splitting off pieces of a diamond. By inspection striations can be detected in the rough gem by which its cleavage plane is determined. The stone to be thus treated is mounted in cement upon the end of a wooden handle. Upon a second handle a sharp-edged fragment such as has been cleaved from another diamond is mounted. The diamond has a little notch made in it by the cleaver pressing and rubbing against it the edge of the fragment. This marks the place for starting the cleavage. A cutting box is used in making this notch. This is shown in the illustration in use for regular cutting. It is a small metal box from whose edge two brass pins or studs rise, against which the spindle-shaped handles are pressed in the cutting operation. The cleaver holds a handle in each hand, pressing them against the pins and edges of the box. The ends carrying the diamonds project over the box. He then scratches or cuts a notch at the desired place. Next, placing the handle carrying the diamond to be cleaved on its end upon the table, he holds a blunt-edged knife of steel firmly upon the notch and gives the back of the knife a gentle tap with an iron rod. The piece at one blow splits off and leaves a bright face. Considerable skill and judgment are needed to perform this critical work, but it is by no means such a mystery as it has been represented to be.

The cutting operation is conducted with heavier handles over the cutting box just described. One diamond is rubbed against another, both cemented on the ends of handles, over

the box, and the abrading goes on rapidly. Here a peculiar skill is needed to give the right stroke. Without it true cutting will not be effected. The left hand stone is the one which receives the final cutting; the right hand stone gets its first rough shaping only. The box has a movable receptacle below to receive the dust. A fine wire gauze screen is above it, to catch any cement which may fall.

A machine has been introduced for performing this work which is in constant operation in the Tiffany shop. It is essentially a planing machine. It contains a fixed adjustable abutment and a reciprocating abutment forming a species of slide rest. These correspond to the right and left hand handles of the hand cutter. The diamond receiving its final cutting is secured by cement in a cup with spindle, which spindle is inserted into a hole in the left hand carriage or reciprocating slide rest. The right hand abutment receives a second cup, with the cutting diamond held in it by cement. Quadrant adjustments and feed screws are provided for shifting the fixed abutment in any desired direction. By turning the hand wheel back and forth through a small arc of a circle, the carriage with the diamond to be cut is made to reciprocate back and forth. By the feed screws the other diamond is brought into contact with it and the cutting begins. A face is rapidly worn upon the stone. The operator feels as well as sees the progress of the work.

As one face is done the cup is removed, the cement is softened by heat, and the stone is turned so as to present another face or corner to be operated on. In this way the gem is soon brought into its approximate shape. The machine is the invention of Charles M. Field, of Boston, Mass., and is only the third in use. It does not entirely supplant hand cutting, as much trimming and shaping of the girdle or outline of the stone is still done by hand. Although designed