

MDR 102 Manual

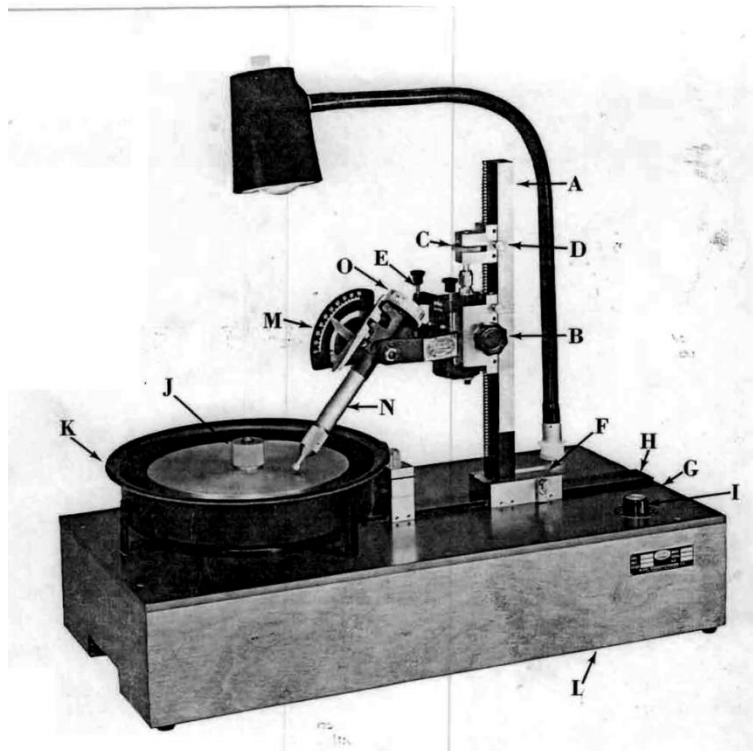
Provided by: The Gem Garden – San Marcos, CA

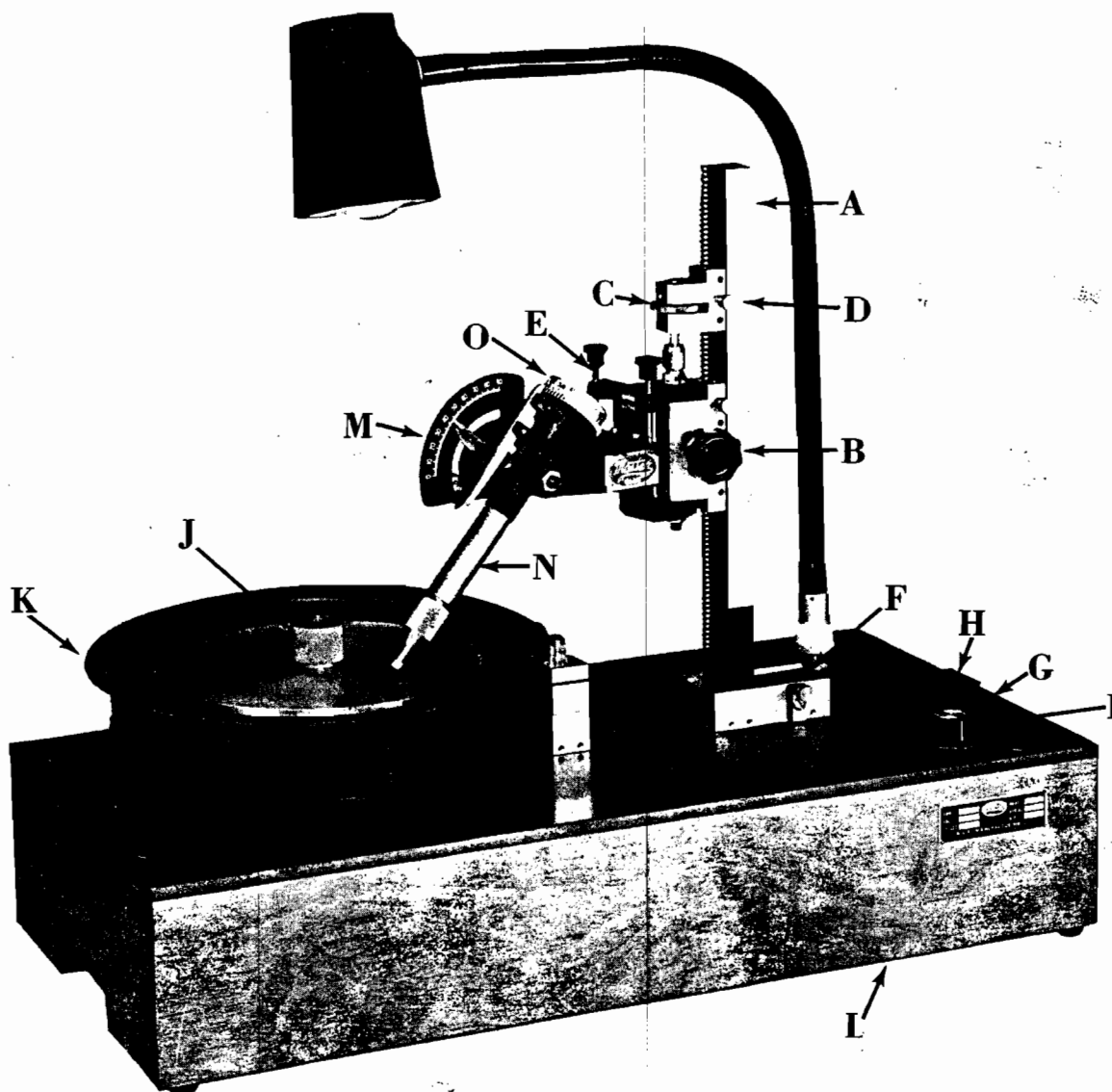
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The Gem Garden

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Twenty-five years ago MDR changed the faceting world with the original *MASTER FACETING INSTRUMENT*. It was an immediate success for one reason; it was an instrument that could be used by professionals and amateurs alike as a total system. A total system that from its design based on engineering dependability produced an instrument with *SIMPLICITY*, *ACCURACY*, and *VERSATILITY*. The new Master retains this concept of the total system and with recent major updating combines to form the best faceting instrument on the market today.

Every major component on the new Master is precision machined to close tolerance to insure the greatest accuracy. Every aluminum component is anodized in a combination of gold and black to ensure long life and added beauty with easy maintenance.

Engineering, materials, craftsmanship and faceting knowledge combine for the essential ingredients necessary to produce a superior faceting instrument. Over 50 years of combined engineering and faceting knowledge have gone into the design and production of the new MASTER. The popularity of the MASTER over the years has been truly remarkable. Amateurs and professionals have purchased over 4,000 faceting instruments since the first model was introduced over 25 years ago.

One reason for this popularity over the years has been this ability to combine *SIMPLICITY*, *ACCURACY*, AND *VERSA-*

TILITY to produce the total faceting system. *SIMPLICITY* for ease of operation. *ACCURACY* for flat consistent facets. *VERSATILITY* for working with gem material with a wide range of shapes, hardness, and refractive index qualities. For the beginning faceting student or the "old master" the new MDR makes faceting easy and enjoyable with the greatest of precision.

The column portion (A) of the faceting head utilizes the unique rack and pinion concept for vertical movement. A glance at the precision machining on this exclusive feature alone indicates the caliber of engineering utilized throughout the total system. Vertical elevation is calibrated over the entire length of the column, and is achieved with a conveniently located control knob (B) for rapid changes in the facet head. Positive 1:1 readout insures quick and easy elevation changes with complete accuracy. Minute vertical positioning is accomplished by means of turning the control knob on the micro-adjustment (C) (2C). This component is located directly above and attached to the horizontal pivot bracket. With finger tip control the locking screw is tightened. The control knob is then turned in either direction with one finger allowing the complete head to be raised or lowered to achieve minute angular adjustment.

The scale of the column (D) (2C) is calibrated in increments of millimeters. One full turn of the micro-knob equals .009 of a millimeter in vertical height adjustment. This component is par-

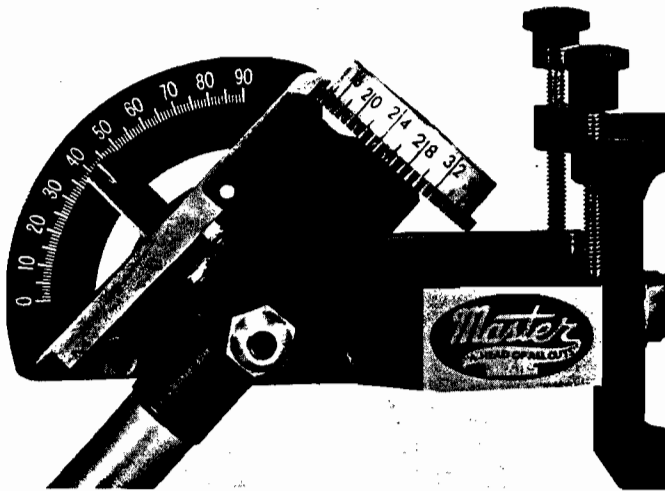


(2C)

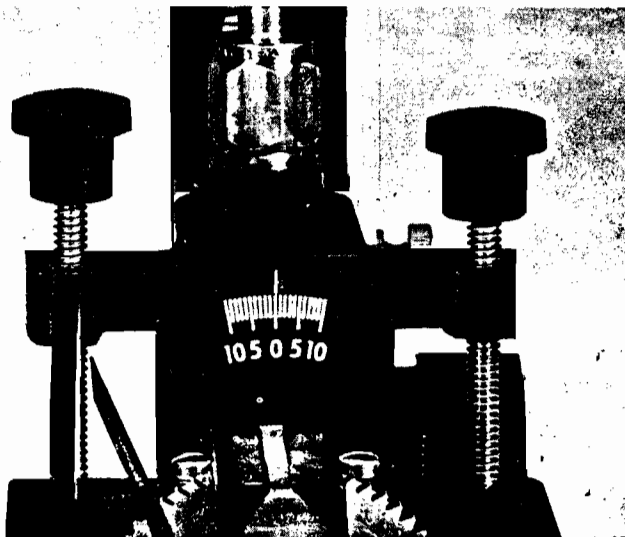
The compound angle feature is invaluable for cutting fancy or unusual shapes and for repeatability in producing the same cut.

ticularly important in obtaining precise "meets" of the facets in both cutting and polishing.

The *MDR MASTER* is not equipped with a cheater but rather a compound angle feature (E), (3A). Any part of the stone can be cut and polished with this type of construction. This component is located on the horizontal pivot bracket. If you wish to bring the facet toward you, use the compound angle screws by tightening the screw towards you and loosening the other. Located between the screw adjustments is the scale (3A) and pointer that indicates the number of increments the faceter has



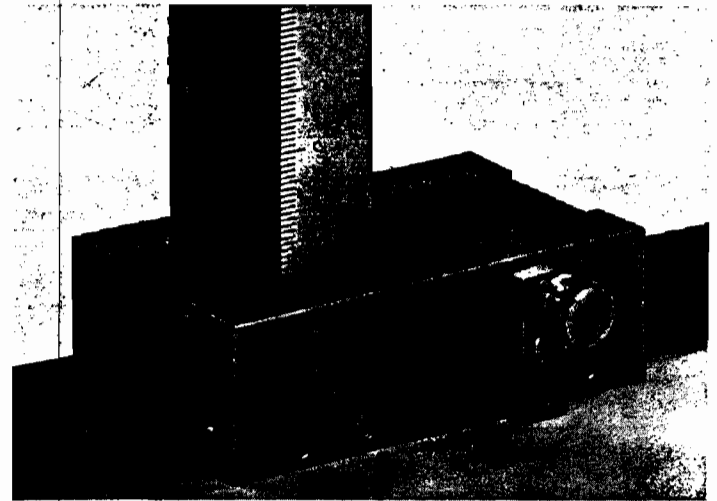
(2B)



(3A)

The facet head is moved forward or back in relation to the by means of the slide base (F) (3B). The base is locked in position by the base gib lock which features a finger tip control knob for easy positioning of the head without the use of additional tools. The base will stay in the proper position with no fear of movement. The aluminum base plate (G) insures horizontal movement of the facet head without changing the total runout from column to dop arm. Made out of 5/16 inch tooling plate,

this component is hard anodized to prevent wear and insure accuracy for years to come. Fastened to the base plate, the track (H) allows the head to be positioned conveniently and removed for easy storage.



(3B)

The features of the new MDR include an AC/DC permanent magnet motor designed in conjunction with the variable, solid state speed control (0-1000RPM) (I) to insure the smoothest and most trouble-free system yet devised. The motor drives the lap spindle with a custom polyflex-belt ensuring power and smooth performance at all speeds. The motor is mounted underneath the facet head and lap assembly completely out of sight.

Utilizing new permanent sealed ball bearings, the total lap drive system including register plate (or platen) runs true to plus or minus .0015 (J) thus insuring flat, consistent facets throughout the stone. These close tolerances are produced by machining the register plate after installation into the ball bearings and motor system. Further, the lap assembly is separate from drip pan (K) allowing both laps and drip pan to be easily removed and cleaned, thus avoiding possible contamination while faceting. The Quadrant protractor (M) (2B) is 5 inches in circumference with large, white crisp divisions on black anodized background. The protractor pointer (2B) indicates the degree at which cutting or polishing is occurring. The anodized pointer swings on an arc of 90 degrees with a 1:1 readout and enables easy reading in any position. An angle stop on the protractor is designed to stop the downward swing of the dop arm. This in essence allows for termination of cutting at any predetermined position and prevents accidentally cutting of a facet beyond the correct angle. The angle stop is adjustable around the arc of the protractor.

There is no need to squint when the protractor is directly in front of the operator and no need to stop and study where you are because of complicated scales and divisions.

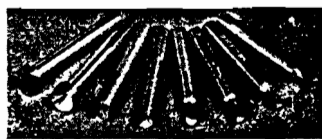
The Masters dop arm (N) utilizes a 1/4 inch collet type chuck machined to highest standards. This component produces the greatest amount of concentricity and thus enhances the accuracy of producing one side of the stone exactly like the opposite side. The new exclusive dop keying system is simple and repeatable, thus allowing the dop to be removed and re-inserted with extreme accuracy and with only a small amount of pressure exerted on the nose piece. The entire dop arm is extremely well balanced thus avoiding the possibility of accidental dropping to the lap surface and causing possible damage to the stone itself. Further, the dop arm is designed so all fingers of the operator may be placed on it to insure full "feel" of cutting and polishing.

The new Master features easily removable and interchangeable index gears (O) (2B). The larger precision teeth that are employed on the Master index eliminates any possibility of lost motion. The index scales are large and designed for easy readability.

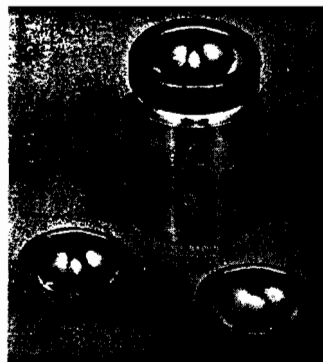
The indexing trigger (2B) is most conveniently positioned for finger tip control and is designed to mesh with 64, 72, 80, 96, and 120 index gears. The index trigger is made of machined brass and may be easily placed in the free wheeling (out of mesh with

index gear) position by means of holdout pin located in the dop arm housing (2B). This ensures concentric girdle grinding or polishing of the stone. A complete 12 piece dop set (round, flat, and vee) with transfer block, girdle attachment, micro-adjustment and other accessories comes with instrument. Volume 1 of the "Book of Gem Cuts" accompanies each instrument. The famous "Book of Gem Cuts" gives illustrations with detailed instructions of each step in cutting and polishing top grade faceted stones.

The compact portable unit (No. 8826) shown is furnished in a beautiful finished custom case. The desk model (No. 8824, No. 8822 D) is shipped ready for installation in the buyer's own workbench or desk.



MDR Dops

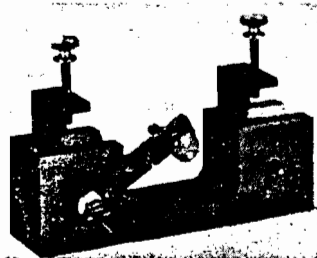


MDR Starmaster

MDR's dops fit all 1/4 inch collets and are precision machined from aluminum. The "V" grooved (No. 490) come in three sizes—3/16, 1/4, and 3/8. The standard round dop (No. 8837) have sizes of 1/16, 3/32, 1/8, 3/16, 1/4, and 3/8. The 45 degree angle

holder is utilized for cutting and polishing of the table on all gem stones. When the angle dop is aligned flat on the lap the dop arm on the faceting instrument is at an angle of 45 degrees. Any regular dop stick inserted in the 45 degree dop holder will be vertical to the lap when the elevation angle on the quadrant protractor reads 45 degrees.

Dopping gems for faceting needs to be more accurate than necessary for cabochons. The "V" block (No. 449) insures proper alignment when the stone is transferred to another dop in preparation for cutting and polishing. MDR's transfer V block and index pin is designed for this purpose and is precision machined and anodized for added beauty and long life.



No. 449 V Block

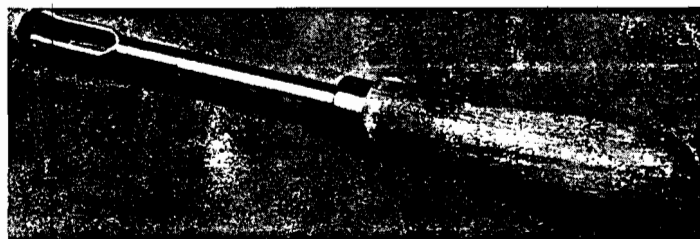
steel knurled roller puts excellent radial, evenly spaced grooves on the lap. This allows for the polishing agent to be evenly distributed in the narrow ridges upon which the gem rides. This procedure forms less suction and more pressure thus promoting greater polishing action.

Charging a diamond lap takes several steps: 1. Oiling the lap; 2. Spreading the diamond powder; 3. Driving in the powder. The secret of success in driving in the powder in the lap is the MDR



45° Angle Dop Holder

The lap scorer (No. 480) is used on all soft polishing laps for conditioning of the lap prior to polishing the gem stone. Uniform conditioning or scoring is accomplished by holding the scoring tool firmly against the lap at about a 45 degree angle. The tool



No. 480 Lap Scorer

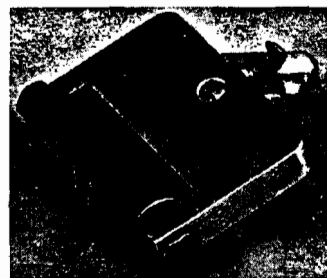
(No. 442) Recharging Roller. The tool steel roller is 3 inches long and revolves as the device is pushed across the lap. Only about 10 pounds of downward pressure need be used for an excellent charge.

MDR Master index gears include 64, at standard equipment, 72, 80, 96, and 120 as optional equipment.

THE MDR BOOK OF GEM CUTS

VOLUME I provides the information that the beginner in facet cutting needs: How and where to begin, what angles to use, what index settings to use, what abrasive, what polishing agent, what type of equipment—all given in simple, step by step form with illustrations and explanations of how to prevent mistakes and how to correct mistakes that may have occurred.

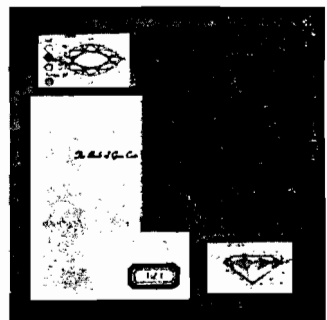
VOLUME II takes a close look at harder problems and keener challenges. This time the accent is not so much on procedures, although they are as thoroughly gone into as before, but now we also explore the unusual in design. Very beautiful cuts will be found here. Patterns that are seldom seen, and then only in the most expensive custom work. Hearts, marquises and pedeloques to name only a few. You will notice, as you go along, a growing freedom in the way you handle your gems; and as you realize the endless variety of shapes possible, your imagination will be stimulated and you will begin to work out your own design. When that happens you will have made a full circle back to all that was finest in the jamb-peg cutting of the past, and will combine technical excellence with artistic freedom. No amateur can ask for more.



No. 442 Recharging Roller



Index Gears



Book of Gem Cuts

MATERIALS AND SPECIFICATIONS

Column, Horizontal Slide Block, Vertical Slide Block, Micro-Adjustment, Dop Arm, Track, are all precision machined from bar stock aluminum and anodized for long life and easy maintenance.
Dop arm housing, Yoke & Compound Bracket: precision machined from aluminum castings and anodized.
Pinion and Rack gear: precision instrument quality gears; best for rapid elevation changes.
Protractor Quadrant: stamped aluminum, anodized, 90 degree scale, 5 inches in diameter for easy reading.
Lap Spindle: 1/2 inch diameter precision machined from 1" steel bar stock. With large diameter bearings seats for best tolerance and long life.

Lap Platen: brass; 2 3/16" in diameter, machined after installation to insure accuracy.
Master Lap: 8" in diam. machined aluminum casting; .0015 max. vert. runout.
Index Gears: machined brass and aluminum; large teeth to avoid lost motion; 64, 72, 80, 96, 120 gears.
Index Trigger: machined brass; silver brazed; spring loaded for finger tip control.
Base Plate: precision alum. plate; 5/16" thickness and hard anodized.
Dops: machined bar stock; 1/4" diameter shanks; round and V grooved. All dops have 90 degree indexing groove.
Bearings: all water proof, sealed.
Dop Arm: 7 1/4" in length and balanced for easy grip and "feel".
Chassis Plate size: 12 x 24
Column Height: 13"
Length of base track: 13"
Lap speeds: 0 to 1000 RPM
Weight: 8824-17 lbs. Shpg. wgt. 23 lbs.
8826-30 lbs. Shpg. wgt. 40 lbs.

The facet head is moved forward or back in relation to the lap and locked in position by means of a screw which presses on a gib to exert or release pressure on the dovetail track. The same method is used on the head slide block. The screw is adjusted to the correct tension, allowing the head to be raised or lowered without tightening or loosening the thumb screw. The head will stay at the proper angle without vibrating out of position.

The M.D.R. Master is designed so one can move the head from the top of the column to the bottom by using just one hand, and stop at any place in between if so desired.

Under normal conditions, the M.D.R. Master should be cleaned, oiled, and adjusted about every two years. The gib should be adjusted, which is a very simple thing to do. Make sure the column is cleaned and oiled before adjusting the gib. Use a fine machine oil.

The adjustment of the gib is done by the set screws provided on the column slide block for this purpose. To adjust these properly, loosen the thumb screw and the three set screws. Loosen completely, then start with No. 1 screw and tighten it and then run the slide block up and down to see that it is not too tight. This is done a great deal by "feel". Then, adjust screw No. 2 the same way. And then do the same with screw No. 3.

When all three are in proper adjustment you would be able to move the head up or down at any place on the column where it will stay without use of the thumb screw. The thumb screw is used more or less as a safety device.

REALIGNMENT OF DOPS

After following instructions for transferring the stone in the V block after the crown has been cut, the dop can be reinserted at the same position each time by uncovering the tip of a main facet. NEVER BURY THE GIRDLE WITH WAX. You may grind into the wax which will pull the diamonds out of the cutting lap and contaminate your polishing lap.

Another way to realign dops: Line up the point of the main facet by eye on 64 index. Then index 2 and 62 at a higher angle than was formerly cut. Take a trail cut at this depth. If your line is in the center of the 2 grinds you will be in alignment. Then index back to the main facets.

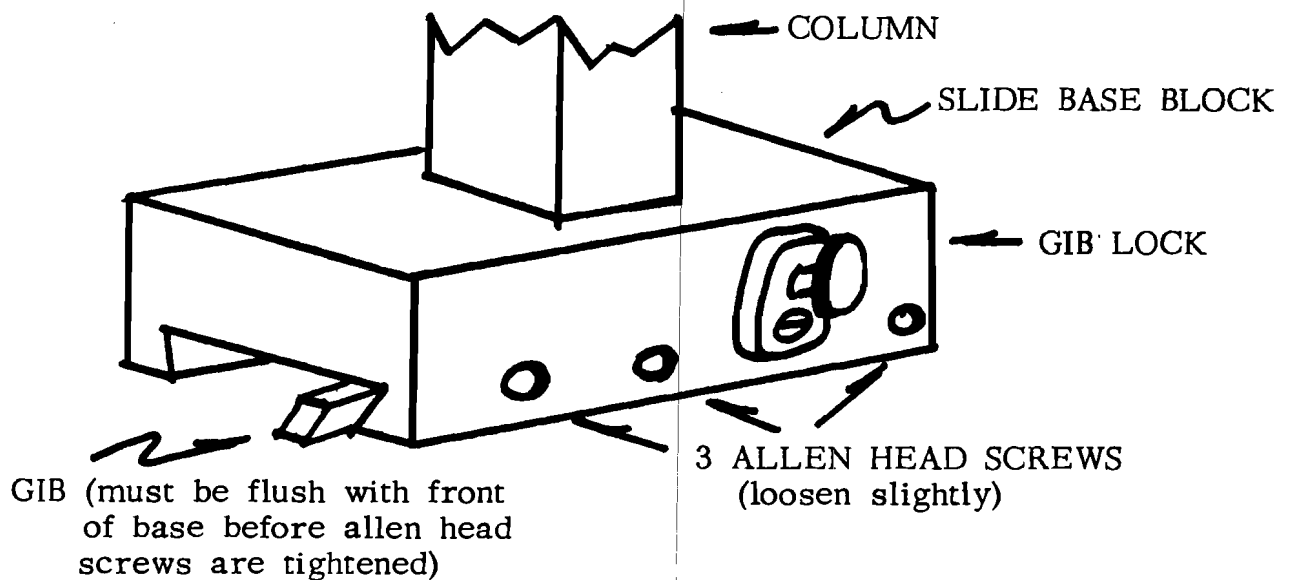
The set screw is only used for cutting large stones, especially free form cuts, while you are cutting off center. It is a safety device to keep the dop from twisting. If one learns to cut without pins, screws and the like, one will do a much better and quicker job of faceting. Pins and screws are worthless when a stone is knocked off the dop. With a little practice, the job of aligning and realigning a stone without the gadgets can be easily and quickly done.

Another way is to mark the unpolished facet with pencil to show proper alignment. On a polished facet, lay-out inck can be used for marking. A beginner would never have any trouble if he dopped a stone already cut and recut and repolished it. Two stones would give very valuable experience.

One method used by a large number of cutters is to first dop the stone with our #61 Special high temperature Facet Wax and then transfer to the low temperature green wax (cab wax), which eliminates the danger of misalignment in transferring.

Installation for Vertical Column

To install the vertical column on track and base plate it is sometimes necessary to back out the 3 allen head set screws in the base block with the wrench provided. First, loosen the GIB LOCK. Insert the Gib in the BASE BLOCK so that the drilled indentations line up with the set screws. Slide the COLUMN, BASE BLOCK and GIB on the track. Re-adjust the 3 set screws so that the base block slides snugly but freely on the track. Tighten the gib lock. If the base does not lock loosen the GIB LOCK KNURLED SCREW and tighten the screw below the knurled screw on the gib lock. Test again for locking.



COMPOUND ANGLE FEATURE

The M.D.R. Master Facet instrument is not equipped with a "cheater". The unit has a "compound angle" feature. Any part of the stone can be cut and polished with this type of construction. This component is located on the horizontal pivot bracket. If you wish to bring the facet your way (toward you) - use the compound angle screws by tightening the screw towards you and loosening the other screw, or viceversa.

This type of compound is invaluable for cutting fancy shapes or unusual shaped stones, and for repeatability in producing the same cut. The steps are logged as the stone is being cut for a future reference in polishing and also for cutting the same type of cut at a later date. It is much easier and faster to keep a log, especially when polishing the stone. The faceter can save time by referring to his notes.

There is a scale, and a pointer between the two compound angle screws, showing degrees. When the screws are adjusted (one tighten and other loosened) the pointer will show the degrees on the scale. Always return the pointer to the center of the scale after use. NEVER OVER TIGHTEN THE SCREWS, or add attachment of screw tops - this will tend to over-tighten the screws and the part attached can get broken. The addition of a spring to the far side angle screw is a help against over-tightening because one screw only needs to be adjusted and the spring under the other screw will compensate automatically to the tension.

INSTRUCTIONS FOR ALIGNING INDEX GEAR WITH INDEXING SCREW ON DOP SHAFT

Remove the dop shaft nut and set up dop shaft in vertical position (when looking towards vertical column) by adjusting the "cheater" or compound angle feature. Use a 90 degree "square" to check (or set) in vertical position, as shown on sketch. Now put the indexed 45 degree angle dop in the dop shaft and set up on the master lap in normal fashion as when preparing to cut the table of a gemstone. Check the pointer to see that it points at 45 degrees on the protractor and adjust pointer if necessary.

Loosen the index gear and turn it so the trigger will fall into No. 64 tooth. Holding the 45 degree angle dop firmly on masterlap, retighten set screw on index gear.

Now, all indexed dops will line up with the No. 64 tooth. This procedure should be followed each time when replacing an index gear (as when changing to a 72, 80, 90, or 120 tooth index gear).

HOW TO USE THE WOOD HARD FELT DAUBER

This dauber should only be used with the cutting lap. Insert dauber in your water receptacle (doesn't hurt to let it soak up first). Hold the dauber in your left hand trailing behind the stone you are cutting, keeping the dauber in motion and pushing the water towards the center of the lap. (See note below)

However, do not use too much water. The purpose of the water is to keep the stone cool or otherwise it may become so hot the wax will soften and change its position on the dop, resulting in misalignment of facets, etc.

If the lap becomes muddy, keep working this mud off the lap into the splash pan, with the dauber (which you can rinse off occasionally). The dauber will help keep your cutting lap clean and remove any particles of stone being ground off.

When faceting, keep your finger on the stone - do not hold the dop stick only - pressure here can sometimes knock off the stone. You can feel the cutting and polishing action also and develop the necessary "feel" to cut and polish quickly.

Always examine your stone frequently to avoid over-cutting.

Some cutters like the dripping water method, but must be careful not to use too much water.

NOTE: If you are using a left hand machine, hold the dauber in the right hand, in front of you, trailing the stone.

This same procedure is used with the leather belting on the #25 Special Lap while polishing. (See #25 instructions)

INSTRUCTIONS FOR TRANSFERING GEMS IN "V" BLOCK AFTER CROWN CUT

Select a dop about $\frac{2}{3}$ the diameter of the stone. Wash the crown of gem with alcohol and place the dopped stone in the V block so that the table is about in the center of the opening in the V block. Clean the dop, (the stone is being transferred to) with alcohol or heat good and hot over the alcohol lamp to rid dop of any oil or grease. Then, apply the dop wax to the dop, the amount being a little larger than the diameter of the stone.

Place the V block with the dopped stone in it, so it is handy to reach. Heat the new dop with dop wax over the alcohol lamp. When good and warm, place the dop in the V block and firmly press it against the dopped stone and clamp into place. If the dop wax around the girdle of the stone has a curved appearance, the dop was not adhering.

When the dop wax is cold, loosen the clamp from the new dop and press down on the dop shaft and pull back. If not dopped properly, the gemstone will come off. Remove the dopped stone from the V block and heat the shank of the old dop until the stone can be easily removed. Clean the dop wax from the pavillion with a knife - the stone is now ready to cut pavillion facets.

CAUTION: DO NOT BURN DOP WAX OR THE TENSILE STRENGTH WILL BE LOST.

One method used by a large number of cutters is to first dop the stone with our #61 Special high temperature facet wax and then transfer to the low temperature green wax, which eliminates the danger of misalignment in transferring.

TRANSFERING STONES WITH INDEX RODS

Gemstones are transfered for cutting pavillion (or crown) in the conventional manner with the addition of INDEXING RODS to orient the indexed dop stick in the transfer block. Slide the index rod into the space made by "V" groove in the dop when positioned against the "V" in the transfer block. This will positively locate the dop in relation to the second dop which is oriented in the same way. The stone is then redopped in the conventional manner. CAUTION: Do not push the rod into the space (or square opening) more than $\frac{1}{4}$ inch.

This method will result in a 180 degree reversal of the stone in relation to the facet machine index gear. For instance, the main facet on No. 1 will now be on No. 32 position on a 64 index gear. As the great majority of stones are symmetrical, no difficulty should be encountered in cutting the pavillion of the gem stone. Some slight adjustment, (cheating) may be necessary depending on the condition of the facet machine used.

#460 GIRDLE GRINDER INSTRUCTIONS

To install, slide the girdle grinder on the track of the facet instrument and tighten the two set screws which bear against the gib. The gib is the small brass piece on the base of the girdle grinder. The gib bears against the dovetail track and holds the attachment securely in place. The girdle grinder attachment can be mounted permanently close to the splash pan.

We recommend grinding the girdle after the table of the stone has been cut. First step is to lower the head to the bottom of the column so the dop shaft will rest on the roller of the girdle grinder. The girdle grinder should be adjusted so the stone does not quite touch the lap. This is done by raising or lowering the upper portion by means of a control knob in the center of the grinder. Place the index trigger release pin through the hole in the dop arm to keep the index trigger out of mesh. Start the machine and lower the stone gently on the lap while turning the dop shaft. Be sure the lap is wet. Keep grinding until the girdle is completely round and ground to desired size. Remove stop from Quadrant when using girdle grinder.

#480 LAP SCORER INSTRUCTIONS

All laps except diamond cutting lap need occasional scoring, depending on the amount of use. Used often, the lines smooth out. If the lap isn't scored and gets too dry, it will scratch the facets because the powder has a tendency to form into little balls. Scoring catches and holds the powder in the lines, helping distribute the powder evenly for a better polishing action.

To score your lap start the motor with the lap to be scored in place in the master lap. Turn about 550 RPM. While the lap is turning, hold the lap scorer at the center of the lap with a firm pressure and then slowly move the scorer to the edge of the lap. Do this twice. Laps are scored at a 45 degree angle from the center to break the continuity of the machine lines. Agate is not needed to finish when using the lap scorer.

GENERAL INSTRUCTIONS FOR CUTTING STANDARD ROUND BRILLIANT

First, inspect the material to be cut with a good light (preferably transmitted light) to locate any flaws which should be eliminated in pre-forming. Then, preform the stone by following the first chart in the BOOK OF GEM CUTS Volumm #1.

After the stone is preformed, select a dop approximately $\frac{2}{3}$ the diameter of the stone. Wash the top of the dop with alcohol to remove any oil. Heat the dop over an alcohol lamp and while hot, apply the dop wax until a fair-sized globule has adhered to the dop. Do not burn the dop wax or it will lose its tensile strength.

The next step is to mount the stone on the prepared dop. Warm the stone and the dop at the same time over an alcohol lamp, slowly and gently, until both are good and warm. Press the stone into the dop with a firm pressure, and while still warm, set the dopped stone in the V block and press the table of the stone against the face plate. Hold the V block up to the light and check carefully for light or space between the stone and face plate. If not, the table is correctly aligned at 90 degrees to the shank of the dop. If light shows, repeat above and correct. If the table is not 90 degrees to the dhank of the dop, the crown facets will not align properly.

Allow the dopped stone to stay in the V block until the wax and stone are cool.

The next step is grind the table. Keep the diamond lap wet at all times during the grinding operation with water - never flood the lap. We recommend dipping a piece of woodhard felt in water and holding on the diamond lap behind the stone while grinding. Hold your forefinger on the stone when cutting and polishing always.

Place the 45 degree angle dop in the chuck of the facet head. Set the head so the protractor is approximately 45 degrees and align the bottom of the 45 degree dop on the lap. When the 45 degree dop is flat on the lap plate, tighten the chuck (the set screw can be tighten against the shank of the dop if necessary). Then, raise the head up and insert the dopped stone in the 45 degree angle dop. Set the machine at 45 degrees and grind the table. NOTE: The protractor should read exactly 45 degrees at the end of the grinding.

Remove the dopped stone sfrom the 45 degree angle dop and place in the V block and check to see if the table is exactly 90 degrees to the shank of the dop. Check the proximity of the table of the stone against the face plate dop in the V block by holding it up to the light to note any space between the face plate and table. If they do not fit perfectly, the table is not 90 degrees and you should warm (or soften) the wax and firmly press the table of the stone against the face plate.

The next step is to grind the girdle. Install the girdle grinder attachment by first removing the splash pan. Then, slide the attachment

GENERAL INSTRUCTIONS FOR CUTTING STANDARD ROUND BRILLIANT (cont)

onto the dovetail. Lock in position by tightening the two set screws which bear on the brass gib (the small, loose part of the attachment). The attachment can be left permanently in place if desired. Re-install the pan, sliding or lowering the pan and use a plastic ring inside pan to prevent splash while girdling.

Now, lower the head to the mast so the dop shaft will rest on the roller of the girdle grinder, which should be adjusted so the stone does not quite touch the lap. Place the index trigger release pin through the hole in the dop housing to keep the index trigger out of mesh. Start the machine and lower the stone gently on the lap while turning the dop shaft. Keep grinding until the girdle is completely round and ground. If a pre-determined size is desired, the girdle should be cut to that size now.

Now, the crown (top) facets are to be cut or ground. Do this by referring to Volume 1, BOOK OF GEMS CUTS, Cut No. 1.

After the crown facets have been cut and polished, the next step is to polish the table. IMPORTANT: Clean stone and machine with alcohol before using polishing laps so the polishing laps will not be contaminated.

Refer to the back of the BOOK OF GEMS CUTS for the proper lap and polishing compound to use for the various gem materials. Mix the polishing compound with water to the consistency of cream and apply sparingly to the lap with the finger or a piece of leather belting, being careful not to let the lap run dry.

Next, prepare a dop of the same size as the first one. When the wax is hot, place the dop in the V block and press firmly against the table of the dopped stone in the V block, setting aside the face plate dop. Clamp the dop in place and warm the stone and the new dop (stone must be warm or the dop wax will not adhere).

Keep gently warming stone and dop until the dop wax flattens and then feathers out. This indicates that the wax is adhering to the stone. Allow to cool. Now we have the stone between two dops.

Take the dops from the V block and heat the first dop with the alcohol lamp about 1/2 inch away from the stone so the heat will gradually warm the wax. When the wax is warmed sufficiently, the old dop can be removed without disturbing the position of stone on the new dop.

Remove the surplus wax with a knife from the stone thoroughly. Also, from the point of one of the crown main facets so that the pavillion main facets can be aligned. Then, proceed to cut the pavillion facets from the same chart, No. 1., in the BOOK OF GEM CUTS.

After the pavillion facets are cut and polished, the stone can be removed by soaking in alcohol or acetone. This sequence of operations is typical for all round cut stones and may be applied to emerald and other cuts by omitting the girdle operation.

MDR FACETING INSTRUMENT INSTRUCTIONS

CONGRATULATIONS! YOU HAVE JUST PURCHASED THE FINEST FACETING INSTRUMENT MADE.

The MDR Master Facetor is, perhaps, the most comprehensive faceting machine available today. The Master possesses capabilities for faceting that are easy to understand and thus easy to put into use without sacrificing the necessary accuracy required.

The reliability of the MDR Master is unsurpassed. That is why the company guarantees the instrument, unconditionally, as to parts and workmanship on the mechanical assemblies. Truly an instrument for a lifetime, a personal possession of distinction and probably the world's best known facetor.

Order your MDR Master from your dealer. If you do not have a dealer in your area, write us direct and we will furnish you the name of our nearest representative.

ADJUSTING THE MASTER FACET MACHINE

INSTRUCTION NO.

1 A The facet head is moved forward or back in relation to the lap and locked in position by means of a screw which presses on a gib to exert or release pressure on the dovetail track. The same method is used on the head slide block. The screw is adjusted to the correct tension, allowing the head to be raised or lowered without tightening or loosening the thumb screw. The head will stay at the proper angle without vibrating out of position. The MDR Master is designed so one can move the head from the top of the column to the bottom by using just one hand, and stop at any place in between if so desired.

Under normal conditions, the MDR Master should be cleaned, oiled, and adjusted about every two years. The gib should be adjusted, which is a very simple thing to do. Make sure the column is cleaned and oiled before adjusting the gib. Use a fine machine oil. The adjustment of the gib is done by the set screws provided on the column slide block for this purpose. To adjust these properly, loosen the thumb screw and the three set screws. Loosen completely, then start with No. 1 screw and tighten it and then run the slide block up and down to see that it is not too tight. This is done a great deal by "feel". Then, adjust screw No. 2 the same way. And then do the same with screw No. 3. When all three are in proper adjustment you would be able to move the head up or down at any place on the column where it will stay without use of the thumb screw. The thumb screw is used more or less as a safety device.

REALIGNMENT OF DOPS

2 A After following instructions for transferring the stone in the V block after the crown has been cut, the dop can be reinserted at the same position each time by uncovering the tip of a main facet. NEVER BURY THE GIRDLE WITH WAX. You may grind into the wax which will pull the diamonds out of the cutting lap and contaminate your polishing lap.

Another way to realign dops: Line up the point of the main facet by eye on 64 index. Then index 2 and 62 at a higher angle than was formerly cut. Take a trail cut at this depth. If your line is in the center of the 2 grinds, you will be in alignment. Then index back to the main facets.

The set screw is only used for cutting large stones, especially free form cuts, while you are cutting off center. It is a safety device to keep the dop from twisting. If one learns to cut without pins, screws and the like, one will do a much better and quicker job of faceting. Pins and screws are worthless when a stone is knocked off the dop. With a little practice, the job of aligning and realigning a stone without the gadgets can be easily and quickly done.

faster to keep a log, especially when polishing the stone. The facator can save time by referring to his notes.

There is a scale and a pointer between the two compound angle screws, showing degrees. When the screws are adjusted (one tighten and other loosened), the pointer will show the degrees on the scale. Always return the pointer to the center of the scale after use. NEVER OVER TIGHTEN THE SCREWS, or add attachment to screw tops - this will tend to over-tighten the screws and the part attached can get broken. The addition of a spring to the far side angle screw is a help against over-tightening because one screw only needs to be adjusted and the spring under the other screw will compensate automatically to the tension.

INDEX GEAR INSTALLATION

5 A Note: Each machine is adjusted for the 64 index when manufactured and the 90 degree cone point set screw mark allows removal and re-assembly without losing the original calibration.

To install 72, 80, 96 or 120 Index Gear and calibrate:

1. Remove dop shaft collet nut and collet.
2. Set dop shaft vertical by use of a square and the compound angle (cheater screws) check "cheater" protractor for zero and adjust if necessary.
3. Install collet and nut and 45 degree angle dop holder and set up flat on master lap so pointer is at 45 degrees. If pointer is not at 45 deg., hold dop holder flat on lap and adjust pointer to 45 deg. on protractor.
4. Install gear making sure nylon washer is in place.
5. Turn gear so highest number is under trigger.
6. Press trigger firmly into notch and press assembly together to remove all slop or end play.
7. Tighten set screw firmly to indent dop shaft.
(on the index gear)
8. If dop shaft is tight in rotation tap gear end of shaft lightly with soft hammer to loosen, then retighten set screw.

To reinstall any index gear, follow Steps 1 thru 7.

When performing Step 3, check that pointer is at 45 degree on protactor and adjust pointer as necessary.

USE OF THE NEW MDR POSITIVE ANGLE STOP

6 A The angle stop device is located on the dop shaft housing on the side nearest to the operator. (Opposite side from 0o to 90o protractor).

1. Loosen the 1/4" diameter thumb screw knob (Gold color).
2. Insure that the 1/2" diameter thumb screw (Black color) is advanced so that the screw protudes through the small block about 2 threads.
3. While holding the dop shaft in one hand, with the transparent protractor index about 10 lower (toward zero degrees) than the desired setting, rotate the stop mechanism until the stop screw contacts the bottom of the near side of the yoke bracket. Tighten Gold knob.
4. While holding a slight downward pressure on the dop shaft, adjust the Black knob to the desired angle.
5. While cutting, maintain the same pressure on the stone and angle stop until the facet cutting noise stops. If heavy pressure is applied to the stop, flexing of the machine may occur which could result in a non-symmetrical stone.

MOTOR & SPEED CONTROL WIRING

- 8 B BLACK wire from motor to speed control BLACK wire.
 RED wire from motor to speed control RED wire.
 BLACK & WHITE wire to fuse block.
 Fuse block BLACK wire to 110/115 volt power line cord BLACK wire.
 WHITE wire from speed control to 110/115 volt power line cord
 WHITE wire.
 YELLOW wire from motor base to GREEN wire power line cord (ground.)

MDR #42 SAPPHIRE CUP INSTRUCTIONS

- 9 A The #42 Sapphire Cups are used for final shaping of Star Sapphires, Rubies, and other star or Cat's Eye stones. The advantage of using these cups is that you obtain a surface that is much easier to polish.

Use one aluminum holder and three copper cups. Mark the cups with the grit number. The cups are charged while they are being used. This is a free hand operation. First, rough out the gem on a silicon carbide grinding wheel or a diamond wheel. Then dop the stone. Insert the copper cup in the holder. Tighten the rim and then screw the holder on the master lap spindle. Mix the diamond grit and kerosene in a small 1/4 pint round bottomed jar. Apply with the finger or a piece of hard leather belting. Insert into the bottom of the jar for the diamond and take the kerosene from the top of the jar. Turn at 1100 RPM or second speed on units without speed controls.

Use 600 grit diamond with kerosene for the first grinding. Finish grinding with 1200 diamond in another cup with kerosene as lubricant.

Wash the holder and stone when changing cups to avoid contamination. Mixing the coarser diamond with the finer will cause scratches.

Polish, using 6400 (50,000 Mesh) diamond with kerosene in the third copper cup. This will give a good polish. Sometimes a few swipes with 6400 dia. and kerosene and MDR #36 Hard Chrome Leather Lap will give a perfect polish.

MDR #42 Aluminum holders are made with 1/2 inch 20 right or left hand thread to fit our Master Facet Instrument or other faceting units with the same arbor dimensions. The MDR Master right-hand facet instrument (used by right handed persons) has a left hand thread on the spindle and turns clockwise. A left hand instrument has a right hand thread and turns counter-clockwise. Thus, the nut will not come loose when in operation because the pressure keeps it tight. Be sure to order the holder to fit your machine - Right Hand or Left Hand Thread!

#112 DIAMOND LAP RECHARGING ROLLER INSTRUCTIONS

- 10A Place the lap to be recharged on a bench. Sprinkle the dry diamond on the lap and distribute the diamond evenly with a small camel-hair brush. Next, roll the diamond into the lap with the roller. Keep rolling until all the diamond is imbedded. DO THIS DRY. DO NOT use oil or water. When a finer diamond is to be rolled in the lap than was previously used, first scrub the roller thoroughly with a brush under running water. A lap can be recharged in a few minutes after the initial process has been experienced.

#116 GIRDLE GRINDER INSTRUCTIONS

- 11A To install, slide the girdle grinder on the track of the facet instrument and tighten the two set screws which bear against the rib. The rib is the small brass piece on the base of the girdle grinder. The rib bears against the dovetail track and holds the attachment securely in place. The girdle grinder attachment can be mounted permanently close to the splash pan.

We recommend grinding the girdle after the table of the stone has been cut.

a tendency to form into little balls. Scoring catches and holds the powder in the lines, helping distribute the powder evenly for a better polishing action. Ref: Price list accessory #118 Lap Scorer.

One thing to be careful of is NOT TO GRIND DOP WAX INTO THE LAP. The wax will pull the diamonds out of the cutting lap and cause contamination of the polishing lap if the wax comes in contact. Use a knife to trim the dop wax so you will not grind it into the lap.

You can tell if the scratches are caused by contamination of the lap or by the polishing powder balling up and rolling. If the scratch starts in the center of the facet and goes across to the other edge, you are using too dry a compound and the polishing compound is balling up. To overcome this, use more water and score the lap. If the scratch starts from one side of the facet and goes completely across to the other side, there is contamination in the lap due to foreign matter imbedded in the lap. The lap must be resurfaced to eliminate this.

All laps do wear. Sometimes they become curved or concave and need resurfacing to obtain a flat surface to keep the facets flat.

A good habit to acquire is to levigate the polishing powder. Do this by adding a tablespoon of polishing powder in a 1/4 pint jar. Shake it up thoroughly. Then, just use the material on top. Never use the material on the bottom of the jar.

We recommend using a small piece of cloth rolled into a swab or the finger to apply the polishing compound to the lap. Keep cutting and polishing laps separate and covered (plastic bags are good for this). Always clean stone and machine when changing laps.

One can always use a harder grit polishing compound on a lap than one previously used, but you cannot return to a softer compound because scratches will result. Cerium Oxide and Tin Oxide can be used on the same lap because they are about the same hardness. Linde A is a harder substance, thus, Linde A cannot be used and then Cerium or Tin Oxide used afterward on the same lap.

GENERAL INSTRUCTIONS FOR CUTTING STANDARD ROUND BRILLIANT

15A First, inspect the material to be cut with a good light (preferably transmitted light) to locate any flaws which should be eliminated in pre-forming. Then, preform the stone by following the first chart in the BOOK OF GEM CUTS VOLUME 1.

After the stone is preformed, select a dop approximately 2/3 the diameter of the stone. Wash the top of the dop with alcohol to remove any oil. Heat the dop over an alcohol lamp and while hot, apply the dop wax until a fair sized globule has adhered to the dop. Do not burn the dop wax or it will lose its tensile strength.

The next step is to mount the stone on the prepared dop. Warm the stone and the dop at the same time over an alcohol lamp, slowly and gently, until both are good and warm. Press the stone into the dop with a firm pressure and, while still warm, set the dopped stone in the V block and press the table of the stone against the face plate. Hold the V block up to the light and check carefully for light or space between the stone and face plate. If not, the table is correctly aligned at 90 degrees to the shank of the dop. If light shows, repeat above and correct. If the table is not 90 degrees to the shank of the dop, the crown facets will not align properly. Allow the dopped stone to stay in the V block until the wax and stone are cool.

The next step is grind the table. Keep the diamond lap wet at all times during the grinding operation with water - never flood the lap. We recommend dipping a piece of woodhard felt in water and holding on the diamond lap behind the stone while grinding. Hold your forefinger on the stone when cutting and polishing, always.