

HALL '2000'  
HEAVY DUTY FACETING MACHINE  
SILVER JUBILEE MODEL

INSTRUCTIONS

- (1) UNPACKING. The carton contains the machine in a broken down form. The Post and Head have been removed from the machine. The Electronic Control and mounting plate are also removed from their mounted position but are still connected to the electric motor. Remove the paper packing from the top of the carton. Lift out the box containing the accessories. Also the Post and the Head. Remove the remaining packing paper and carefully lift the machine with the loose control out of the carton.
- (2) SETTING UP THE MACHINE. Place the machine where it is used to be. Mount the control behind the plash bowl. Fit the plastic drain tube up through the Base Plate onto the fitting under the bowl. Stand the Post up in the hole in the swinging arm. Fit the clamp washer and tighten the screw with the Allen key provided. It may be necessary to set the machine at an angle to give more comfortable operating position.
- (3) ELECTRICS. The Motor is a 180 volt D.C. permanent magnet motor operating on 240 volt A.C. current. The Control box contains the rectifier and speed control circuitry. The Front knob is both the on-off switch and the variable control.
- (4) BELT DRIVE. The Drive uses twin belts of 4 mm Dia. Polyurethane. Pulleys are of sufficient diameter to avoid breaking at the join. No belt adjustment is necessary.
- (5) SPEED RANGE AND ADJUSTMENT. The Electronic Speed Control provides a 20:1 speed range. No-load top speed is around 1200 r.p.m. The minimum speed is adjustable. To do this, take a small screw driver and insert it through the hole at the bottom of the dial plate. About 25 m.m. in a screw driver slot can be felt. With the switch on and the Control Knob turned anti-clockwise, adjust the screw either way to increase or decrease the speed. This was adjusted before despatch and should not require touching.
- (6) WATER BOTTLE. The Water Bottle will swivel on its base to allow the Drip tube to be swung out of the way for fitting and removal of lap plates. The bottle will lift off for cleaning. If the tap becomes hard to turn, pull it out and smear it lightly with grease. Do not block the water channel.

Warning. Though the motor is totally enclosed, it is advisable not to spill water on it.

- (7) SWINGING POST. The Post is carried on a swinging arm mounted below the base plate. This arm swings on a large bronze journal with 100 m.m. dia. hard nylon thrust washer. Journal and Washer are lubricated through two oil holes on top of the base plate. The Arm will swing close in against the Bowl or away to allow cutting of the girdle. The Arm is clamped with a lever on top of the base plate. Experiment to find the minimum clamping pressure to lock the arm rigid. If the machine has been standing idle for a period of time, the arm tends to "freeze" in position. Unclamp and swing it back and forth a few times until it moves freely. When swinging, move the arm. Avoid putting the hands on the vertical adjustment sleeve.
- (8) RAISING AND LOWERING THE HEAD. The Head is raised or lowered by loosening the clamp wheel and sliding the vertical slide up or down. When positioned, use only sufficient force to clamp. Do not overtighten and strain the casting. Also allow sufficient down-feed to cut the facet. When raising and lowering the head place a hand under the vertical slide casting. Not around the vertical adjustment sleeve.
- (9) MICRO HEIGHT ADJUSTMENT. Around the Post is the vertical adjustment sleeve, on which the vertical Slide moves. At the top is a large graduated knob with a fine thread for raising and lowering the Head. At the top of the sleeve are three indicator lines. Periodically rotate the sleeve a third of a turn and read off a different line. This will distribute wear evenly on the bronze bushings. The Post can be rotated a third of a turn periodically to distribute wear on it evenly.
- (10) SETTING THE ANGLE. When setting the Angle, the micro-adjustment at the back of the Head should be set at zero ('0' Mark). This allows adjustment either way. Swing the Dop Arm clear of the Lap Plate and down until stop Pin contact is made. Then loosen the large wing nut at the back of the Head. Swing the Dop Arm up or down until the desired angle is read by the Pointer (.) on the vernier scale. Tighten the Wing nut. Necessary corrections to the setting can be done with the Micro adjustment.  
WARNING. When a dial gauge is used, care should be taken that the Stop Pins are in contact before loosening the Wing Nut. If not the Stop Pin Plate will slam up and do damage to the dial gauge.
- (11) MICRO ANGLE ADJUSTMENT. The Knob is scribed with a zero line. There is adjustment either way of this line. Turning the Knob away from you raises the Dop Arm and increases the angle. Turning it towards you lowers the Arm and decreases the angle.

- (12) THE VERNIER SCALE. The Vernier Scale reads directly to  $.1^{\circ}$ . The whole angle is read off the main scale and the decimal fraction off the Vernier scale. The Protractor scale is adjusted to align the whole number of the angle with the zero (•) on the vernier scale. The Protractor is then advanced until the decimal line of the required fraction lines up with the next main scale division. Use the Micro-adjustment screw for this. This is illustrated in Fig. 1.
- (13) ANGLE STOP. The Angle Stop Pin is carried on the Spring loaded plate on the front of the Head. The Micro-angle adjustment is the adjustable stop pin. These stop pins operate the angle stop indicator light, when the light is fitted.
- (14) POSITIONING THE HEAD. Set the Angle as described in(10). Unclamp the swinging arm that carries the Post. Place the left hand under the head to support its weight and loosen the vertical slide clamp wheel. With the Dop Arm down and Stop Pins in contact raise or lower the head, and swing it to or away to position the stone over the lap plate. Clamp the slide, then clamp the Post.
- (15) INDEX WHEEL. A 96 tooth Index Wheel is fitted as standard. 80,72 and 64 tooth wheels are also available. Index Wheels are secured by two screws and located with a dowel pin.
- (16) CHANGING INDEX WHEELS. First disengage the Index Pawl. Remove the two securing screws. With thumbs on the end of the Dop arm and forefingers behind the wheel, work it off the Hub and locating pin. When replacing a wheel, line up the locating pin and hole and work the wheel into place. Replace the screws.
- (17) SETTING INDEX AT ZERO. Always start cutting with the Index Wheel correctly at zero. Set the Index pin in the 96 position and the index micro adjustment knob set at zero. It is possible to set this at several zero positions, but the correct one is as set with the 'D' Dop.(See 27).
- (18) INDEXING. When indexing, depress the pawl sufficiently to lift the Index pin clear of the teeth in the wheel. Do not slide the pin over the teeth. The tooth selected rotates directly with the facet being cut. If when the pawl is depressed or released, the index pawl spindle turns, moving it from the zero setting, then it has to be retensioned.  
To do this, loosen the grub screw in the collar on the right hand end of the spindle. Press the collar and the graduated knob together and retighten the screw. This is illustrated in Fig.2.

- (19) FREEWHEELING. Depress the pawl and slip the catch back into the groove on the lever. The Dop arm will now free-wheel. To engage the Pin again, just depress the pawl and the catch will release. When released, make sure the catch is free of the pawl and not preventing the pin from engaging properly.
- (20) DOPS. The Dops are made with a stainless steel stem and a brass head. They are in three forms; cone, vee & flat. As the stainless steel is a poor conductor of heat the brass head heats up and cools down quickly. A Bevel is cut on the end for locating purposes. Fig. 4 Shows a cross section of the end of the Dop Arm, illustrating how the Dops are located. If you look at the Dops you will notice that the Bevel on the end is concave. This is done intentionally to give positive two point contact on the locating pin in the dop arm.  
NOTE The Beveled end of the Dop and the Pin in the Dop arm are for locating purposes only. It is not intended as a wedge to stop the dop turning. The Dop should be locked with the grub screw sufficiently to prevent turning.
- (21) LOCATING DOPS IN DOP ARM. (Fig. 4). Swing the Dop Arm to a vertical position. Insert the Dop and with a light pressure on top rotate it until it drops down and locates on the off-set pin in the Dop arm. Maintaining a light pressure, tighten the grub screw which closes the Split Sleeve collet. Do not overtighten. Very little pressure is required to lock the Dop securely.  
WARNING. Do not tighten the Grub Screw without a Dop in place as it will collapse the Collet Sleeve and prevent insertion of the dops. The Dop Arm will then have to be returned and a new sleeve fitted.
- (22) SETTING THE 45° ANGLE DOP. Insert the angle dop in the Dop Arm and locate and lock it as explained for ordinary Dops. It will be necessary to lock this dop more securely. Do not apply a twisting force to see if it is locked properly. This could damage the locating points. Set the angle accurately at 45°. Locate the Index pin in the 96 tooth. Set the Index cheater at zero. Fit the large flat dop in the angle dop and clamp. Position the head so that while the dop arm rests on the stop pins. The Flat top Dop just touches the Master Plate. It should sit flat. If not, adjust the angle and Index Cheaters and the height adjustment until it does. The Flat Top Dop is removed and the dop holding the gem stone inserted. Of course it will be necessary to readjust the height. If it was necessary to adjust the Index Cheater to cut the table, it must be returned to the zero setting for cutting the facets.

- (23) CUTTING THE GIRDLE. Slide the removable piece in the splash bowl back to open the gap. Swing the post away from the Bowl and with the angle set at 90° lower the Head until the stone rests over the edge of the lap plate. Free wheel the index wheel. Rotate the dop arm, sweep the dop over the edge of the plate and lower the head until the stone is cut round to the required diameter. Rotate the dop arm with an even pressure otherwise the stone may cut out of round.
- (24) TRANSFER JIG. This consist of two aluminum blocks sliding on parallel slide rails. The Blocks are clamped with a clamp wheel and washer. In operation one block is clamped and the other moved. This should be periodically alternated to even the wear on the blocks and maintain true alignment. To insert the Dops, loosen the clamp knobs on top and swing the clamp plates to the back. Place the Dops in the vee groove locating the bevel under the locating piece. Swing the clamp plates over the Dops and clamp, while maintaining a slight pressure to the end of the dops to ensure they are located properly. Slide the movable block along to make Dop contact. Then clamp the block.
- (25) LAP PLATES. It is essential that Laps run true. They should not be bowed, warped or of uneven thickness. They can be checked with a straight edge and micrometer. If a dial gauge is fitted it can be used to check the runout of the lap. The oscillation of the dial gauge needle should not exceed one division on the dial. Severe oscillation of the needle will destroy the gauge. Also the gauge cannot be used effectively as accurate readings can not be made. Copper and tin lap plates can be remachined to true them up. Commercially impregnated laps cannot. Though the machine will accomodate 8" diam. lap plates they are not recommended as the larger diameter plates are prone to wobble. 6" diam. plates are recommended.
- (26) FITTING LAP PLATES. Wipe the master plate and the back of the lap plate clean. Though a central screw is provided to secure the lap it is not necessary as the laps will drive through friction and suction with the master plate. If not it means that the lap is convex on the underside. Tightening the central screw to get the laps to drive will only increase the convexity. The Laps should be machined flat.
- (27) DIAL GAUGE. (Where Fitted). For effective use of the dial gauge it is absolutely essential that it is not subjected to vibration. Laps must run true and should be checked to be flat and true to .01 m.m. (.0005"). When operating, oscillation of the needle should not exceed

one division of the scale. Excessive vibration of the gauge mechanism can completely destroy it. The manufacturers of the gauge do not recommend it for this application and no warranty applies.

(28) SETTING DOP ARM LOCATING PIN PARALLEL WITH MASTER PLATE. It is necessary to have the locating pin in the dop arm parallel with the master plate. The effect of not having this is illustrated in Fig.6. After transfer the Pavilion and crown facets will not line up and adjustment of the Index Cheater is required to correct it. The Special 'D' dop is used to check this. The machine is checked and set with this Dop on assembly.

The 'D' dop is fitted into the dop arm, located and locked. With the angle set at approximately  $45^{\circ}$  the dop is lowered onto the master plate. The straight edge of the dop should sit flat on the plate with the index pin in the 96 tooth and the index cheater at zero. If the cheater has to be altered slightly, the new setting is where it must be set before cutting the facets or it must be reset. To do this refer to Fig.10. With the Index set at 96, the Index Cheater at '0' and the angle at approx.  $45^{\circ}$ , loosen the screw as indicated at (1). Now press the 'D' dop down hard on the master plate, or turn the whole assembly until there is straight line contact (2). Now tighten the screw(3).

When a different index wheel is fitted it may be necessary to reset with the 'D' dop. This is due to slight variations in each wheels location. It must be pointed out that it may be necessary to cheat a little after transfer.

WARNING. The sharp straight edge of the 'D' dop must not be damaged. Do not sweep the dop across the master plate or apply it to the plate while it is rotating. It must be carefully lowered down onto the plate.

(29) CHECKING AND SETTING THE MASTER PLATE. To check if the master plate is square with the post, the procedure is as follows. Insert a flat top dop in the dop arm and set the angle to approx.  $45^{\circ}$ . Lower the Head until the dop just touches the plate. By moving the post and swinging the head, check that the dop just touches the plate in the four positions, left and right, front and back. If a dial gauge is fitted it can be used to do this. It is necessary to back off the Stop pin so that the gauge is reading. If it is necessary to adjust the plate, this can be done by tightening or loosening the three nuts on the screws that hold the spindle housing. Refer to Fig.( ). Checks are made at the three positions directly above these nuts. Reading are taken at positions (1) and (2) and the nuts adjusted so that the dop just touches or the dial reads the same. Make sure the swinging arm is clamped each time. Then bring the dop over position (3) and adjust to get the same reading. Now swing the dop to position (4). Adjust the dop so that

it touches or zero the dial gauge. Swing back to position (3) and adjust the nut again to get a similar reading.

- (30) CARE OF THE MACHINE. Always keep the machine clean and oiled. It is just as important to keep hands clean. Avoid touching the vertical adjustment sleeve. Do not allow an accumulation of stone residue to build up. Keep the turntable clean. Polish off occasionally with emery paper while running. Spray lightly with de-watering fluid, when not in use.

When the machine is not in use, swing the head to a vertical position and loosen the wing nut, to relieve the tension on the stop pin plate spring. Switch the power off at the power point when finished using the machine.

- (31) LUBRICATION.

Motor : Permanently lubricated ball bearings

Spindle: " " " "

Swing Arm: Lubricate occasionally with oil supplied.

There are two oil holes in the base plate above the journal.

Post: Lubricate through the oil hole in the top of the vertical adjustment knob. Absence or presence of oil at the bottom of the vertical adjustment sleeve will indicate condition.

Vertical Adjustment Sleeve: Wipe the sleeve clean and oil lightly. Move the vertical slide up and down a few times to work the oil onto the sliding surfaces.

Vertical Adjustment Knob: The post oiling procedure should keep this lubricated.

Pivot Bearing: Permanently lubricated ball bearing.

Stop Pin Plate: Loosen the wing nut a few turns and work the stop pin plate away from the Protractor plate to allow a few drops of oil behind it. Oil behind the chrome plated washer also.

Micro Angle Adjustment: A drop of oil in the hole provided.

Index Pawl Spindle: This is grease lubricated. When it is considered necessary, the spindle should be removed and grease applied to the thread and bearing surfaces. Replace and tension as in (18).

Dop Arm Spindle: The dop arm spindle is hollow and is filled with oil. It should not require attention for a long time. If eventually all the oil works out and the dop arm becomes tight to turn, then the whole dop arm assembly has to be removed. To do this, loosen the clamp screw '1', Fig. (10) and withdraw the whole assembly from the protractor plate. Remove the screw in the rear end of the spindle. Drip oil into the hole until it is full.

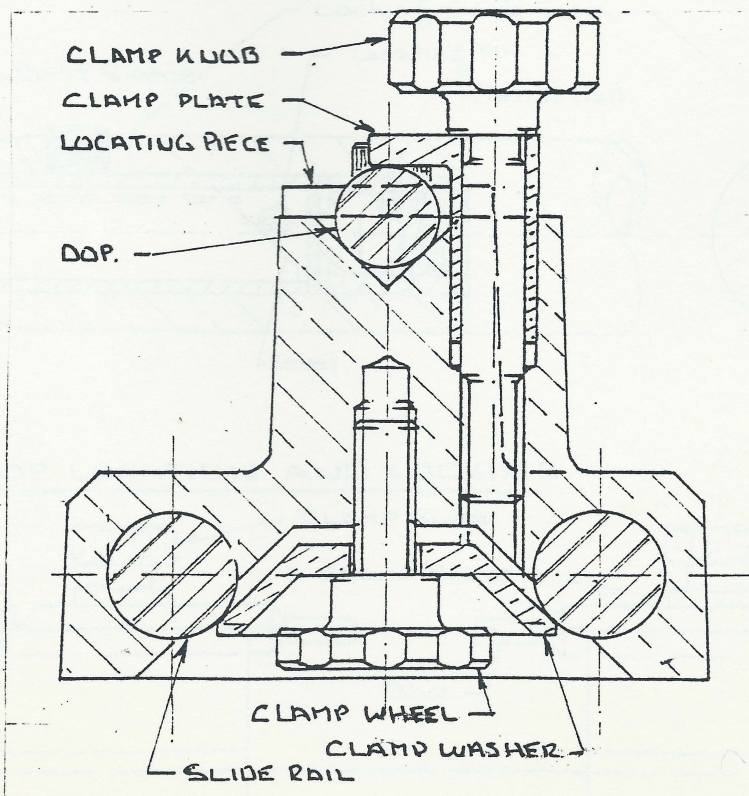
Replace the screw and the whole assembly. There will be a little juggling with the index pawl, spring and catch in this operation. Using the 'D' dop reset the dop arm as explained in (28).

Dop Locking Screw: Grease occasionally

Note : No definite period can be given for lubrication frequency. This is something the user must determine depending on the use of the machine. It is better to over lubricate than under lubricate.

- (32) FAILURE OF THE ELECTRONIC CONTROL. In the event of failure of the electronic control it can be removed and returned to the manufacturer for replacement.  
First. Unplug the cable from the power point. Remove the two screws that hold the control cover box. Unplug the motor and power cord leads from the back of the control. Remove the knob from the front and undo the nut that hold the dial plate and control. The control is now free.

000



CROSS SECTION - TRANSFER JIG.



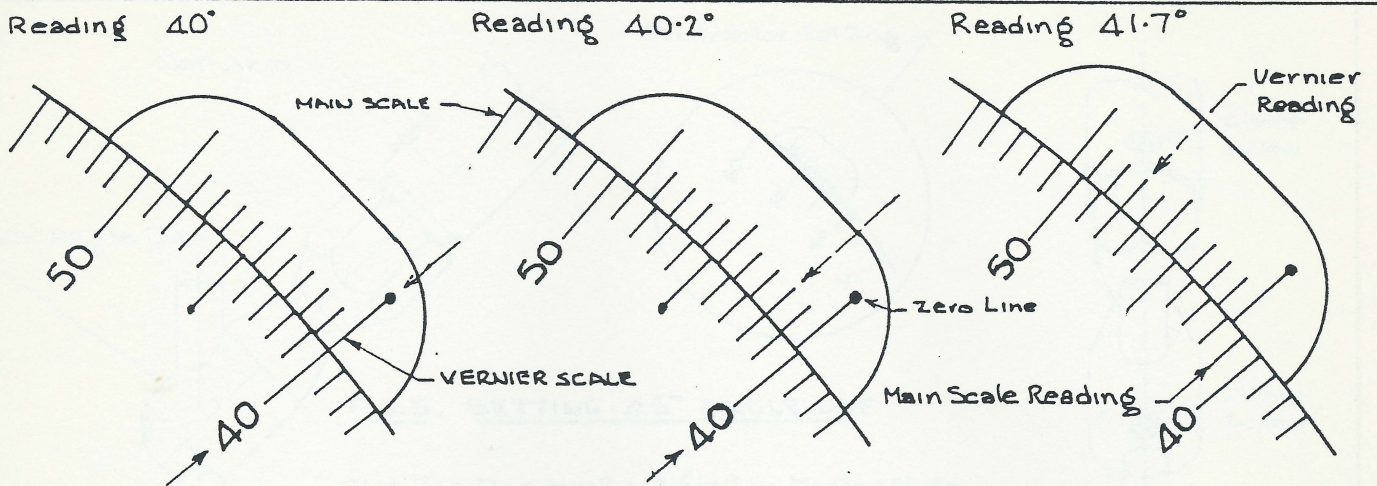


FIG. 1. SETTING THE VERNIER

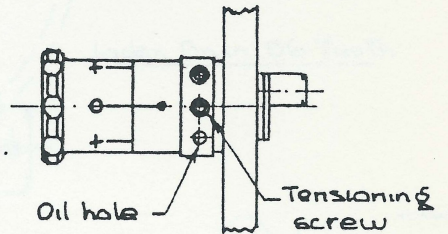
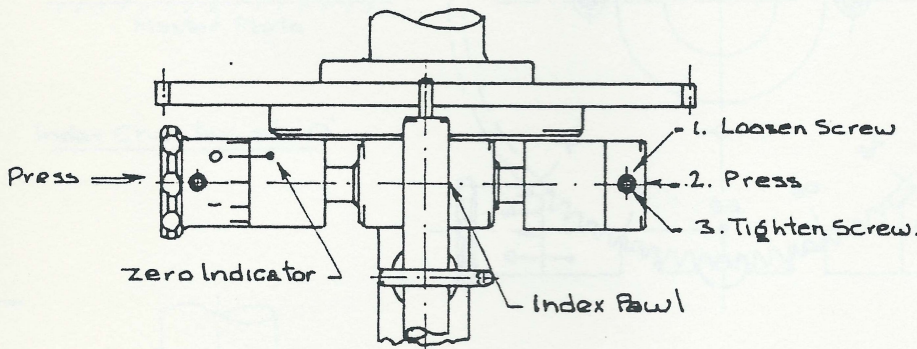


FIG. 2. TENSIONING INDEX PAWL

FIG. 3. MICRO-ANGLE ADJ.

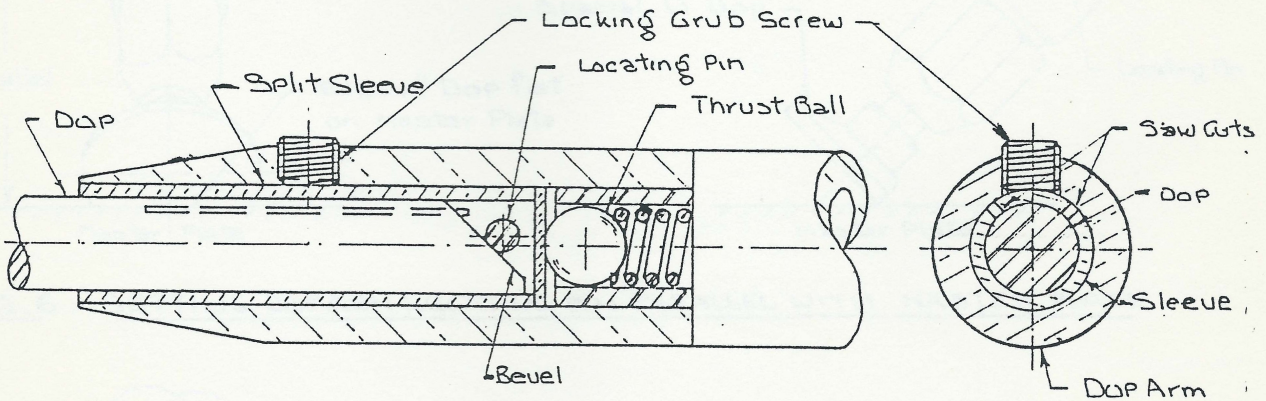


FIG. 4. DOP LOCATION AND LOCKING

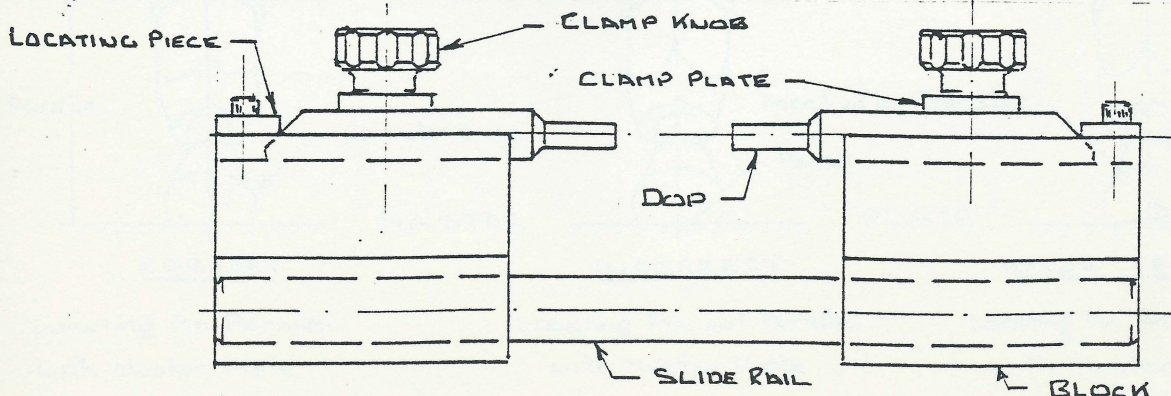


FIG. 5. LOCATING DOPS IN TRANSFER JIG

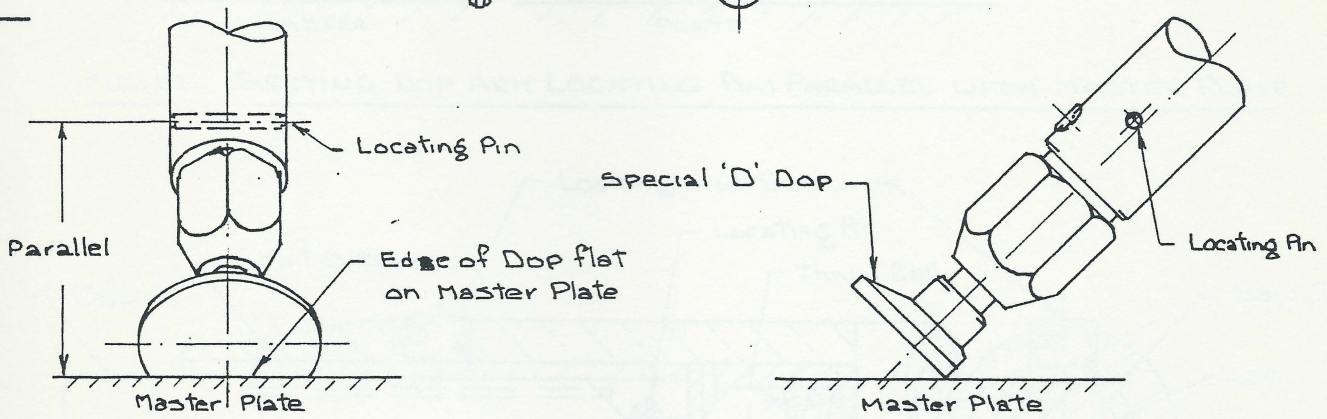
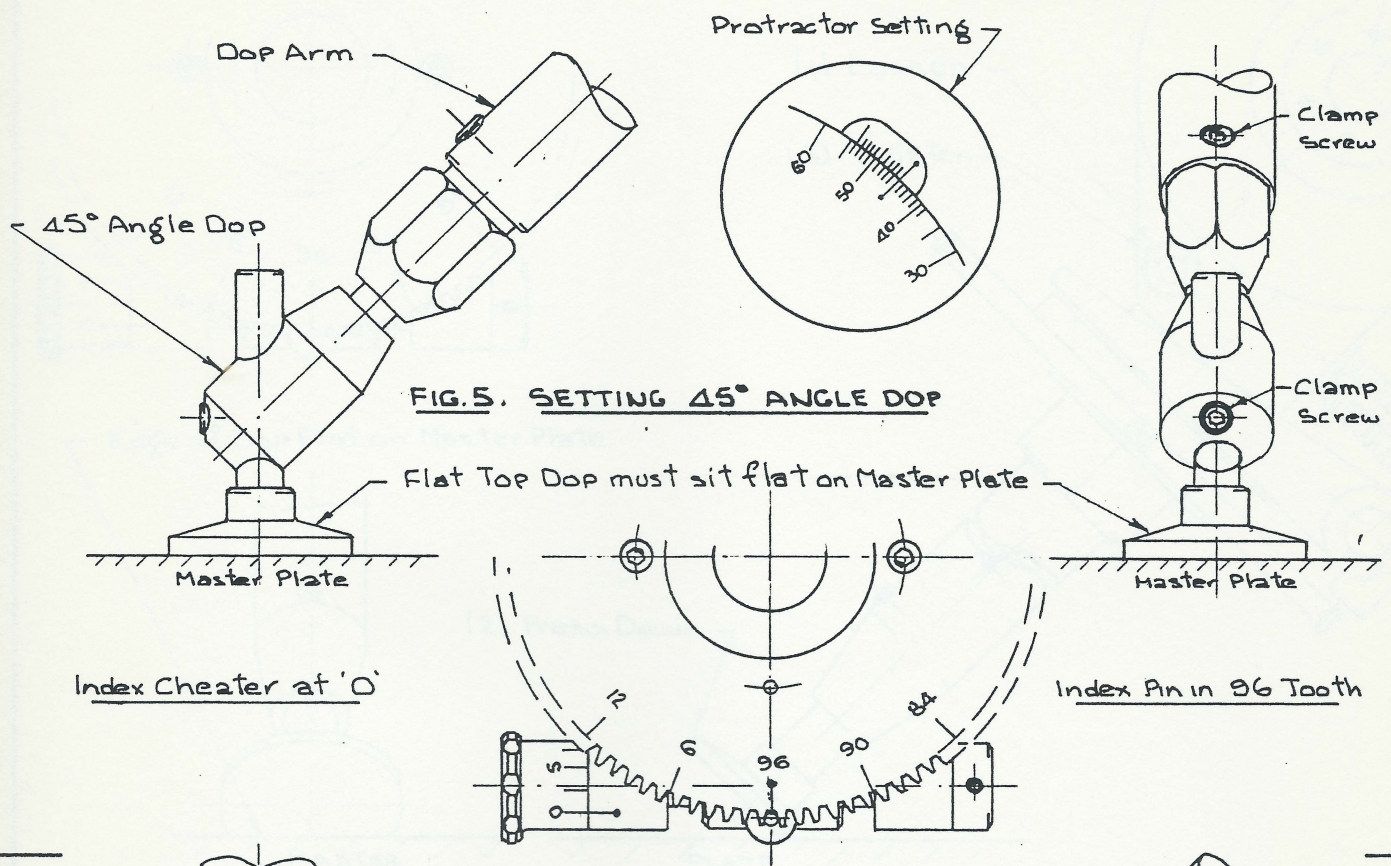
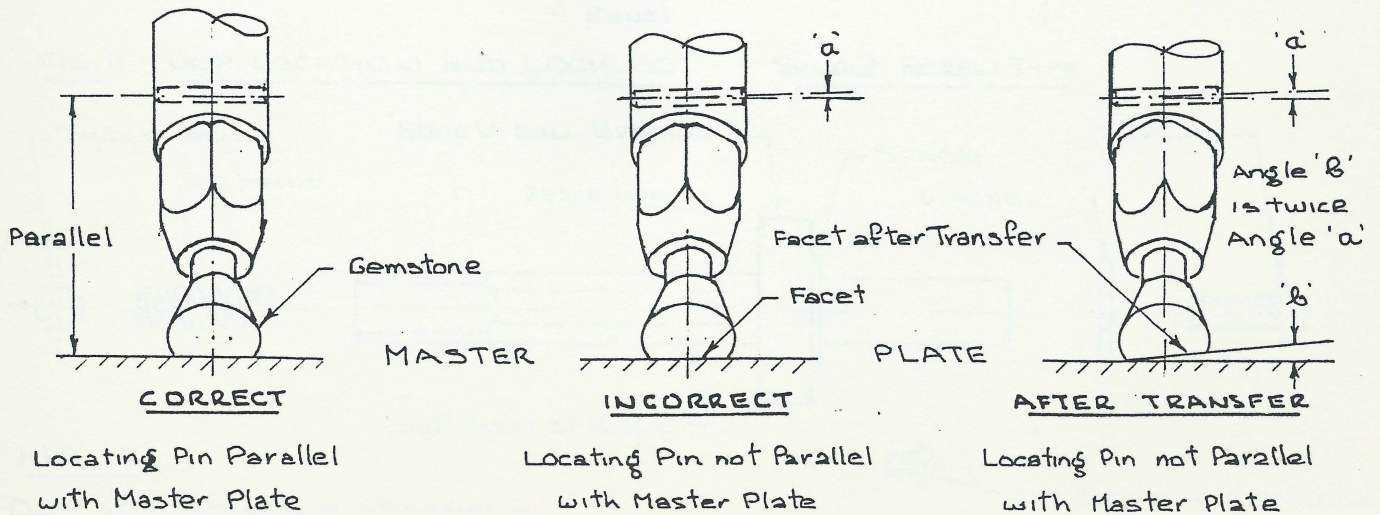


FIG. 6. SETTING DOP ARM LOCATING PIN PARALLEL WITH MASTER PLATE



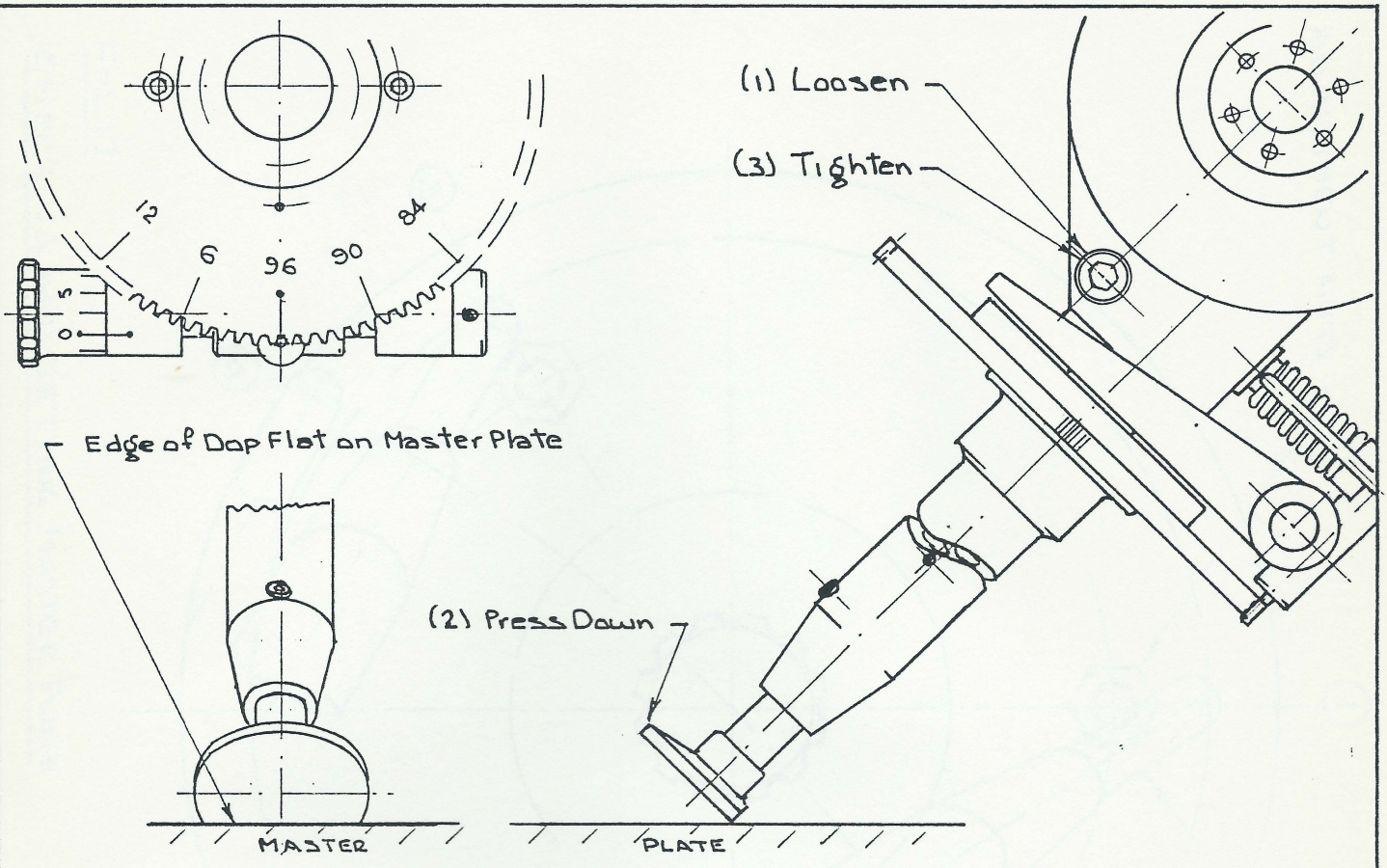


FIG. 10 SETTING DOP ARM LOCATING PIN PARALLEL WITH MASTER PLATE

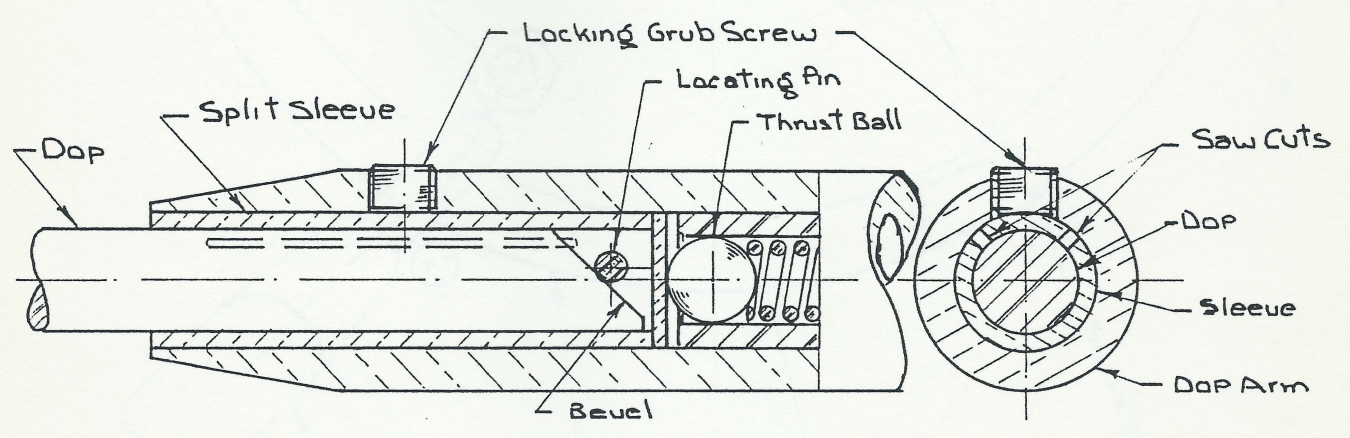


FIG. 11 DOP LOCATION AND LOCKING. SINGLE SCREW TYPE

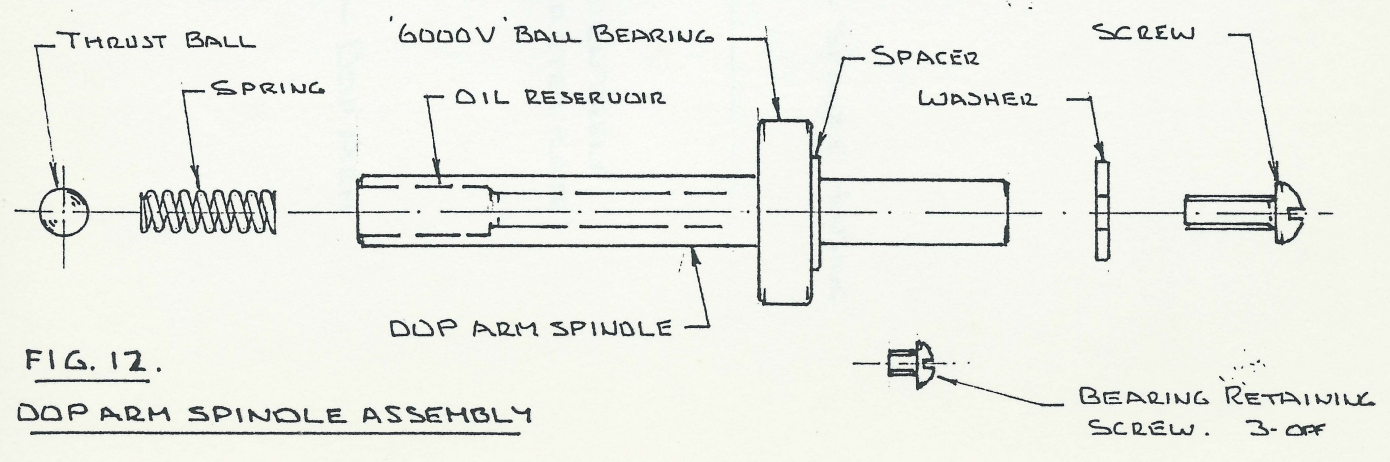
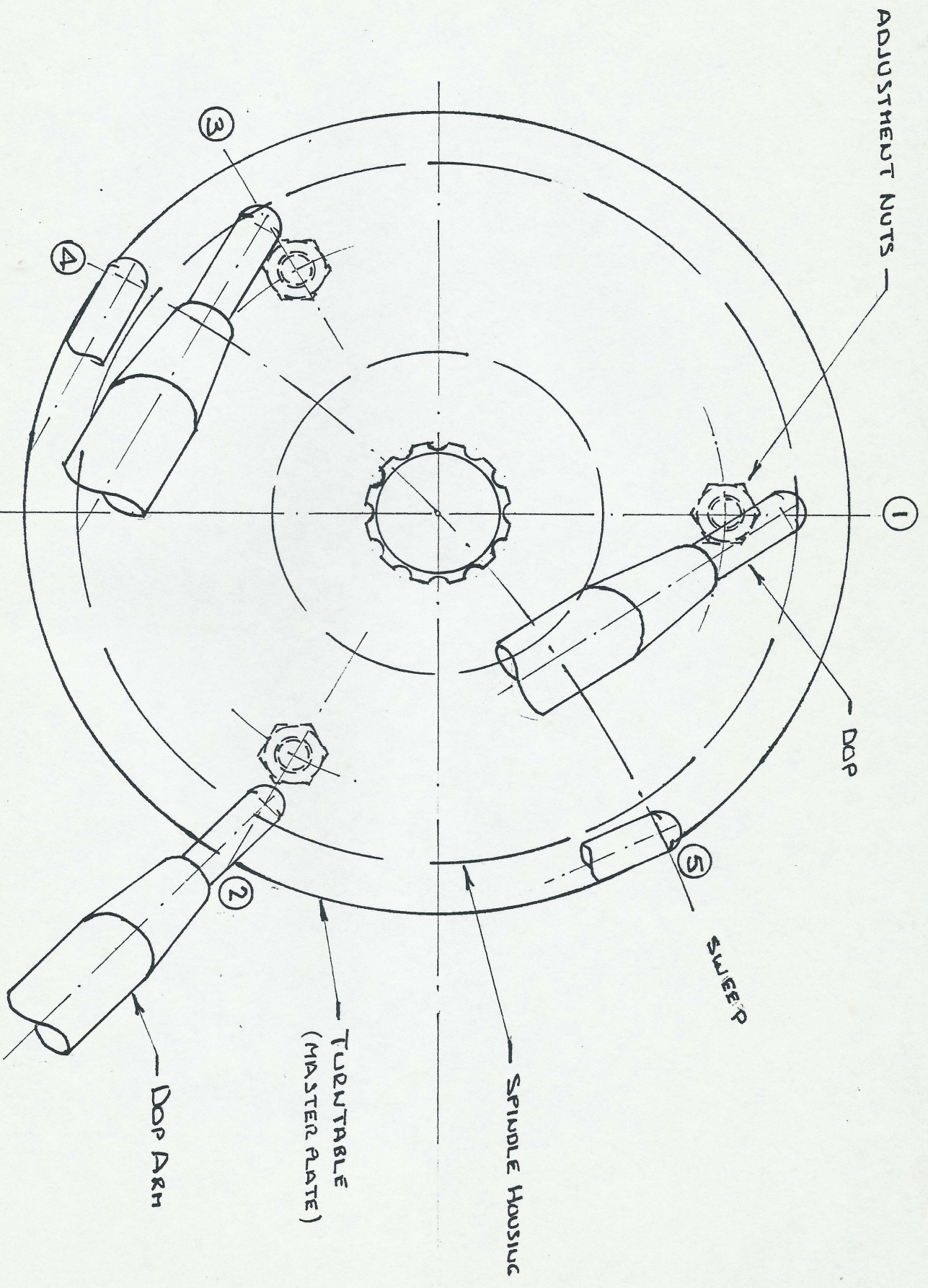


FIG. 12. DOP ARM SPINDLE ASSEMBLY



**FIG. 12**  
**CHECKING AND SETTING MASTER PLATE**

This Hall 2000 faceting machine manual  
edition is copyright Laurie Hall 2012  
all rights reserved