

HALL - "XTRA"

Faceting Machine

INSTRUCTION

BOOK

Read these Instructions before operating machine

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XTRA Instructions

Before reading these Instructions refer to the Drawings (Figures 1,2,3 & 4) to be familiar with the names and locations of the machine parts referred to.

1. **UNPACKING** – The carton contains the Machine with a set of Dops, Transfer Block, set of Keys and Instruction Book. Also included are any accessories ordered with the machine.
2. **SETTING UP THE MACHINE** – Set the machine up where it is intended to be used. Fit the drain tube to the ferrule underneath the splash bowl and drop it through a hole in the table into a bucket. Plug the electrical lead into a power point.
3. **MOTOR** – The motor is a 240V DC brush motor. The main switch is on the Control Panel and incorporates the speed control. For longer brush life they should be reversed periodically. When a faceting session is finished, the motor must be switched off before switching the machine off at the wall outlet.
4. **CONTROL BOX** – The control box is mounted behind the bowl and contains the electronic speed control. The On-Off switch is incorporated with the speed control. (Figure 5)
5. **SPEEDS** – Speed range (no load) is from 0 to 1500rpm. Twin belts are fitted to drive the spindle. Should a belt break, one belt will operate the machine while repairs to the belt are made or a new belt obtained. The belts are 4mm, diameter Polyurethane and heat welded.
6. **WATER BOTTLE** – This is mounted on a post at the right back of the machine. It can be swivelled to position the drip over or off the lap plate. A drip tap controls the water feed to the lap plate. There are two “off” positions. The bottle may be lifted off for cleaning. To avoid splashing water over the control box when adding water it is best to remove the bottle from the machine.
7. **SPLASH BOWL** – The splash bowl has a cut-out with a removable piece. This is to allow entry of the dop arm when cutting the girdle of the stone. A deflector prevents splash from throwing out of the gap. At the back of the bowl is the drain hole. **DO NOT** flood the bowl. **DO NOT** feed water faster than it can be drained away. Always keep the drain hole clear.
8. **SWING ARM AND POST** – The swing arm that carries the post is mounted below the base plate and is mounted on preloaded ball bearings and a nylon thrust washer. These are tensioned so that there is no play in the post. Tension is adjusted with a Nyloc nut underneath. This has been adjusted before despatch to the tension that we consider right. If left standing the arm will “freeze”. The post should be moved back and forth a few times to free it. **Refer Figure 6.**
9. **POST AND VERTICAL ADJUSTMENT SLEEVE** – The post is precision ground steel over which fits the stainless steel Vertical adjustment sleeve. This is bronze bushed. A large graduated knob at the top provides fine up and down feed.

The weight of the head is carried on nylon washers inside the knob. 12mm of vertical down feed is provided. Before cutting a facet ensure that there is sufficient downfeed.

10. **THE HEAD** – The head is the whole assembly that slides up and down the post. Refer Figure 3.
11. **VERTICAL SLIDE** – This is the square block that fits around the vertical adjustment sleeve and is moved up and down by hand. It is released and locked by a knurled handwheel. **Avoid** placing hands contaminated with diamond and stone residue on the vertical adjustment sleeve.
12. **PIVOT PLATE** – This plate is fixed to the vertical slide by four clamp screws and one jack screw. These screws are used to adjust the pivot axis square with the post and should **NOT BE TAMPERED WITH**. Special equipment is required to make this adjustment. **FACTORY SETTING -- Refer Figure 7**. The plate carries the pivot axis spindle. This is a double row angular contact ball bearing, preloaded to avoid any side play.
13. **PIVOT BLOCK** – This block is on the back side of the pivot plate and carries the index pawl plate and the dop arm. A tension spring for the stop pin plate is recessed into the block.
14. **STOP PIN AND PLATE** – The stop pin plate is spring loaded. A large knurled handwheel locks and unlocks it. The pin in the stop plate bears up against the adjustment screw which is used for fine adjustment of the angle setting and the stem of the dial indicator. A square brass pillar carries this screw and dial gauge.
15. **PROTRACTOR** – On the front of the pivot plate is a protractor plate graduated in degrees. The angle indicator reads off whole degrees. On the back of the pivot block the stop pin plate is clamped with a large knurled hand wheel. The plate is fitted with a pin that bears against the micro angle adjustment screw and the plunger of the dial gauge. The dial gauge may be removed and replaced without affecting any adjustments.
16. **MICRO ANGLE ADJUSTMENT** – The micro angle adjustment screw is for accurately setting the angle on the protractor and for **setting the angle to one hundredth of a degree** with the gauge. Refer Figure 12. It is also used as the vertical cheater when polishing.
17. **INDEX PAWL AND PLATE** – The plate carries the index pawl and the dop arm. Micro adjustment (**Cheater angle**) is achieved by turning the knurled knob on the left. This knob is graduated and a vee notch in the plate indicates the setting. This is set at zero before commencing faceting. The index pawl is depressed to lift the index pin out of the engagement with the index wheel and may be clipped back under a sliding plate for free wheeling the index wheel
18. **DOP ARM – QUILL** – The dop arm is carried on two lightly preloaded ball bearings. The preloading prevents any end or side play in the dop arm. The dop arm carries the index wheel which is secured to a brass collar by two screws. This collar has a grub screw for locking the wheel onto the arm. The arm passes over centre to hold in the vertical position. The dop arm is bored to receive the dops. A

large flat end grub screw locates and locks the dops.

19. **INDEX WHEELS** – The machine is fitted with a 96 tooth index wheel as standard. 64 and 80 tooth index wheels are supplied.
20. **CHANGING INDEX WHEELS** – First depress the index pawl and clip it back in the freewheel position. If this is not done, when the wheel is removed the pawl will spring up and the spring under it will fly out. After a new wheel has been fitted it will be necessary to set it in relation to the master plate using the “D” dop. **Refer paragraph 26.**
21. **DOPS** – These are made from centreless ground brass. They are in flat, cove and Vee form. A flat is milled along the side for locating and locking in the dop arm and the transfer jig. A 45° angle dop, a “D” dop and a large flat top dop are also supplied. Care must be taken to ensure the dops are located correctly in the dop arm “Quill” and the transfer block. **Refer figures 8 & 10.**
22. **ANGLE DOP 45° – Refer figure 9.** The angle dop is used for cutting and polishing the “table” of the gemstone. With the index wheel set at zero, and the angle set at 45° it is inserted in the dop arm and located and locked as a normal dop. The dop holding the gemstone is inserted in the angle dop and locked. The large flat top dop is used in conjunction for setting the dop arm accurately in relation to the master plate.
23. **TRANSFER BLOCK – Refer figure 10.** This has a vee groove for holding the dops. In operation, one dop is placed in the groove. The brass plate slid over it and clamped making sure the plate is located correctly on the flat on the dop. The other dop is inserted in the same way and the plate located and tightened enough for the dop to slide. When the dop is positioned as wanted in relation to the other dop the plate is clamped.
24. **MASTER PLATE** – This is an accurately machined aluminium disc and must be treated with care. **Keep it clean.** Avoid dropping lap plates on the master plate as it may be sprung and distorted causing runout.
25. **LAP PLATES** – It is essential that lap plates are flat and run true. They should not be bowed. They can be checked with a straight edge and a micrometer. A knurled knob holds the plates. This should be tightened sufficiently to drive the lap plate. Over tightening will cause the plate to bow up.
26. **SETTING INDEX WHEEL AND DOP ARM IN RELATION TO MASTER PLATE – Refer figure 11.** The index wheel is set at 96 and the cheater zeroed. This is when the zero on the cheater knob is exactly in line with the notch in the index pawl plate. Insert the “D” dop in the dop arm, locate and lock. Setting the angle at around 45°, lower the head until the dop touches the master plate. Loosen the grub screw in the brass collar behind the wheel. Now press the top of the “D” dop so that it sits flat on the master plate. Tighten the grub screw. **DO NOT** sweep the “D” dop across the master plate as this will wear the straight edge of the dop and cause errors in setting. The dop arm has been set correctly before the machine was despatched.
27. **SETTING THE ANGLE – Refer Figure 12.** The handwheel is loosened to free

the stop pin plate. The dop arm should be in the vertical position or the arm held down so that there is stop pin contact. DO NOT have the arm in a position that when the plate is unclamped it swings up and the stop pin strikes the dial gauge plunger. This will damage the inside mechanism of the dial gauge and cause erratic errors. **THERE IS NO WARRANTY ON THE DIAL GAUGE.**

1. The dop arm is swung down until the **whole angle** is indicated on the protractor scale. Use the micro adjuster to set this accurately.
 2. Now turn the face of the dial gauge until the pointer is reading the decimal angle, (hundredths per division of the dial gauge). Now turn the micro adjuster to bring the pointer on the dial gauge to zero.
 3. The dop arm is now set to the desired angle in hundredths of a degree.
 4. Confirm the protractor shows the correct offset from unit degrees.
28. **POSITIONING THE HEAD** – Now the angle is set and with the dop arm down, the head is unclamped from the vertical adjustment sleeve. The gemstone is positioned in relation to the lap plate by swinging it forward and lowering it until the stone just clears the lap plate. At the bottom of the vertical adjustment sleeve is a knurled collar. Moving this back and forth will make the raising and lowering of the head easier. This knurled knob has been discontinued on later models.
29. **CUTTING THE FACETS** – Cutting is commenced and the head fed down with the micro height adjustment until by observation the facet is cut as desired. **DO NOT lean on the stop as this will cause deflection.** The dial gauge does not read deflection. In cutting the remaining facets the head is swung down and cutting is to the zero.
30. **INDEXING** – When indexing, press the pawl sufficiently for the pin to clear the teeth. **DO NOT skid the pin over the teeth.** The teeth relate directly to the facet being cut. If when depressing the pawl the cheater knob turns moving it from the zero setting, it can be tensioned with the small grub screw adjacent to the knob.
31. **FREEWHEELING** – To freewheel the dop arm for performing a gemstone, the pawl is depressed and the catch slipped forward to clip over the end of the pawl, releasing the index pin from the wheel.
32. **INDEX MICRO ADJUSTMENT – Cheater – Refer figure 13.** This provides adjustment for aligning the facets if necessary. To get facets to polish evenly all over. Turning the knob towards the operator rotates the dop anti-clockwise; away for the operator, clockwise.
33. **CARE OF THE MACHINE** – Always keep the machine clean. It is just as important to keep the hands clean also. This assists in preventing cross contamination of grits. **DO NOT** allow an accumulation of stone residue to build up. Keep the master plate clean and dry. Occasionally polish it with silicon carbide paper. Spray lightly with a dewatering fluid when not in use. When finished cutting, switch off at the wall point. **NOTE:** One of the motor brushes wears more than the other. For maximum life, periodically reverse the brushes so that they wear evenly.

34. **CLEANING THE SPLASH BOWL** – Stone residue will build up under the master plate. This residue will do no harm. **DO NOT flush this out with water.** This may wash grit into the top bearing. However it can be cleaned periodically. To do this, remove the water bottle. Tip the machine back until it rests on the control box. Remove the belts and the pulley on the spindle. Now bump up the spindle with the hand or a piece of wood. Tip the machine back onto its feet and withdraw the master plate and spindle. The bowl can now be cleaned. The bowl can be removed by loosening a grub screw under the left hand side.

35. **LUBRICATION** –

1. **Motor:** Permanently lubricated ball bearings.
2. **Spindle:** Permanently lubricated ball bearings.
3. **Pivot:** Permanently lubricated ball bearings.
4. **Dop Arm:** Permanently lubricated ball bearings.
5. **Swing Arm:** Requires no lubrication.
6. **Vertical Adjustment sleeve:** Absence or presence of oil at the bottom will indicate lubrication condition. Occasionally remove that holds the vertical adjustment knob, lift the sleeve and drop a few drops of oil in the hole. When replacing the screw **DO NOT** tighten it right down.
7. **Micro Height Adjustment:** Unscrew the knob and smear a little grease on the thread.
8. **Index Pawl Spindle:** An occasional drop of oil in the holes either end.
9. **Index Cheater:** A smear of grease on the thread when necessary.

NOTE:: No definite period can be given for lubrication frequency. This is something the operator must determine depending on use of the machine.

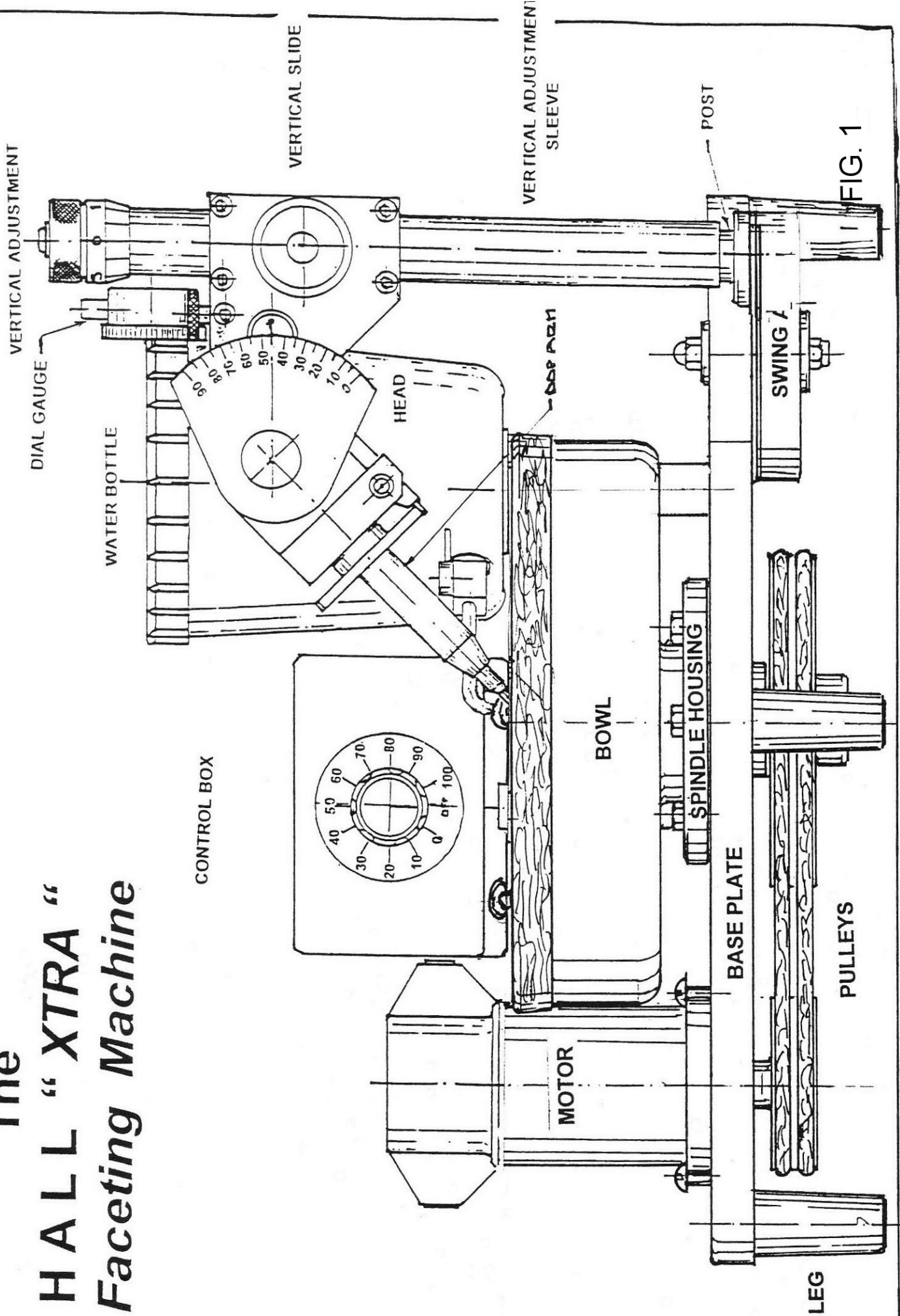
36. **WARRANTIES** –

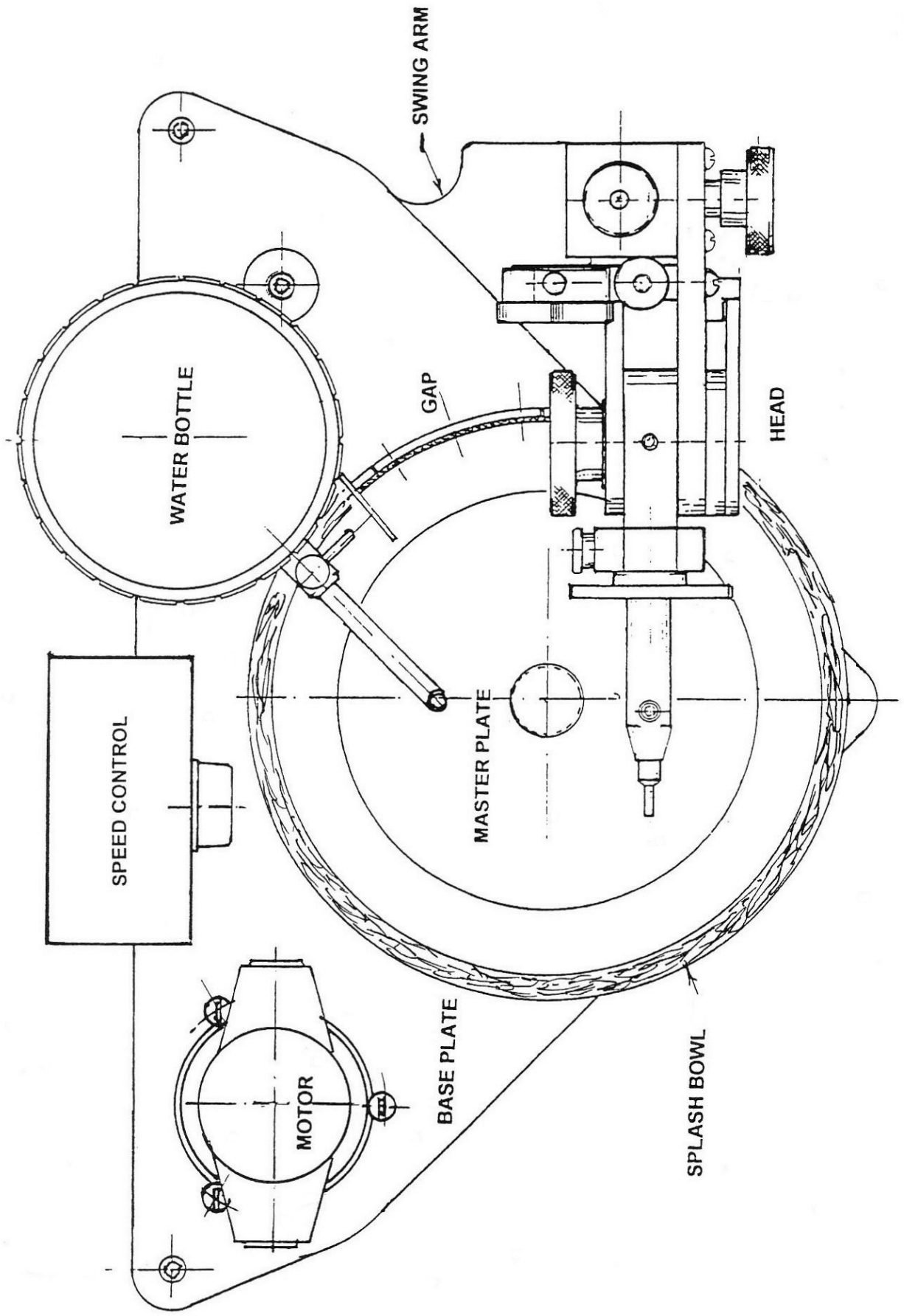
1. Motor : Twelve months from the date of purchase.
2. Bearings : Unlikely to ever need replacing
3. Electronics : Twelve months from the date of purchase.

37. **OUR GUARANTEE** – We will at any time correct any fault detrimental to the operation of the machine for which we are responsible.

THESE MACHINES ARE BUILT TO LAST A LIFETIME

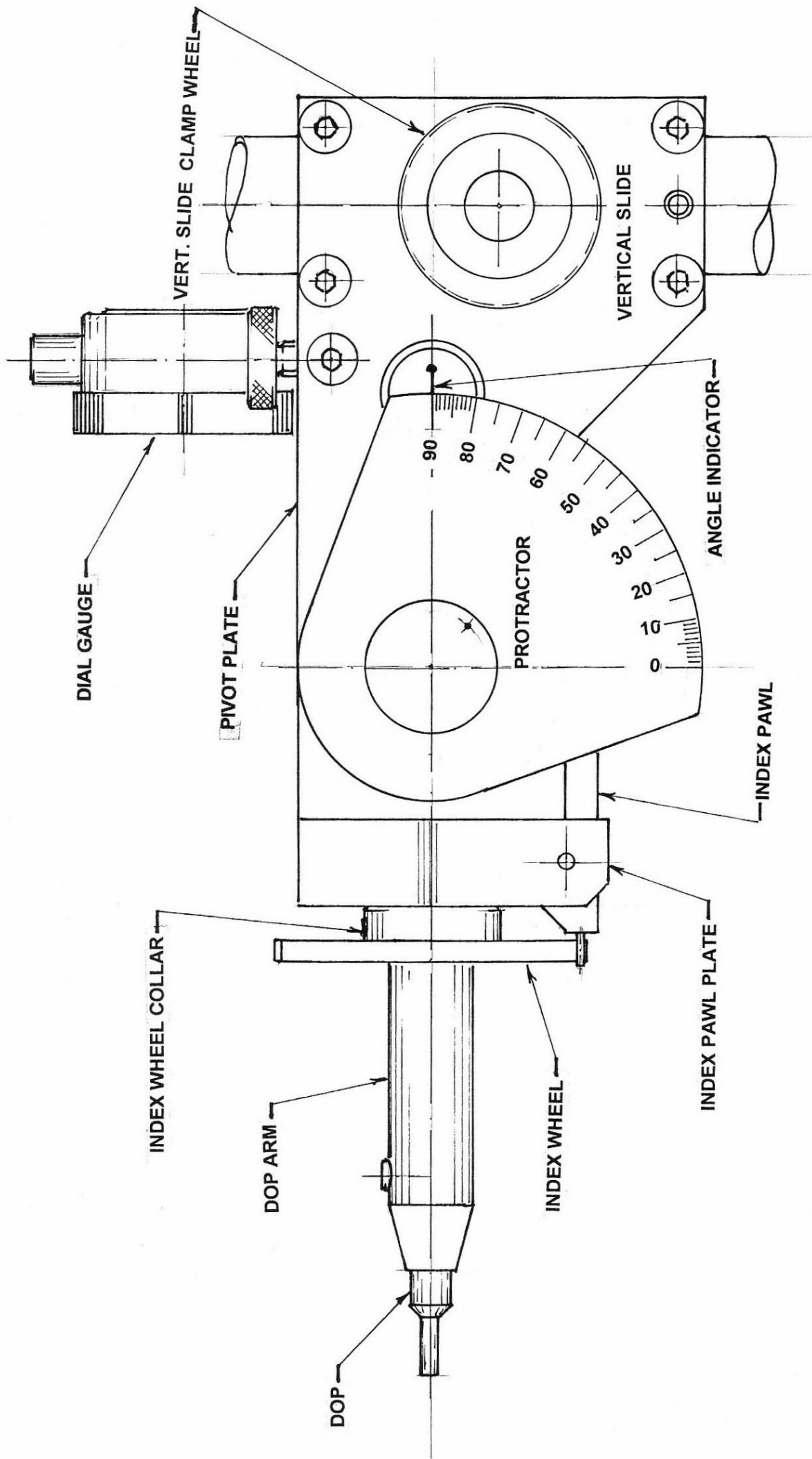
The HALL "XTRA" Faceting Machine





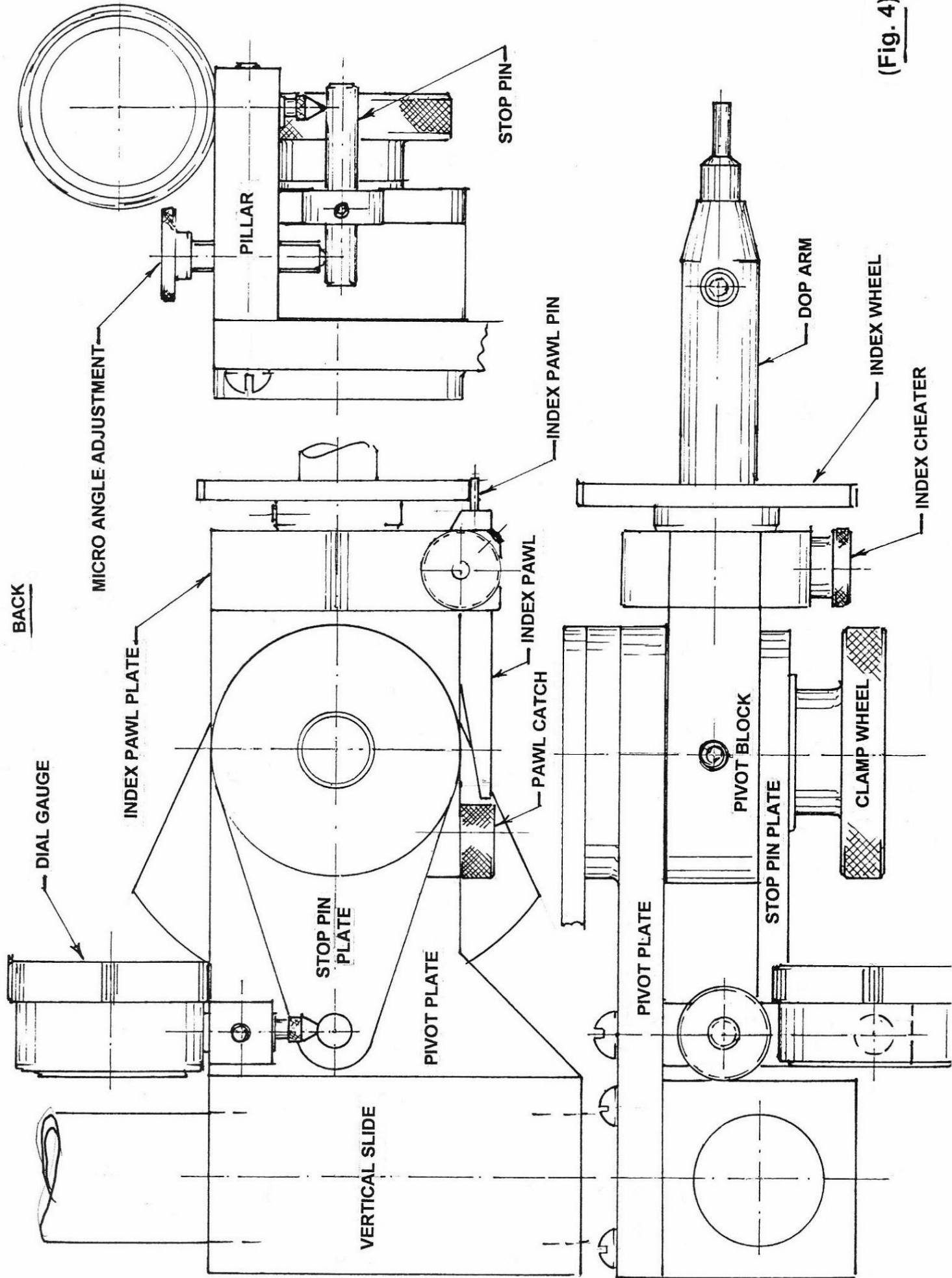
PLAN VIEW

(Fig. 2)



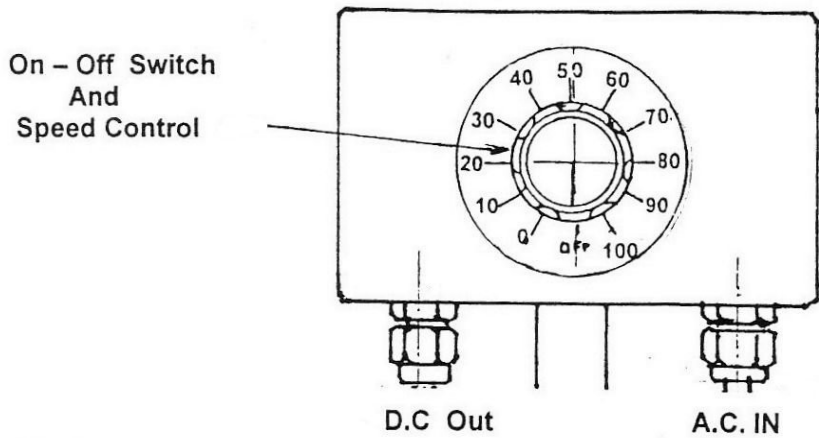
HEAD FRONT

(Fig. 3)

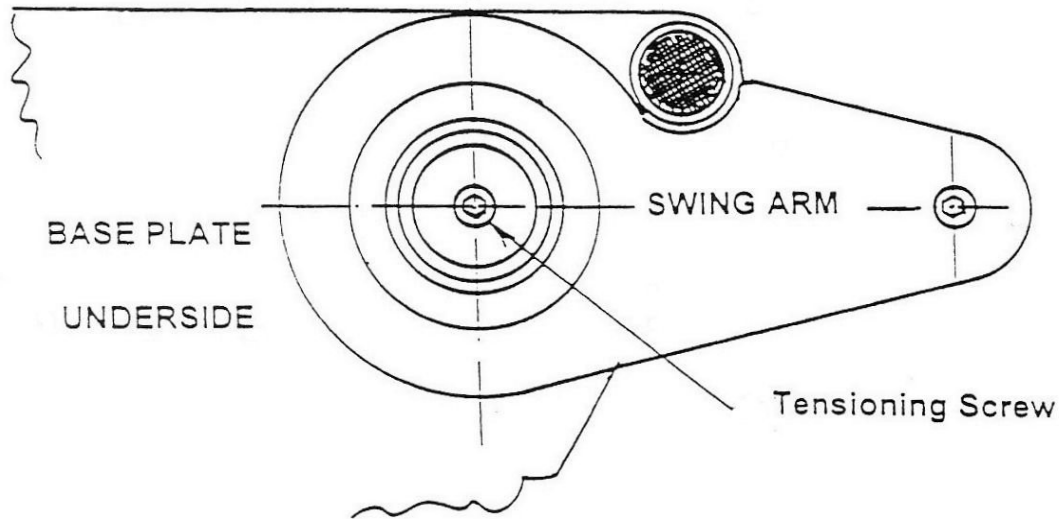


(Fig. 4)

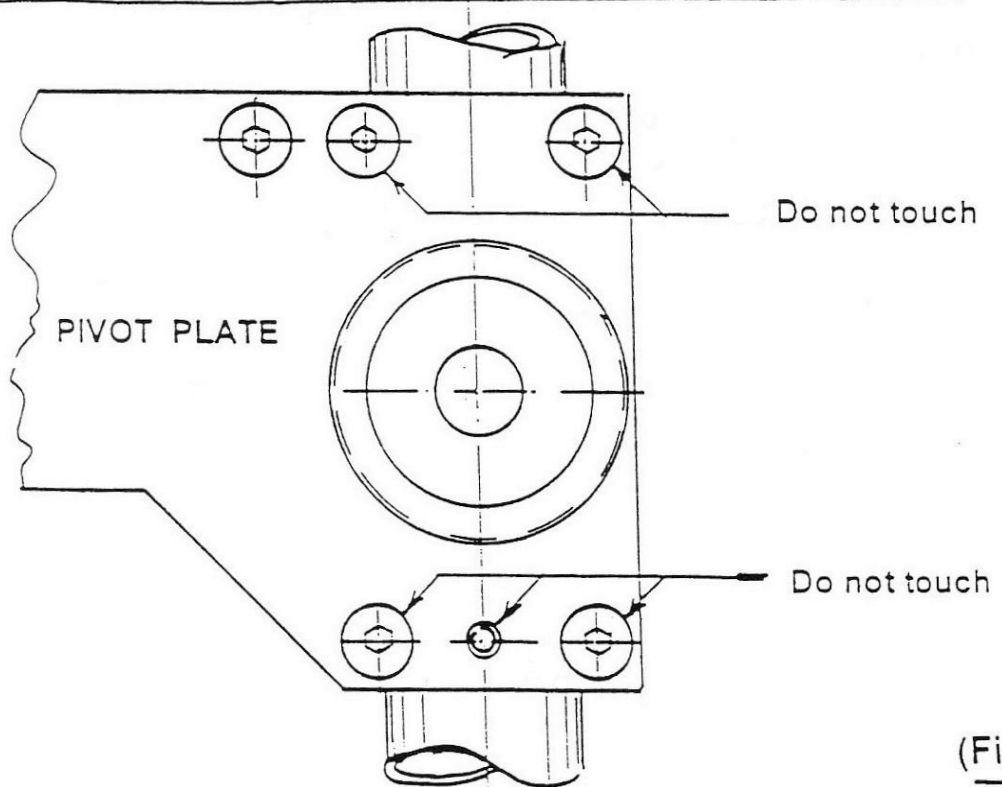
SPEED CONTROL BOX



(Fig. 5)



(Fig. 6)



(Fig. 7)

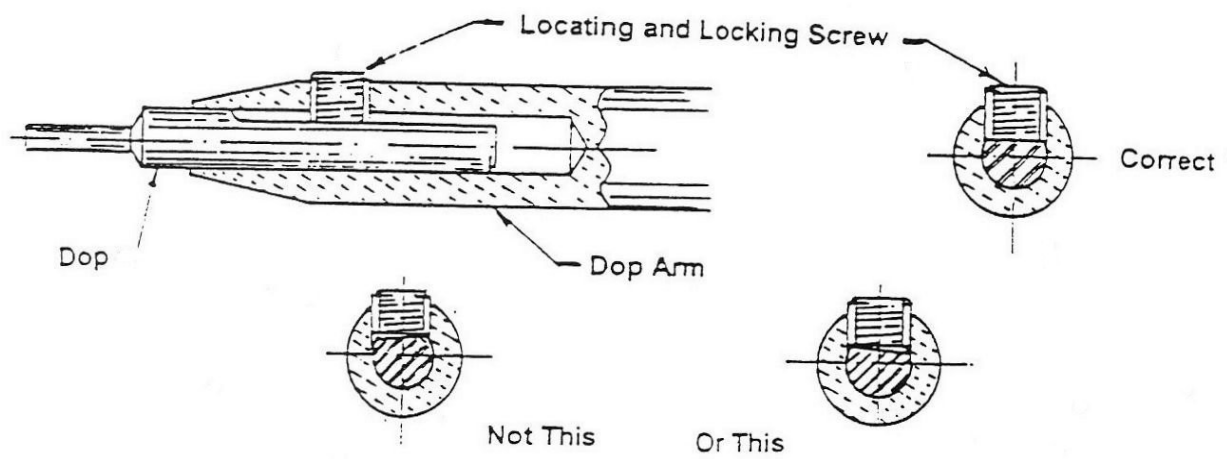


Fig. 8

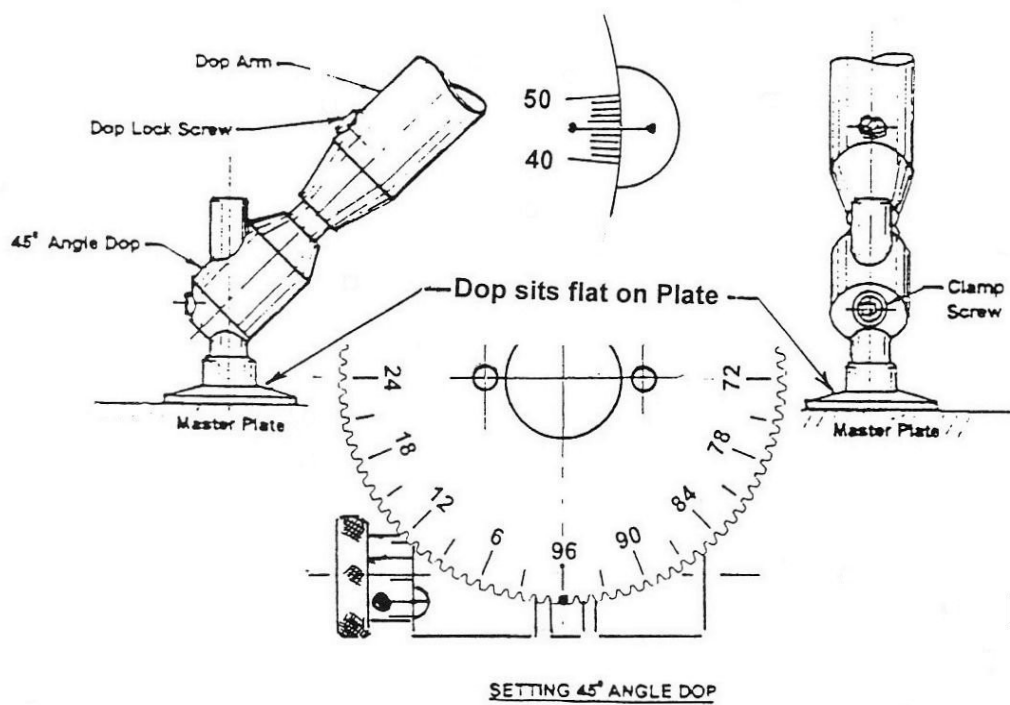
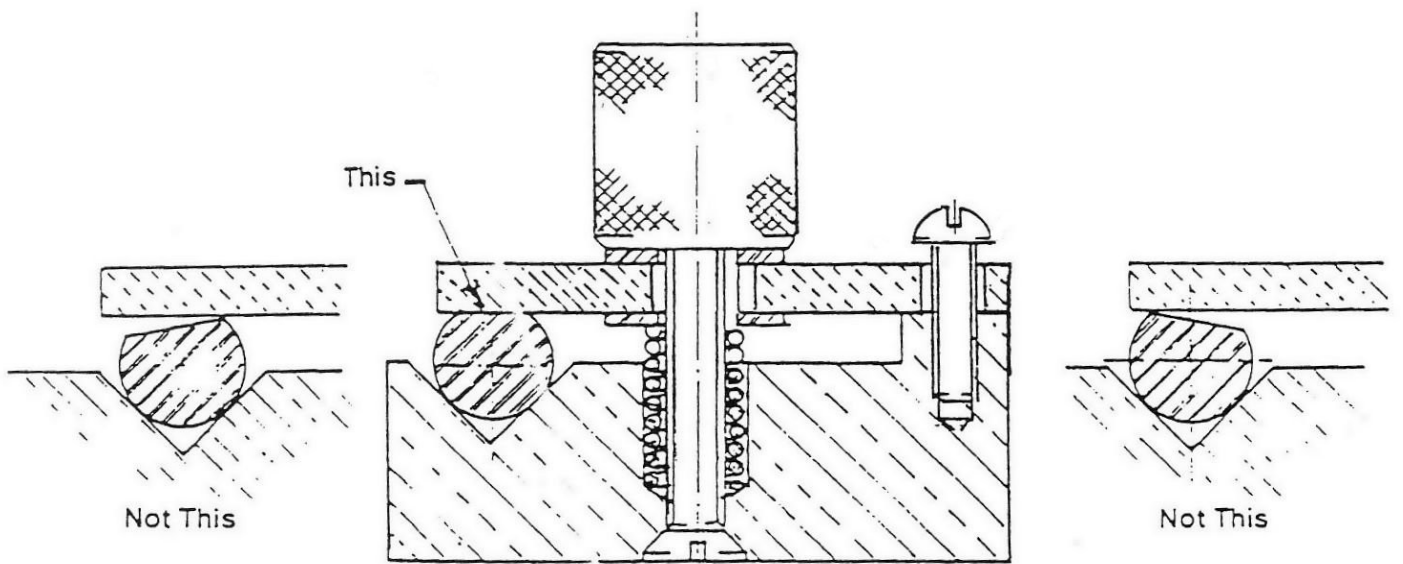


Fig. 9



TRANSFER BLOCK

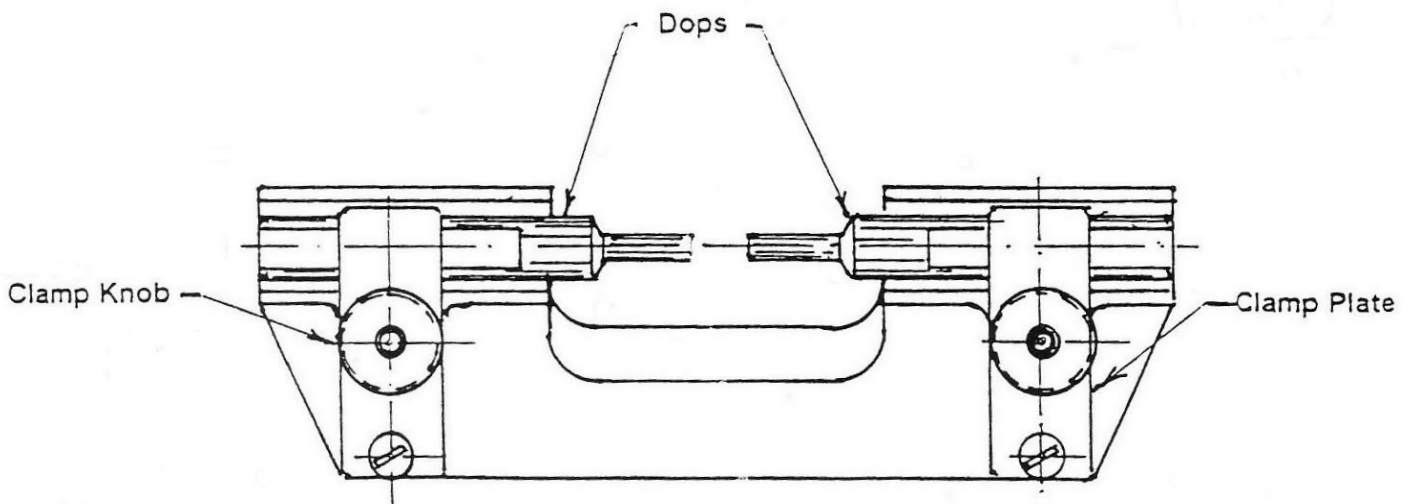
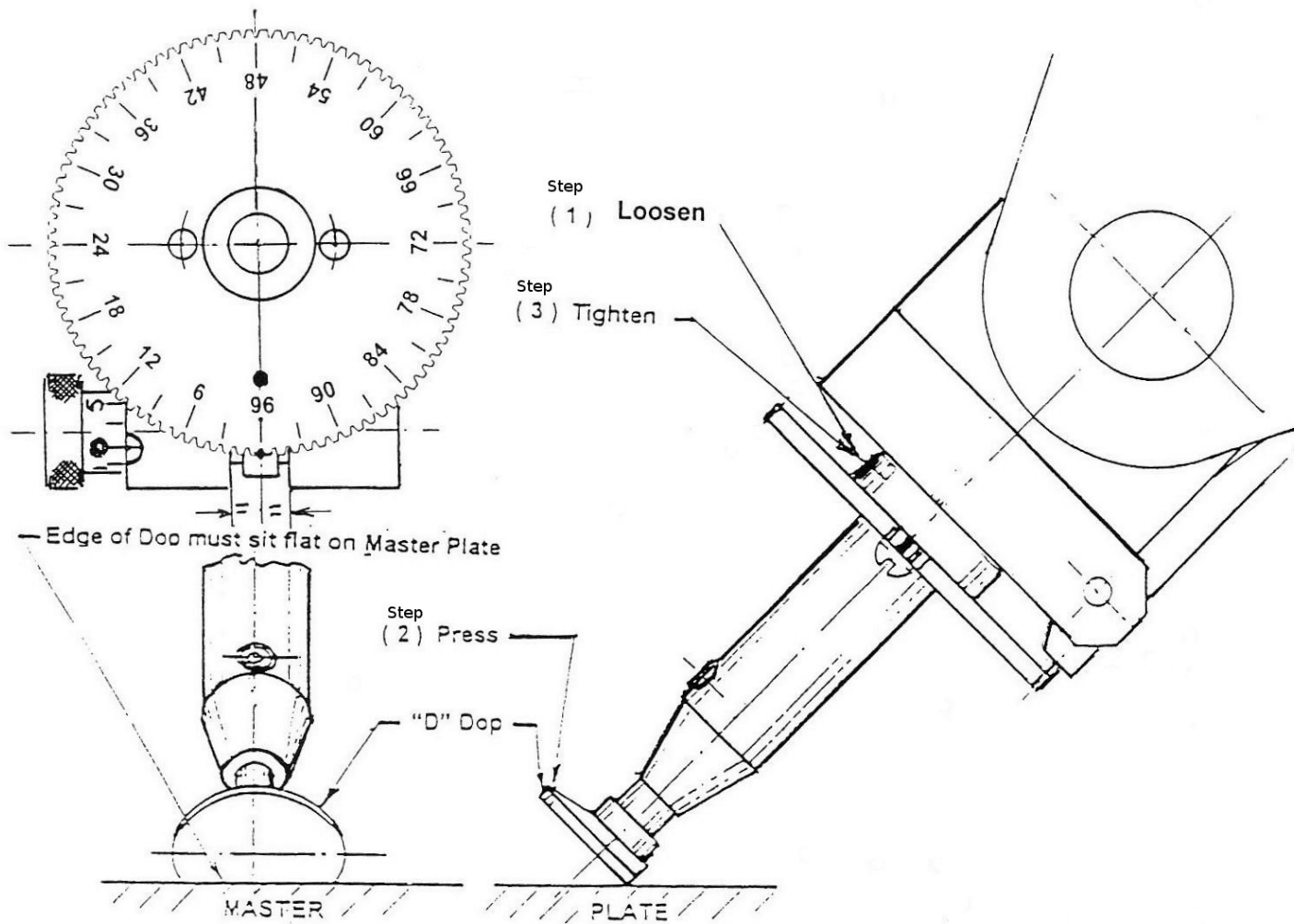
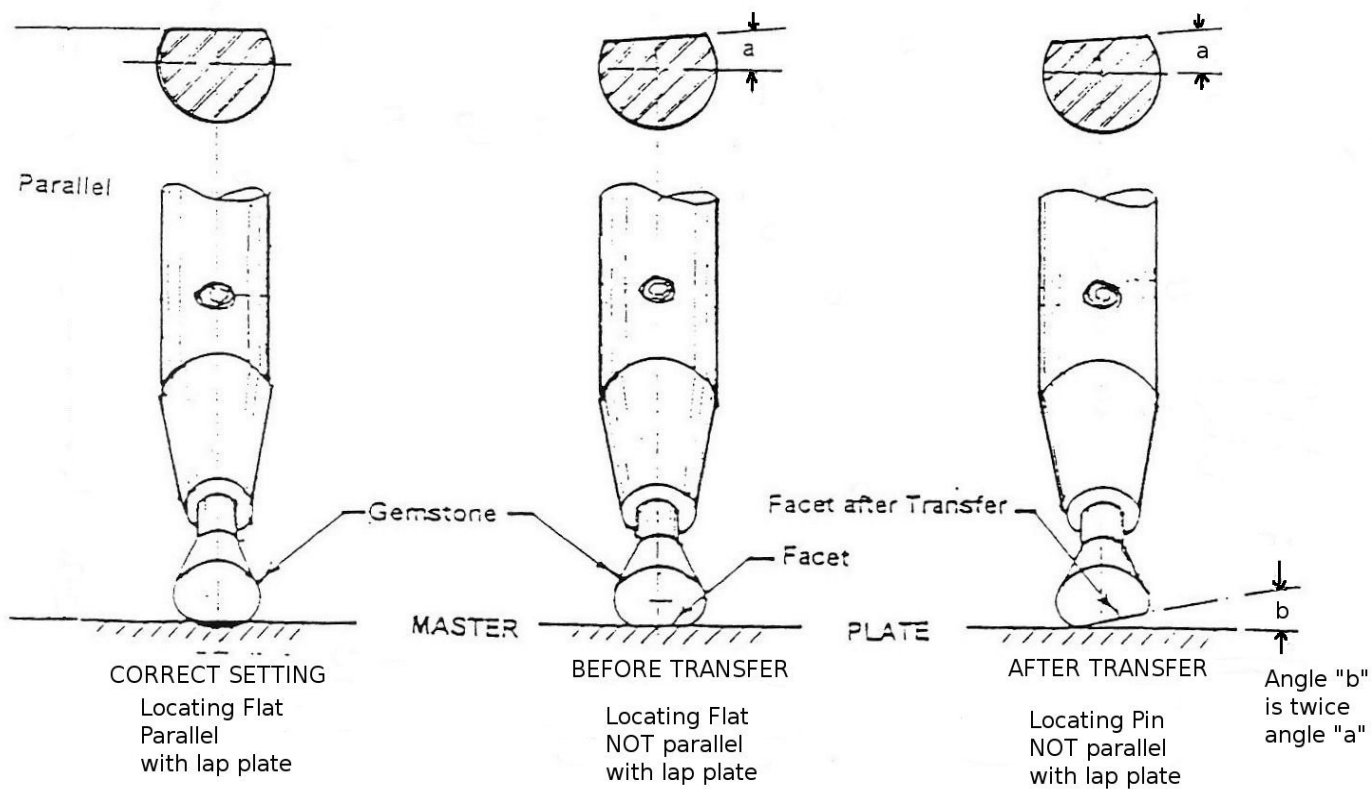


Fig. 10

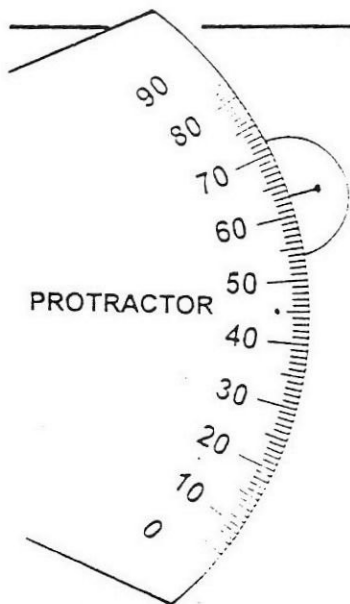
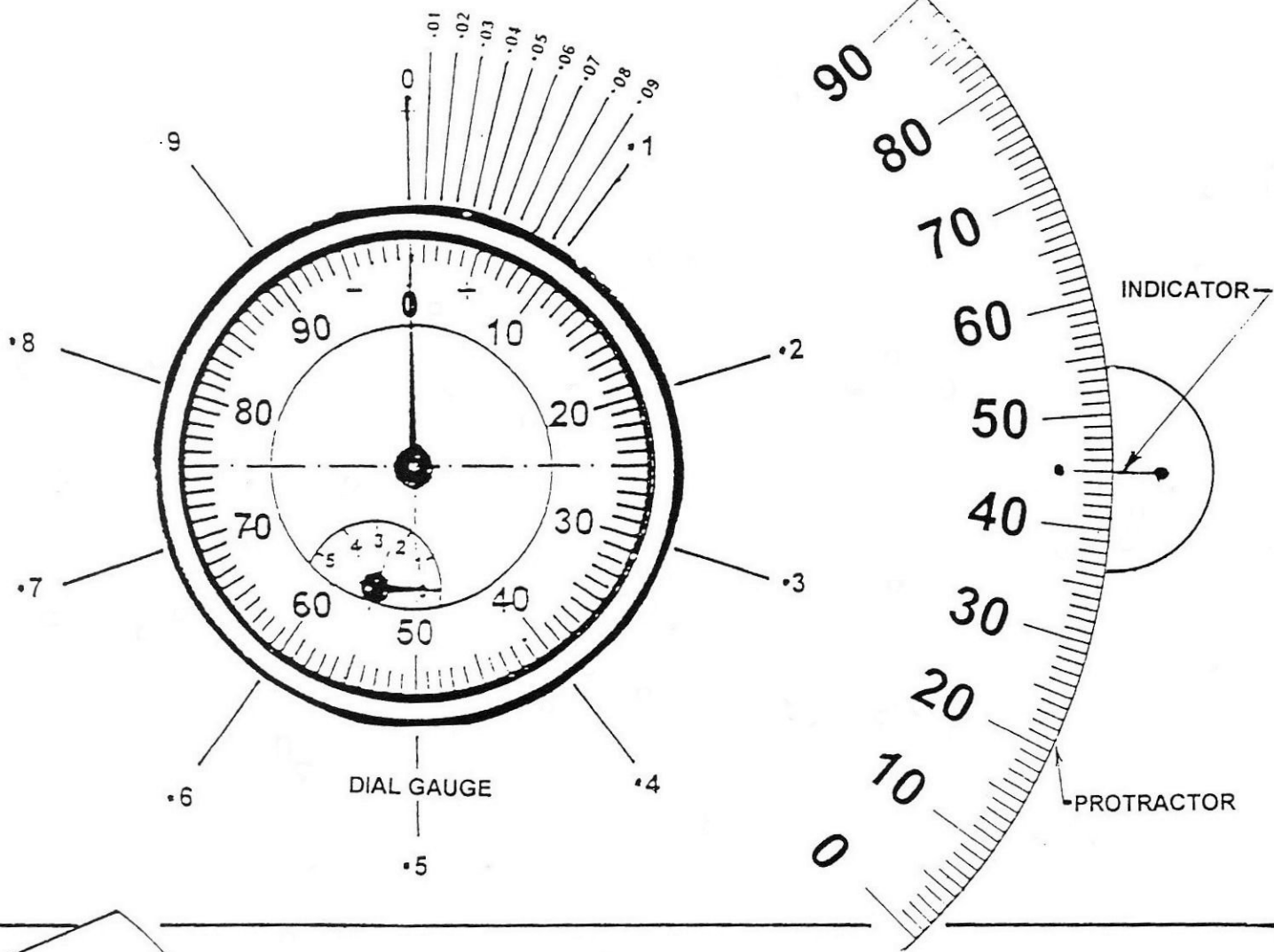


SETTING INDEX WHEEL and DOP ARM WITH MASTER PLATE



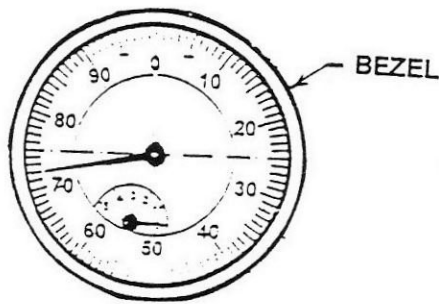
EFFECT OF LOCATING FLAT ON DOP NOT PARALLEL WITH LAP PLATE

FIG. 11

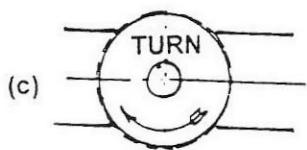


(a) PROTRACTOR SETTING AT 63°

SETTING ANGLE AT 63.72°

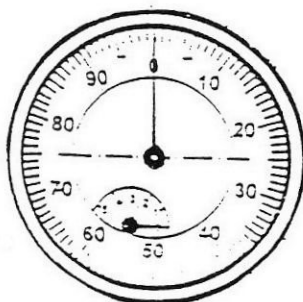


(b) GAUGE SETTING AT .72°

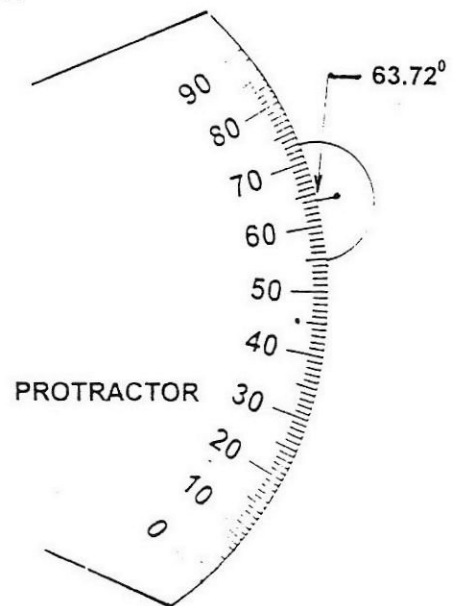


(c)

MICRO ANGLE ADJUSTMENT



(d) GAUGE ZEROED



ANGLE SETTING ON PROTRACTOR

(e)

FIG. 12

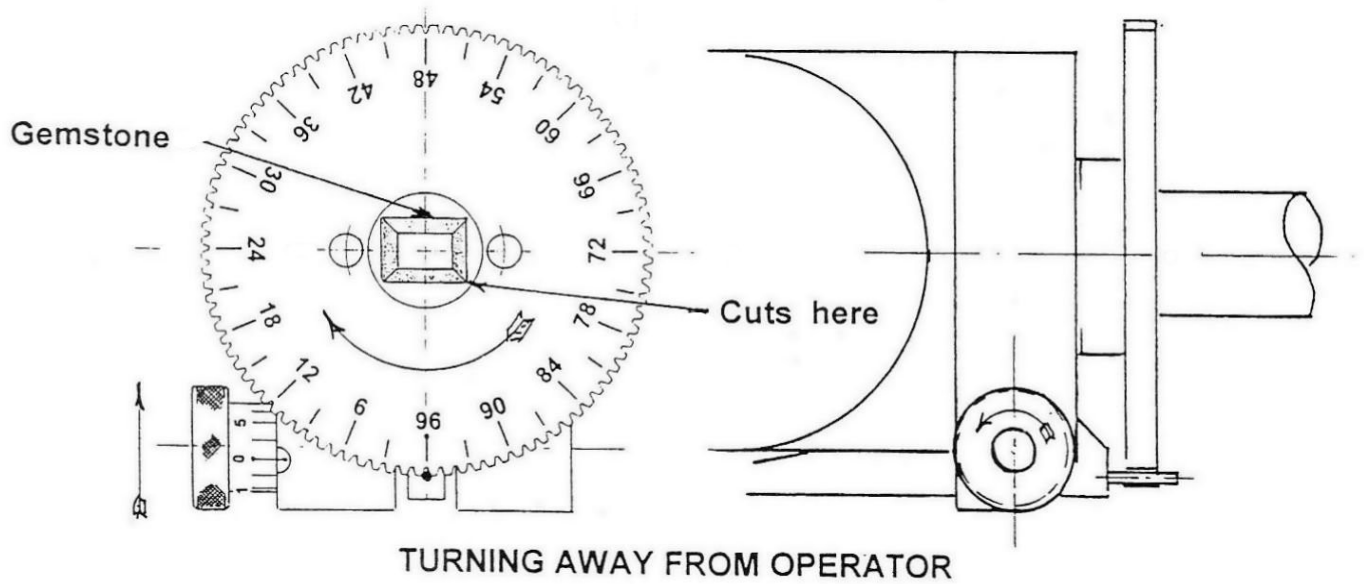
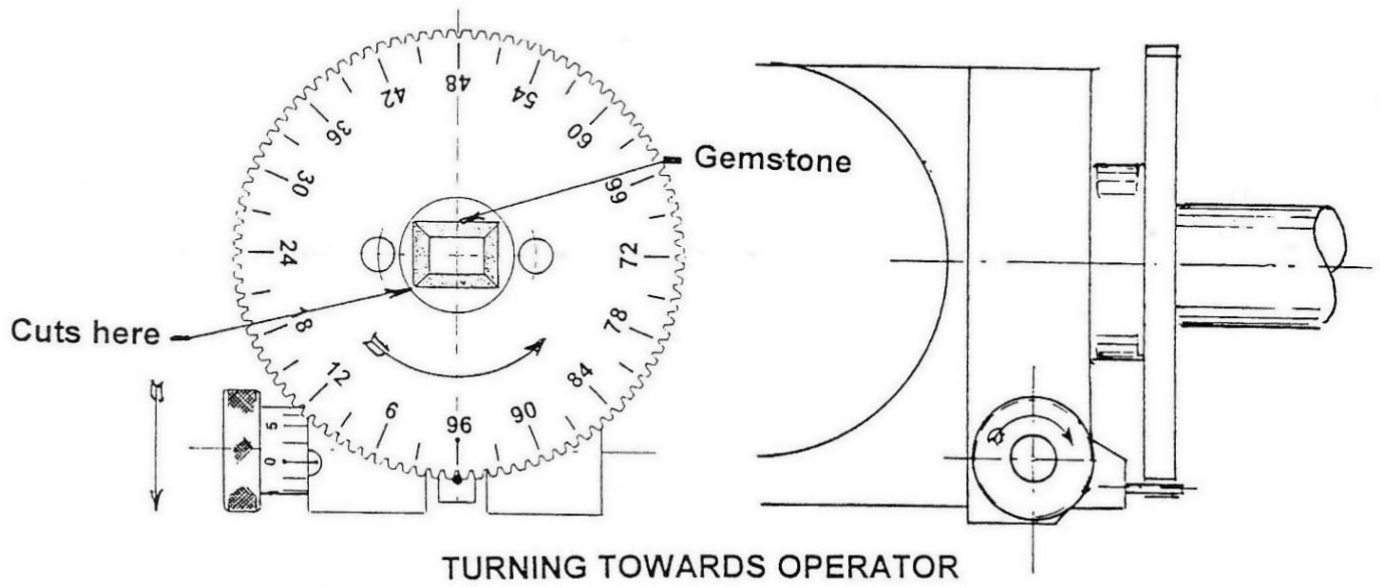


FIG. 13

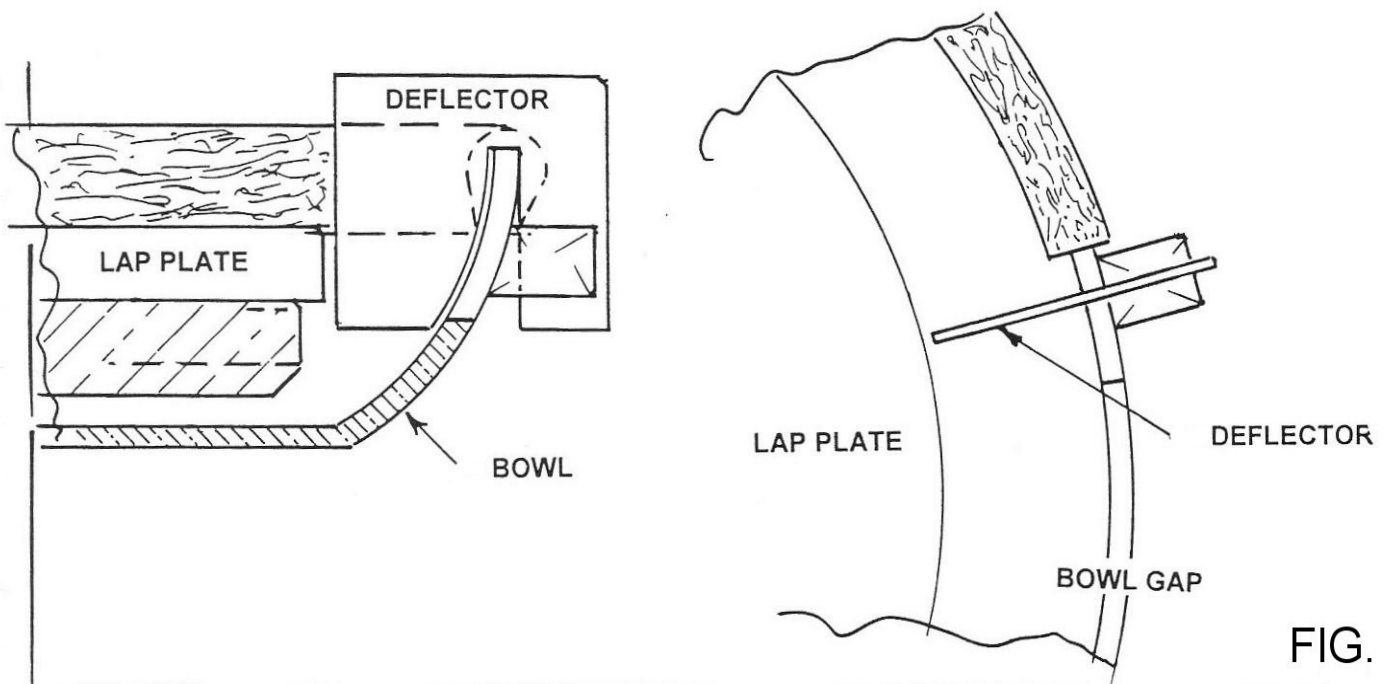


FIG. 14

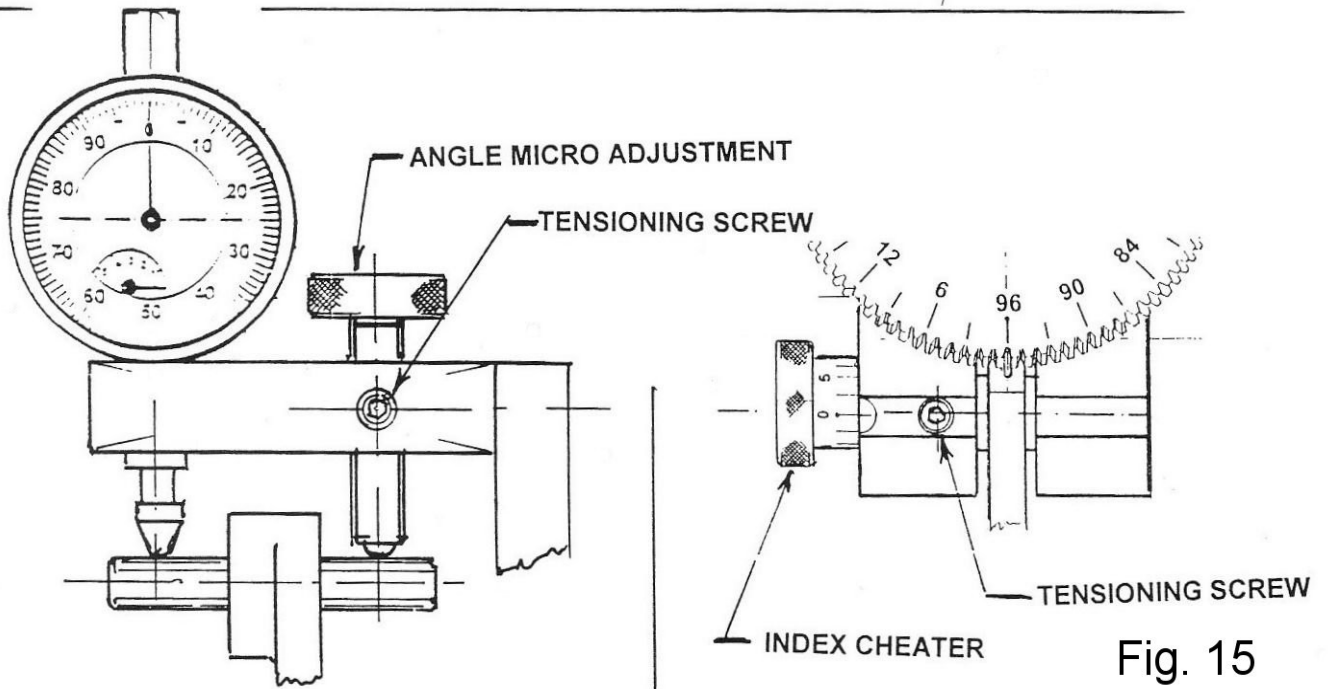


Fig. 15

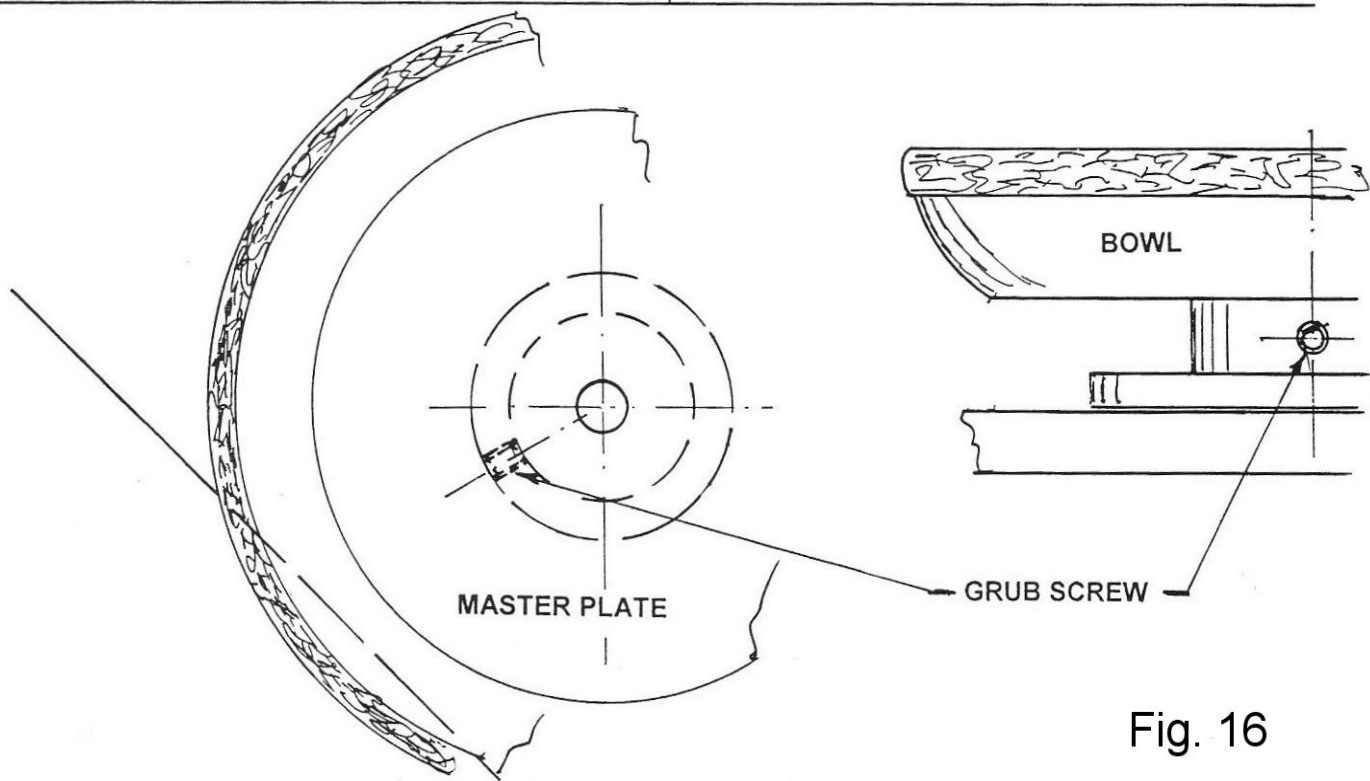


Fig. 16

**Proudly
Manufactured in Australia
From
Original
Laurie Hall design
by
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Intl. Ph. 617 4053 1474

Aust. Ph. 07 4053 1474

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