



NX

PROFILE GRINDER

INSTRUCTION MANUAL No. 4011

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PREFACE

IMPORTANT

IT IS OUR POLICY AND THAT OF OUR SUPPLIERS TO REVIEW CONSTANTLY THE DESIGN AND CAPACITY OF OUR PRODUCTS. WITH THIS IN MIND WE WOULD REMIND OUR CUSTOMERS THAT WHILE THE DIMENSIONS AND THE PERFORMANCE DATA CONTAINED HEREIN ARE CURRENT AT THE TIME OF GOING TO PRESS, IT IS POSSIBLE THAT, DUE TO THE INCORPORATION OF THE LATEST DEVELOPMENTS TO ENHANCE PERFORMANCE, DIMENSIONS AND SUPPLIES MAY VARY FROM THOSE ILLUSTRATED.

Should you have any questions regarding the use of the machine, please feel free to contact our Technical Design Department who will be willing to assist in any way.

Wadkin Leicester

Green Lane Works, Leicester LE5 4PF, England.
Telephone: 0116 2769111
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HEALTH AND SAFETY WARNINGS

THIS MACHINE CAN BE DANGEROUS IF IMPROPERLY USED

The safe operation of machinery requires constant alertness and close attention to the work in hand.

Carefully read the instruction manual before operating the machine.

Do not operate without all guards and covers in position.

Ensure that the machine is electrically earthed - grounded.

Remove and fasten loose articles of clothing - such as neckties etc, confine long hair.

Remove jewellery such as finger rings, watches, bracelets, etc.

Use safety face shield, goggles or glasses to protect eyes and utilize other personal safety equipment as required.

Stop machine before making adjustments or cleaning abrasive or steel dust from the working area.

Although the electric motors on the grinder are splashproof, they are NOT designed to withstand constant jets of water, therefore coolant hoses should be directed away from the motor and should not be used in cleaning down.

KEEP CLEAR UNTIL ROTATION HAS CEASED

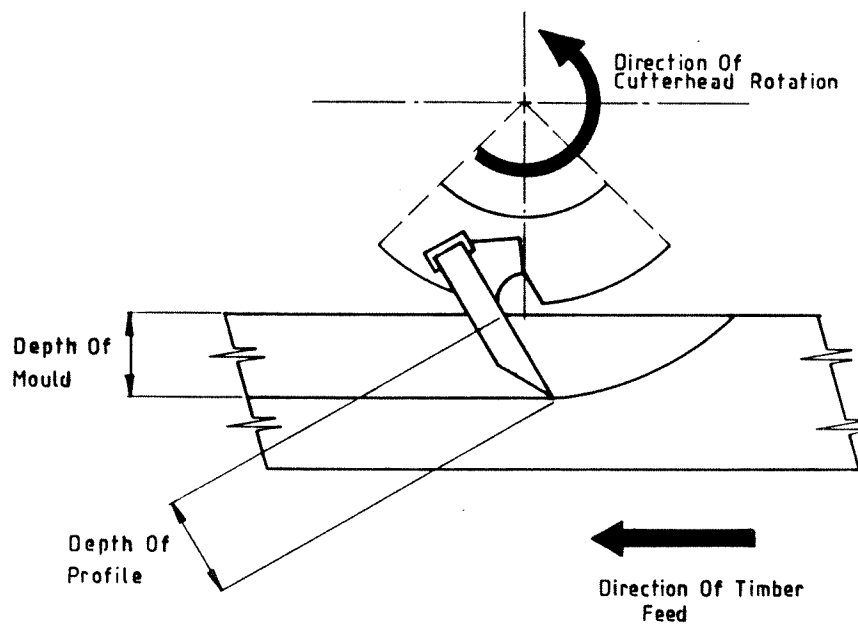
SECTION 1

General Description

The WADKIN profile grinders, models NX230 and NX300, are designed for the grinding of suitably shaped cutters which are required to machine a shape or profile onto a piece of timber. Their operation removes the 'hit and miss' of producing shaped or profiled cutters for use on any machine employing a rotary cutting action.

The grinding process is the principal method of sharpening the special steels used for moulding and profile cutters. The main purposes of cutter sharpening are to restore the cutting edge and to ensure the correct clearance behind the cutting edge. To maintain the correct cutting angle and clearance, machine grinding is essential. The process requires great care to ensure that the maximum working life is obtained from the cutters. Any carelessness will result, at the best, in impairing the efficiency of the cutting edge, and at the worst, in rendering the cutter knives useless.

The profile ground on a cutter is a geometrically developed shape of that profile which is to be machined onto the timber. This needs to be so, because, at the cutting point, the cutter is at an angle to the workpiece. The profile must therefore be elongated to compensate for the loss of depth when it is moved from a position of 90° to the workpiece.



Depth Of Mould Is LESS THAN Depth Of Profile

Figure 1:1

Therefore, if a cutter were made to a drawing of the finished component, the depth of a rebate on the drawing would become somewhat less on the finished article. This loss of depth obviously depends on the depth of mould, the cutting circle of the cutterhead, and the angle at which the cutters are set in the cutterhead (the cutting angle).

The blank cutters are set into the cutterhead prior to profile grinding, and the cutterhead mounted onto the NX grinder. A 'mirror image' template, made 1:1, ensures that all the cutters are not only exactly the same shape, but they are also in exactly the same position laterally, and as near as possible radially. This is achieved because the finished ground block containing 2, 4, 6, 8 or more knives is mounted onto the machine on which it is to be used, without further movement of the cutters.

On the NX grinder the cutterhead is rotated so that the cutter comes into contact with a fixed height rest, this ensures that the cutter is brought into the same position and angle as when it is cutting. This means that although the template is an exact 1:1 mirror image of the finished article, because the grinding occurs at the same angle at which it will cut on the machine, a 'developed' shape is actually ground onto the cutter, which automatically elongates the profile so that it produces the correct depth of mould on the finished article.

The NX profile ground cutters will immediately give a better finish on timber than hand ground and set cutters. This is because NX ground cutters, being ground from a master template, are all exactly the same shape. Also, as the cutters are mounted into the cutterhead prior to grinding, errors in side positioning and projection cannot occur. The better finish is achieved by each cutter now doing an equal share of work, whereas previously only one hand ground cutter was finishing and would leave a definite single knife wave pitch on the timber.

On NX ground cutters, because their profiles are so close together in shape, position and projection, the peaks of the single knife wave pitch are removed, so reducing the depth of the knife mark and thus creating a smoother feel on the timber surface.

A further advantage of the NX becomes apparent when re-grinding is necessary. When hand ground cutters require re-sharpening the cutters have to be removed from the cutterhead, re-ground by hand (which may lead to errors), then reset in the cutterhead (a further chance of error). - an operation which is inefficient and time consuming as well as leading to the possibility of altering the profile shape.

On the NX the cutters need not be removed from the cutterhead and the template ensures that the shape and position of all knives remain the same. Also, the time factor will be drastically reduced, with a guarantee that the profile shape will remain unaltered.

A point that should be highlighted is that the NX user can promote the NX as a selling feature to his own customers, as providing the original template is retained, he can guarantee the profile of any component will be the same no matter what period of time elapses between orders on special items. On stock items, this guarantee of profile shape can be a major advantage over competition using traditional methods.

Although less skill is required to profile grind by the application of the NX, it would always be imprudent to employ an operator without previous grinding knowledge or skills. However, once a template has been made correctly, with a little training and experience, a total stranger to the machine can produce the correct size and shape of the finished article - An almost impossible task if this was to be done by traditional hand grinding methods.

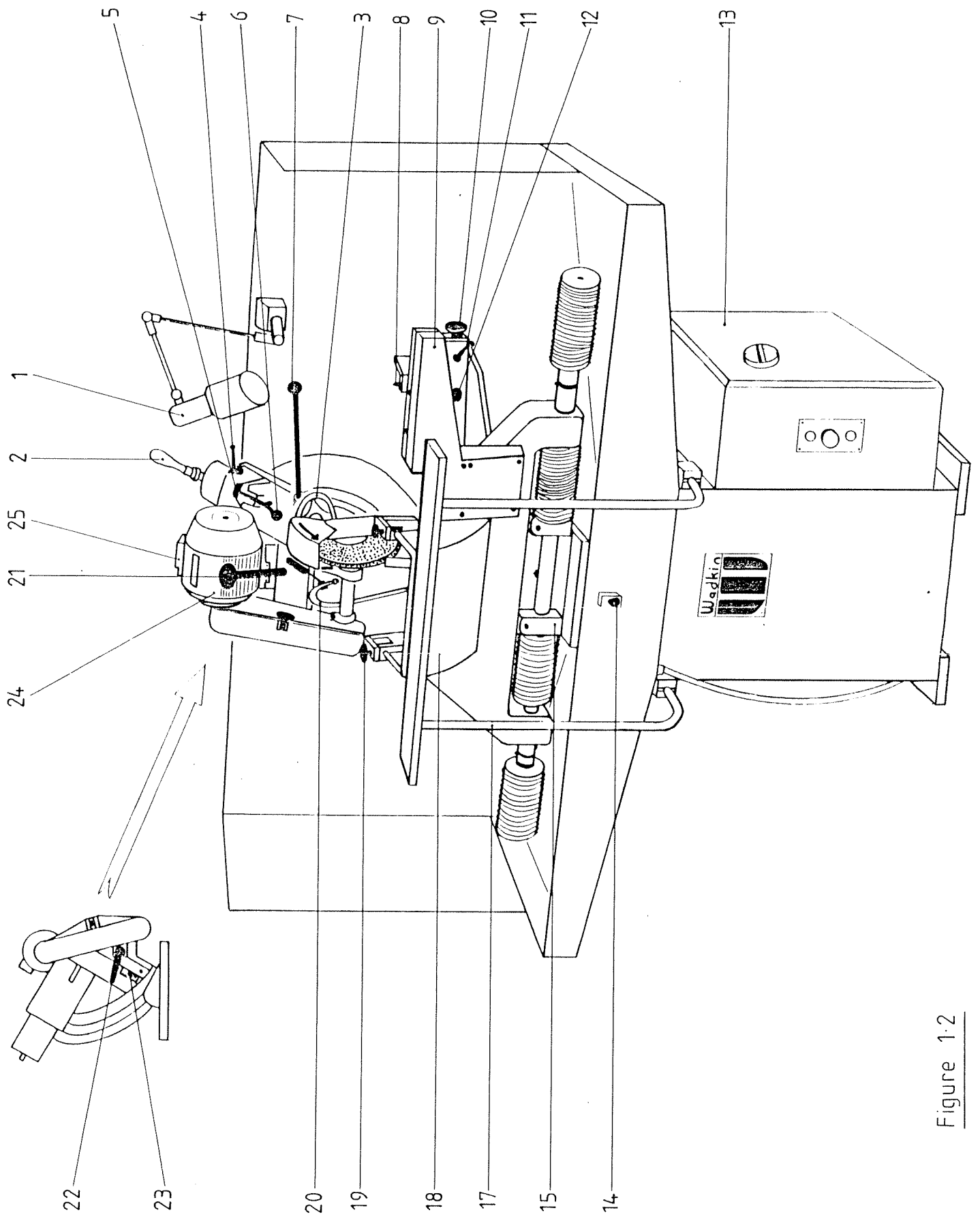


Figure 1-2

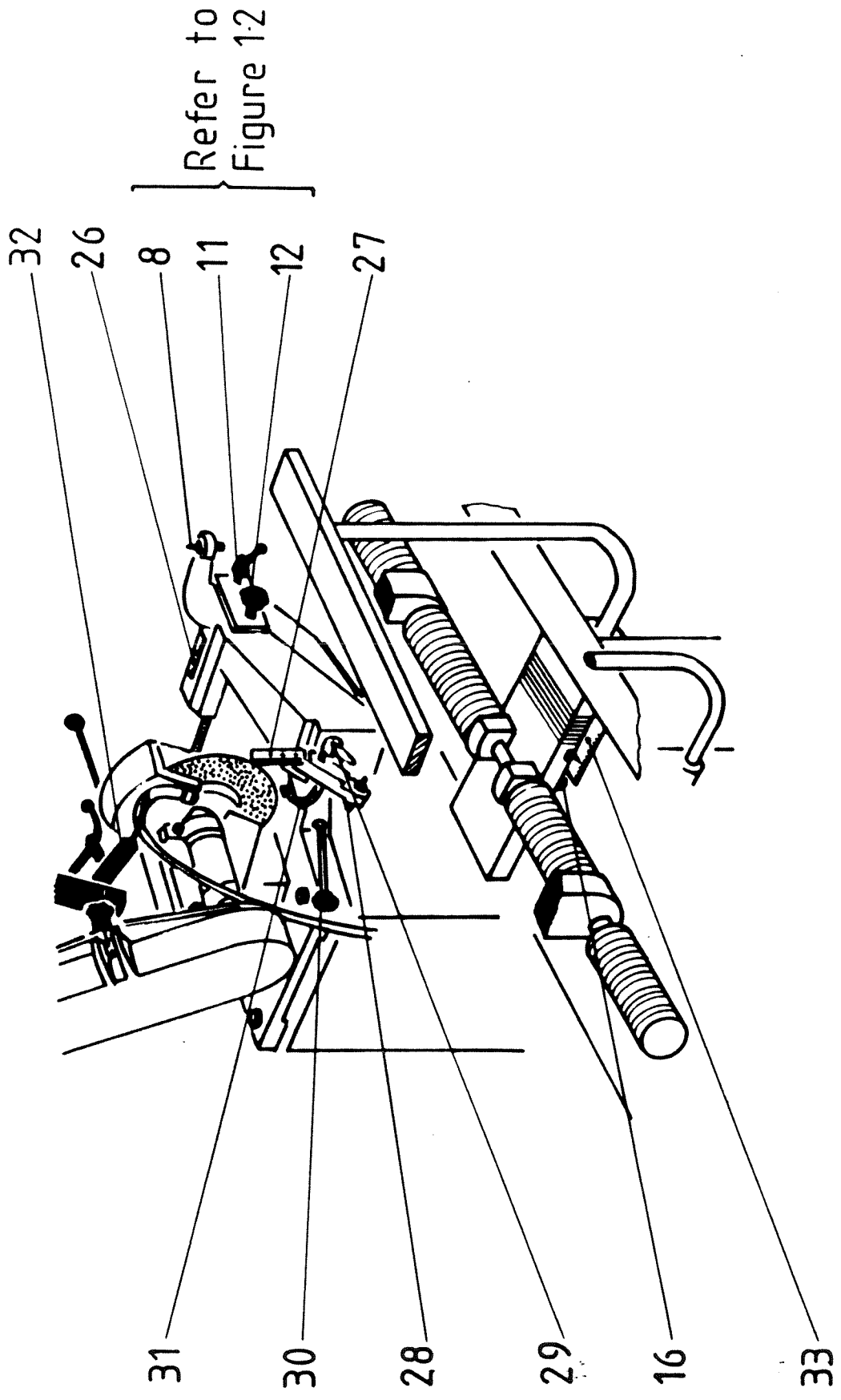


Figure 1.3

WALKIN PROFILE CUTTER GRINDING MACHINE - MODELS 110, 115,
120, 125

(REFER TO FIGURE 1.2)

- 1) Spot light
- 2) Crank handle for adjusting grinding wheel relative to dressing unit (COARSE FEED).
- 3) Handwheel for adjusting grinding wheel relative to dressing unit (FINE FEED).
- 4) Side clearance locking lever.
- 5) Index plate.
- 6) Index plunger.
- 7) Tilt handle.
- 8) Stylus.
- 9) Template holder.
- 10) Handwheel for lateral adjustment of stylus.
- 11) Locking lever for lateral adjustment of stylus.
- 12) Handwheel for cross traverse movement of stylus.
- 13) Electrical control cabinet.
- 14) Location point for carriage adjustment handle.
- 15) Carriage shaft support.

- 17) Adjustable arm rest.
- 18) Cutterhead carriage.
- 19) Cutterhead arbor clamp.
- 20) Coolant pipe.
- 21) Rise and fall adjustment handwheel.
- 22) Locking lever for rise and fall adjustment.
- 23) Calibrated scale for rise and fall adjustment.
- 24) Wheel head squirrel cage induction motor.
- 25) Electrical motor terminal box.

WADKIN PROFILE GRINDING MACHINE - MODELS NX 200
NX 300

(REFER TO FIGURE 1.3)

- 8) Stylus.
- 11) Locking lever for lateral adjustment of stylus.
- 12) Handwheel for cross traverse movement of stylus.
- 16) Carriage clamping nuts.
- 26) Calibrated scale for stylus cross traverse movement.
- 27) Tool rest.
- 28) Diamond wheel dresser.
- 29) Handle for locking dresser and tool rest.
- 30) Handwheel for locking dresser when employed in radial mode.
- 31) Calibrated scale for dresser when employed in radial mode.
- 32) Coolant pipe connection arm.
- 33) Calibrated scale for resetting carriage.

SECTION 2

TECHNICAL SPECIFICATION

Grinding wheel diameter	- 230mm	(9in.)
Grinding wheel width	- 5mm (4.7mm finished dressed)	
Grinding wheel bore	31.75mm	(1.25in.)
Maximum length of cutter profile		
Model 230	- 241mm	(9.5in.)
Model 300	- 310mm	(12.25in.)
Maximum diameter of cutting circle	- 250mm	(10in.)
Minimum diameter of cutting circle	- 100mm	(4in.)
Maximum depth of profile	- 30mm	(1.1875in.)
Output of grinding wheel motor	- 0.75KW	(1HP)
Output of cooling pump motor	- 0.14KW	(0.18HP)
Coolant tank capacity - max	- 22.7 litres at 102mm deep	(5 gallons at 4in deep)
Speed of grinding wheel		
a) pulley sheave (1)	- 2880 RPM	
b) pulley sheave (2)	- 2500 RPM	
Height	- 1600mm	(63in.)
Width	- 1460mm	(57in.)
Depth	- 1000mm	(39in.)
Weight		
Model 230	- 340kgs	(750lbs)
With magnetic cooling filter (optional extra)	- 380kgs	(840lbs)
Model 300	- 360kgs	(794lbs)
With magnetic cooling filter (optional extra)	- 400kgs	(882lbs)

SECTION 3

LIFTING AND TRANSPORTATION3.1 Unloading

Verify the weight of the machine (see technical specification). Ensure that all lifting equipment used is capable of lifting the weight as a minimum.

To lift the machine, place a suitable sling each side of the base under the suds tray and bring one end of each up behind the rear suds tray-guard and the other end of each up the front of the machine, ensuring that the slings pass on the inside of the wooden adjustable steady. It is very important to ensure that the lifting slings are suitably arranged to enable the machine to be lifted so that the body is parallel to the floor prior to its siting.

If lifting the machine using a fork lift, place the forks underneath the main body of the machine either side of the stand and above the electrical control cabinet. Carefully slide the forks into place and lift the machine, ensuring, as with lifting with a sling, that the body is parallel to the floor.

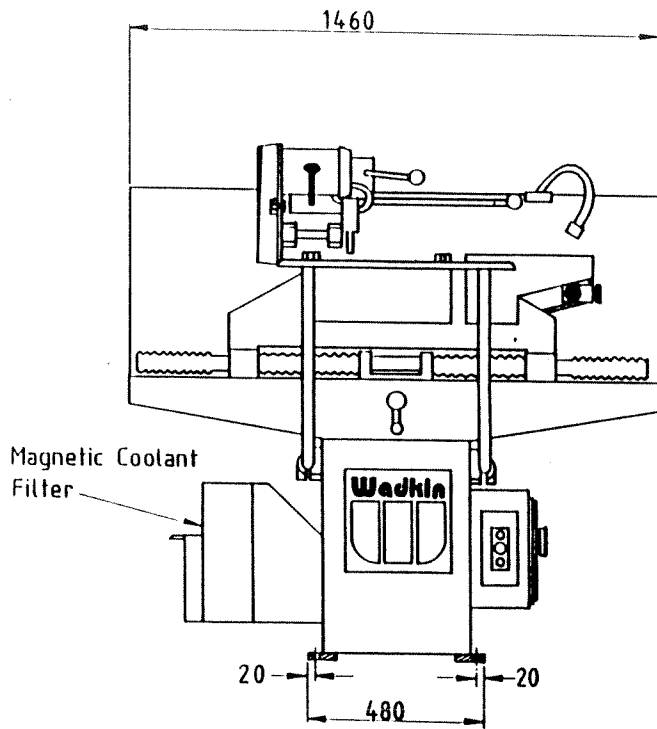
3.2 Moving

When moving the machine ensure that the carriage is secured so as it does not slide around during transit. The carriage may be securely tied to the arm rest to prevent any movement. In the process of moving, avoid jolting or vibrating the machine.

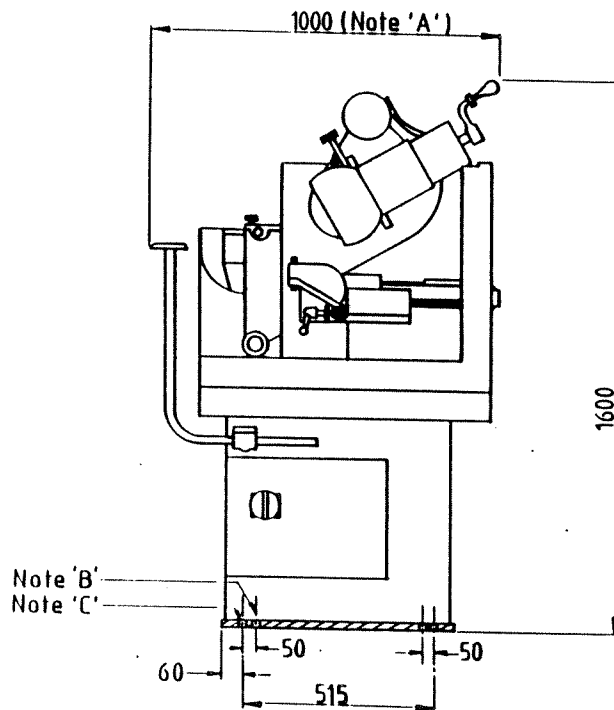
3.3 Cleaning

The machine is despatched from the works with all bright surfaces greased to prevent rusting. This must be carefully removed by applying a cloth damped with paraffin.

Foundation Plan



Front View



End View

(Machine With Right Hand
End Shield Removed)

Notes

- A:- Dimension Correct When Armrest In Used Position
- B:- 4 Holes Tapped M12 For Levelling Screws
- C:- 4 Holes ϕ 16 For Fixing Screws

Figure 3-1

SECTION 4

INSTALLATION

4.1 General

It is recommended that adequate room for routine maintenance is provided all round the machine. Consideration should also be given to operator comfort. The machine has been designed to suit average operator height, therefore :-

- a) short operators may require a duckboard to prevent excessive reaching.
- b) tall operators may require packing under the machine to prevent excessive bending.

4.2 Foundations

If the floor consists of 6 inch solid concrete no special foundations are required. Rag type holding down bolts may be used and working from the foundation plan 4 inch square holes should be cut in the concrete for these bolts. After careful levelling, the machine should be grouted in position with liquid cement.

A good wooden flooring is satisfactory and the machine should be carefully levelled before fixing and again after final fixing to ensure that no distortion has taken place.

4.3 Electrical supply

The customer is responsible for an adequate electrical supply. Details of the power requirements are provided on the machine nameplate. The electrical cabling between the motor and the attendant control gear has been carried out by WADKIN prior to despatch. It will only be necessary to connect the 3 phase power supply to the incoming terminals L1, L2 and L3 at the disconnect switch in the electrical control cabinet, situated at the right hand side looking from the front of the machine.

ENSURE THAT THE MACHINE IS CONNECTED SOLIDLY TO EARTH

- 1) Check that the electrical supply details on the machine nameplate correspond to the electrical supply available and select the size of the main cable to correspond to the current indicated on the machine nameplate.
- 2) Check that the fuses at the electrical supply distribution board are correct.
- 3) Check that all connections are sound.

IMPORTANT : ANY ELECTRICAL WORK SHOULD BE CARRIED OUT BY A COMPETENT ELECTRICIAN

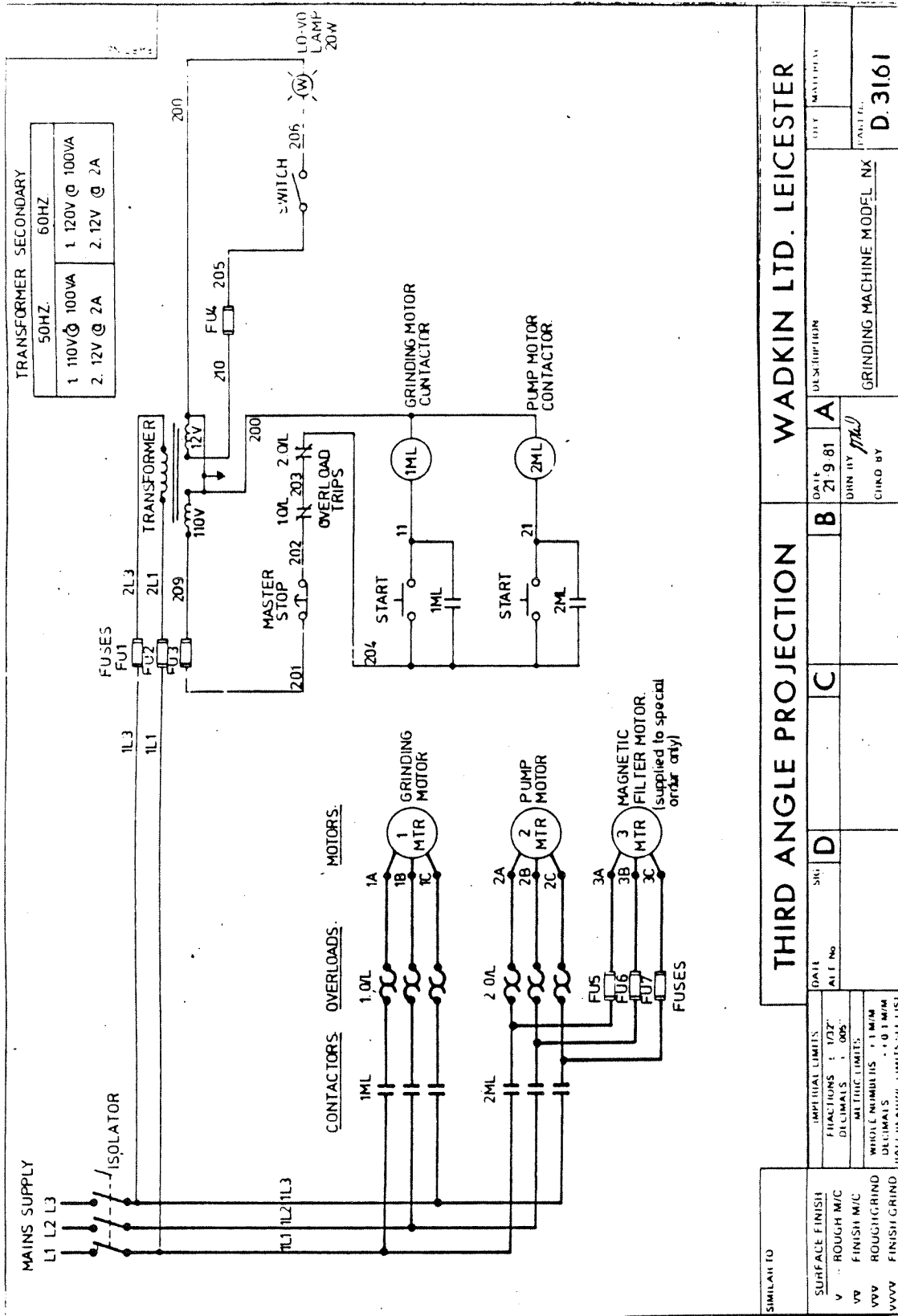


Figure 4.1

SECTION 5

GRINDING COOLANT FOR USE WITH PROFILE GRINDERS

The recommended grinding coolant to use and that which is supplied with the machine is WADKIN part number NXT 49 which has the following advantages :

- PERFORMANCE - outstanding bacterial resistance, excellent corrosion resistance, good detergency, settles fines rapidly.
- ECONOMIC - longer life solution, less maintenance, longer tool and wheel wear.
- SAFETY - excellent skin irritation tolerance, no bad smells, non-toxic.
- ENVIRONMENT - no nitrate, no toxic chemicals, fewer dumpings.

5.1 GRINDING FLUID DATA

NXT 49 is a semi-synthetic machining and grinding compound that has been designed for use on both ferrous and non-ferrous metals. Solutions of NXT 49 offer excellent cut rates, fines settling and rust protection. Solution life is outstanding, with cut rates maintained at a high level for an extended period of time. When diluted NXT 49 is a translucent solution allowing good visibility.

A) ECONOMIC BENEFITS

1. settles fines rapidly, maintaining clean solutions and fast cut rates.
2. maintains high cut rates for extended periods of time, extending the time between clean outs.

B) PERFORMANCE BENEFITS

1. ensures good performance for light to medium duty operations.
2. provides excellent lubricity, promoting good quality finish and smooth machine operation.
3. has excellent detergency to keep grinding wheels clean and cut rates high.
4. provides good rust protection on finished parts.

C) ENVIRONMENTAL BENEFITS

1. free of nitrites, phenols and heavy metals.
2. not strongly alkaline or acidic.

5.2 PHYSICAL AND CHEMICAL PROPERTIES

appearance: concentrate.....amber, opaque, medium
viscosity liquid.
diluted.....translucent, odourless.
pH diluted solution....9.3
@ 5%
solubility.....suitable for hard and
soft water.
S.G.....1.007

5.3 STORAGE

1. indoor storage is preferred.
2. if frozen, allow NXT 49 to thaw, then mix thoroughly.
3. first in, first out stock rotation is suggested.

5.4 SAFETY AND HANDLING

Avoid contact with eyes and wash thoroughly after handling. In case of contact, flush eyes immediately with plenty of water for at least 15 minutes. Avoid excessive contact with skin, wash with copious quantities of water.

5.5 SPILLAGE AND WASTE DISPOSAL

NXT 49 is non toxic and biodegradeable. Spillages may be washed away with water to a suitable drain. Normal waste disposal notifications should be made when disposing of NXT 49 concentrate and dirty used emulsion. Remember that long life means fewer dumpings. Use a barrier cream as normal practice.

5.6 APPLICATION RECOMMENDATIONS

1. When using NXT 49 it should be mixed with water to the dilution of 2% by volume (ie. 50 to 1).
2. If it is found necessary to 'top up' the coolant tank at a later stage, allowance should be made for water evaporation. This is necessary to prevent a gradual increase in fluid concentration. An approximate dilution of 1% by volume when 'topping up' will normally achieve this.
3. NXT 49 can be mixed either directly in the coolant tank or in a separate container.
4. To ensure that the mixture of coolant is at the correct dilution a refractometer should be used. Available from WADKIN, part number T3049102.

5. As a general guide, every 4 to 6 months the coolant should be drained and the system cleansed with an anti-bacterial cleaning fluid before replacing with fresh coolant.
6. A barrier and cleansing cream should be used by the operator for Health and Safety reasons.
7. Different types of cutting fluid concentrate should not be mixed together. When changing supply of the concentrate the machine should be thoroughly drained and cleaned before replacing with new concentrate.

SECTION 6

WADKIN MAINTENANCE CLEANER - NXT 486.1 Description

Maintenance cleaner NXT 48 is a liquid cleaner containing a strong bacteriacide, designed primarily for the removal of coolant residue and tramp oil from lubricant sumps.

Maintenance Cleaner NXT 48 may be added directly to the lubricant bath, or diluted in water to flush an empty system. It should be circulated for a minimum of 2 hours and ideally 4-6 hours.

Maintenance cleaner NXT 48 works efficiently at room temperature. Concentration of use depends on condition of sump and time available for circulation.

6.2 PHYSICAL AND CHEMICAL DATA

colour.....	clear, amber liquid
odour.....	mild detergent
pH (concentrate).....	8.8
specific gravity.....	1.02

6.3 TYPICAL USE CONDITIONS

concentration.....	2-10 % by volume
temperature.....	ambient to 60°C
circulation time.....	2-6 hours

6.4 STORAGE

- 1) indoor storage is recommended
- 2) container should be covered at all times
- 3) first in, first out stock rotation is suggested

6.5 SAFETY AND HANDLING

Maintenance Cleaner NXT 48 is an alkaline detergent cleaner and contains a strong bacteriacide; it causes irritation to skin and eyes and so contact should be avoided and suitable protective gloves and goggles worn.

In case of contact with skin, flush with copious quantities of fresh water for 15 minutes and if irritation persists SEEK MEDICAL ATTENTION.

In case of contact with eyes, flush with copious quantities of fresh water and SEEK MEDICAL ATTENTION.

IMPORTANT NOTES

Grinding fluid - part number NXT 49; anti-bacterial cleaning fluid - part number NXT 48; and Refractometer - part number T3049102; can all be obtained from WADKIN.

If it is desired to use a cutting fluid other than NXT 49 and purchase from elsewhere, then you should strictly follow the manufacturers recommendations.

WADKIN TOOLING reserve the right to change the type of cutting fluid to our customers at any time. However, any changes of supply will be notified with the delivery.

SECTION 7

PROFILE GRINDING THEORY

The basic objective of profile grinding is the accurate reproduction of cutter knives. The method used on the NX is that of template and stylus, similar to that commonly employed in key cutting. The template matches the form to be cut onto the knife and the stylus matches the form of the wheel. Wheel and cutters are connected in parallel with the template and stylus, therefore the action of one is copied by the action of the other. Good reproduction is therefore dependent upon the accuracy of the template and an accurate matching of grinding wheel form to the stylus.

A third factor is brought into play by the cutting angle. If the cutting angle was 0° , the cutter would be ground in the horizontal plane and the finished profile would match the template. However, most cutterheads have a cutting angle of between 15° and 45° . This necessitates the use of the cutter rest, to allow rotation of the cutterhead whilst grinding. If the cutting action of a shaped cutter is examined, it will be observed that the outer cutting edge reaches the maximum depth of cut before the inner and that the maximum depth of cut for both edges occurs when the edge passes a line drawn through the horizontal plane of the cutterhead. Similarly the cutter rest ensures that each successive edge ground is in the same plane as the template. Theoretically this means that the ground edge and the cutter rest should be at the same point and horizontally level with the centreline of the cutterhead. However, for practical considerations, there should be a gap of 0.5mm between the dressed wheel and the cutter rest, but the bigger the gap, the greater the inaccuracy. Similarly, deviation in the height of the cutter rest creates inaccuracies in depth. It is therefore important to keep the cutter rest in good condition and to replace it when worn.

On the NX profile grinder the cutter rocks on the rest directly in front of the grinding wheel so as to produce the same cutting angles as when moulding. Through this movement the true cutter profile is developed out automatically by the grinder so manual cutter development is unnecessary and the template may be made and checked against a full-size drawing or mould sample.

The NX profile grinder repeats precisely all pre-set main and side clearance angles regardless of wheel wear. The moulder cutters are ground to profile whilst they are already mounted onto their cutterhead and the whole assembly is transferred to the moulder. The cutters will not need balancing nor will any adjustments to their setting be required after grinding. When the cutters lose their edge the complete cutterhead is again fitted to the grinder and the original template used to regrind exactly the same profile.

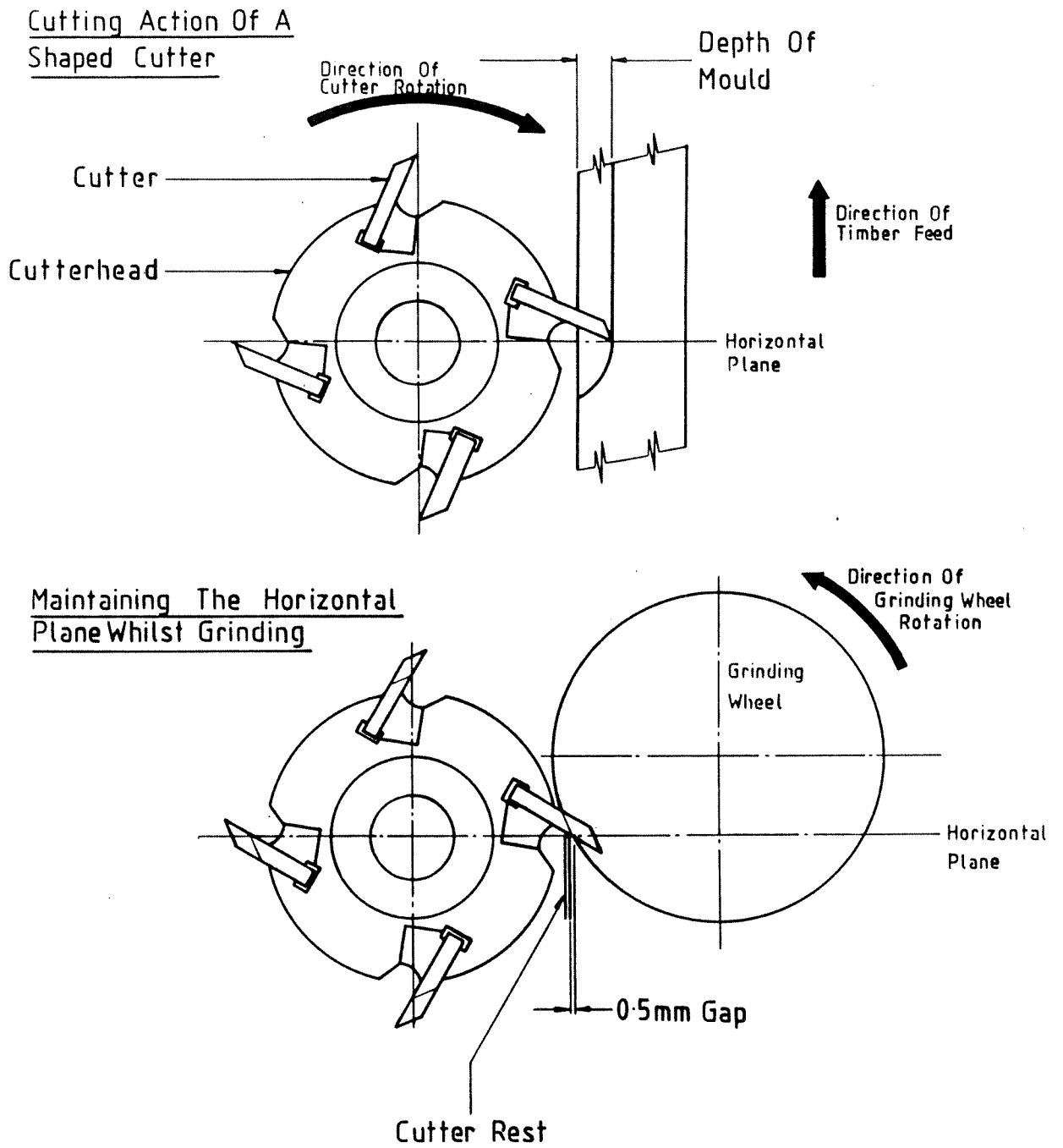


Figure 7-1

SECTION 8

OPERATING INSTRUCTIONS8.1 General Information

The NX profile grinders have a floating carriage which is used to support both the cutterhead on a free rotating arbor, together with the template. Mounted onto the machine base is the cutter rest, and immediately behind the cutter rest is the grinding wheel. The stylus is mounted onto the machine frame opposite the template and may be positioned both width-ways and for feed-cut control. In grinding, the cutter is supported on the cutter rest whilst the carriage is moved.

8.2 Safety

The safe operation of machinery requires constant alertness and close attention to the work in hand.

READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE OPERATING THE MACHINE

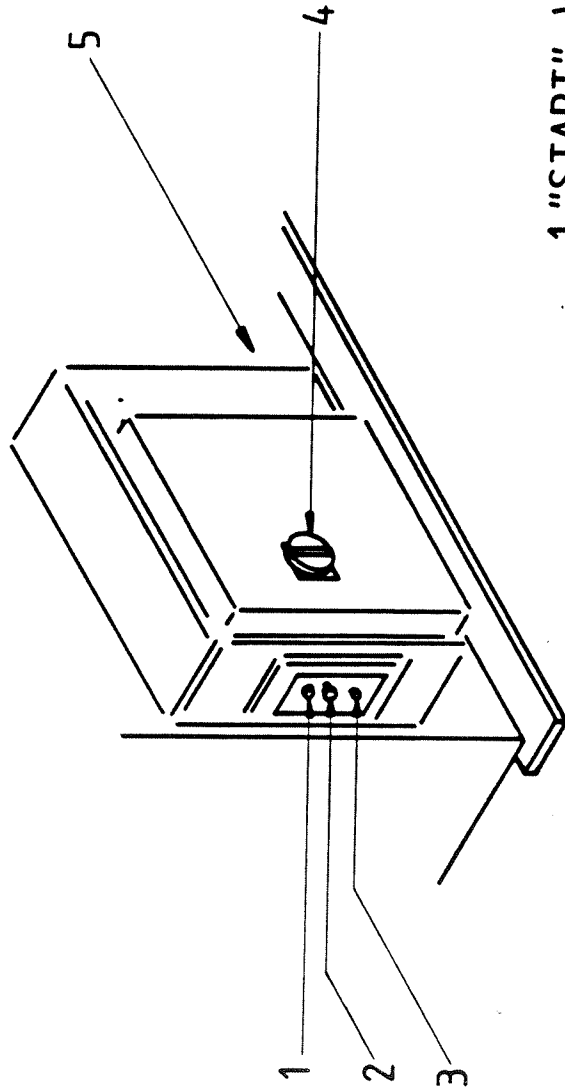
It is recommended that personnel involved with the machine are acquainted with the Woodworking Machines Regulations 1974 and also Booklet Number 41 'Safety In The Use Of Woodworking Machines', issued by the Department Of Employment and available from Her Majesty's Stationary Office. Also Code Of Practice 'Safeguarding Woodworking Machines' Part 1 BS6854.

Personnel involved with the use of grinding wheels should also be acquainted with the Abrasive Industries Association leaflets "Safety In The Use Of Abrasive Wheels (General)" and "DO'S and DONT'S - Safety Guide For Grinding Wheel Users". Also the Health And Safety Series Booklet HS(G)17, FEPA Safety Code 12-GB-1987 and HSE Guidance Book Note PM22.

Before operating the machine the operator should be conversant with the electrical control buttons, lock taps and grinding and safety procedures. Ensure that the floor around the machine is free from scrap, sawdust and oil or anything else that is likely to cause tripping or slipping. Safety footwear should be worn. In addition loose clothing and long hair should be fastened back and jewellery removed when it is likely to cause a hazard. No grinding should ever be undertaken without protective eyewear, or without the appropriate guards in position.

Adjustments should be made to the steady, so that the operator can assume a comfortable working position. Finally, ensure that the proper hand tools and work pieces are conveniently placed to prevent loss of concentration or hurried actions.

Electrical Control Cabinet



- 1. "START" Wheel Head Motor
- 2. Master "STOP"
- 3. "START" Coolant Pump Motor
- 4. ISOLATOR Switch
- 5. Electric Mains Conduit Entry Hole

Figure 8.1

SECTION 8.3

USE OF GRINDING WHEELS

SECTION 8.3.1

GRINDING WHEEL SAFETY AND MOUNTING

NO PERSON SHALL MOUNT ANY GRINDING WHEEL UNLESS HE HAS BEEN TRAINED AND APPOINTED IN ACCORDANCE WITH THE ABRASIVE WHEELS REGULATIONS 1970 No. 535 (REGULATION 9).

It is a statutory requirement that the person who mounts grinding wheels onto the grinding machine shall be a trained and competent person appointed by the factory occupier, and whose name must be registered in an appropriate register. Before mounting, the wheel should be closely inspected for any signs of damage (eg. chips, cracks or discolouration) which may have occurred in storage, or in transit. The 'Ring Test' should be carried out in a place where the 'ring' can be easily heard.

8.3.1.1 THE RING TEST

The ring test depends on the fact that the damping characteristics of a cracked wheel alters the sound emitted when a wheel is lightly tapped. It is subject to interpretation by the operator and is primarily applicable to vitrified bonded wheels. To perform the ring test, wheels should be tapped gently with a light non-metallic implement such as the handle of a screwdriver.

Tap the wheel approximately 45° each side of the vertical centre line and approximately 1 or 2 inches from the periphery, then rotate the wheel 45° and repeat the test.

A sound, undamaged, wheel will give a clear tune. If cracked, there will be a dead sound and not a clear ring, and the wheel must NOT be used.

8.3.1.2 MOUNTING THE WHEEL

To remove the wheel cover:

- 1) Loosen the wing nut which retains the guard in position.
- 2) Slide the guard fully forward.
- 3) Remove the two retaining screws.
- 4) The cover may now be easily removed.

Open the drive belt cover and use a peg spanner to hold the spindle while the lock nut, used to hold the grinding wheel in position, is loosened. The nut, washer and outer flange may now be removed.

After selecting the required wheel, wipe the spindle clean, ensure that the bore seats firmly onto the shaft and that the maximum recommended speed of the wheel exceeds the range of the machine. Fit the grinding wheel onto the spindle. The wheel requires soft card washers (blotters) to be sandwiched between the wheel and the wheel flanges. These ensure that the tightening stresses are evenly distributed around the inner and outer flanges, prevent slipping at lower clamping pressures and reduce wear on the flanges. Add the outer flange, washer and finally the locknut. When the assembly is seated firmly tighten the locknut (Any excessive clamping of the locknut should be avoided). Close the drive belt cover and fasten into position.

Caution

A newly mounted wheel and a wheel being re-mounted, should run free for a short period (1 minute is recommended) before it is used and everyone should stand clear. Note: A remount should always be treated as a new wheel.

IMPORTANT

SHOULD A WHEEL DISINTEGRATE ALWAYS CAREFULLY EXAMINE THE WHEEL SPINDLE, THE GUARDS AND FLANGES TO ENSURE THAT THEY ARE NOT DAMAGED.

Correctly Mounted Grinding Wheel

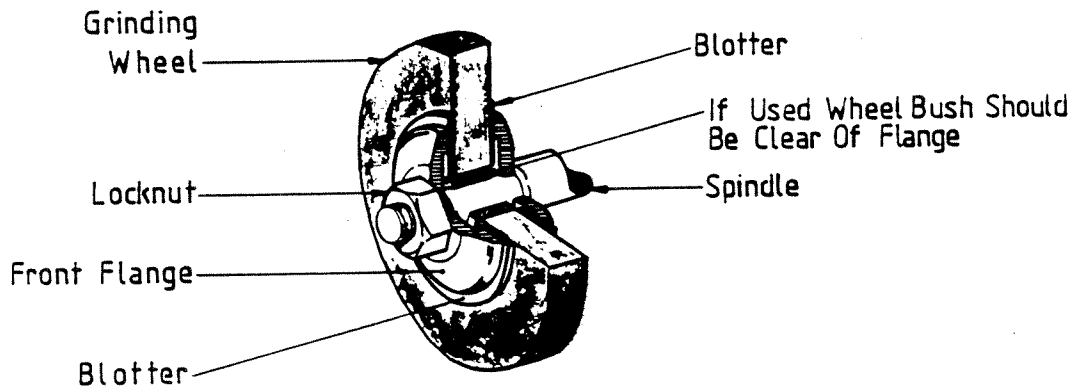


Figure 8-2

8.3.1.3 PROTECTION DEVICES

Safety Guards

The safety guards serve two purposes:

- 1) To avoid, as far as possible, the chance of an operator coming into contact with the wheel.
- 2) The guard should contain the majority of the wheel fragments if it shatters.

The wheel guard should ALWAYS be in the proper position and correctly adjusted.

Safety Goggles

Eye protection is of the utmost importance in the presence of sparks and flying particles caused during grinding. Safety goggles or face shields should be worn at all times in the grinding area.

Protective Clothing

Safety aprons, gloves and safety shoes should be worn as required due to the nature of the grinding operation. Well designed protective clothing will allow the operator to work more effectively and safely.

Dust Protection

A jet wash from above aids the cooling of the cutter but more importantly it washes away all the wheel and grinding dust. An important improvement and a consideration towards the health and safety of the operator. Provided that the minimum level of dust in the atmosphere does not exceed $10\text{mg}/\text{m}^3$, then the threshold value of any ingredient in the grinding wheel will not be exceeded. Whenever a grinding wheel contains ingredients of an abnormally hazardous nature then these grinding wheels will be marked accordingly.

8.3.1.4 OPERATING PRECAUTIONS

Training of operators

Grinding operators should be trained in the safe use of each machine which they operate. They must also be given instructions in the safe use of grinding wheels.

Speeds

No abrasive wheel should be operated at a speed in excess of the permissible speed, in RPM, for that abrasive wheel.

Coolants

Prolonged immersion of a stationary wheel can produce an out of balance condition, therefore, before stopping a wet grinding operation, the coolant should be shut off and the wheel allowed to run free until all the coolant has been removed.

Side grinding

Side grinding should only be performed with wheels designed for the purpose. Grinding on the flat sides of wheels designed for peripheral grinding may be dangerous and cause broken wheels. This does not preclude their use for applications such as shoulder and form grinding where it is recognised that a limited amount of side grinding is performed. Extreme caution should be exercised not to use excessive pressure.

8.3.1.5 GRINDING WHEEL DO'S AND DONT'S

The following DO's and DONT's should be followed at all times when using grinding wheels:

- | <u>DO</u> | <u>DON'T</u> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1. HANDLE and STORE wheels in a safe manner. | 1. use a wheel that HAS BEEN DROPPED. |
| 2. VISUALLY INSPECT and RING all wheels before mounting, for possible damage. | 2. FORCE a wheel onto the machine spindle OR MODIFY size of the mounting hole. |
| 3. MAKE SURE OPERATING SPEED established for machine does not exceed speed marked on wheel. | 3. EVER EXCEED MAXIMUM OPERATING SPEED established for the wheel. |
| 4. CHECK MOUNTING FLANGES for equal and correct diameter and that they are clean, free from burrs and recessed where applicable. | 4. use mounting flanges on which the bearing surfaces ARE NOT CLEAN AND FLAT. |
| 5. USE MOUNTING BLOTTERS where required. | 5. TIGHTEN the mounting nuts EXCESSIVELY. |
| 6. be sure WORK REST is properly adjusted and not more than 3mm away from the periphery of the wheel. | 6. TRAP the workpiece between the wheel and workrest. |
| 7. always USE A CORRECTLY DESIGNED AND ADJUSTED WHEEL GUARD. | 7. start the machine until the WHEEL GUARD IS IN PLACE. |
| 8. allow NEWLY MOUNTED WHEELS to run at operating speed with guard in place for at least one minute, with ALL PERSONNEL STANDING CLEAR before grinding. | 8. grind on the SIDE OF THE WHEEL. |
| 9. always WEAR SAFETY GLASSES or some type of eye protection and protective clothing, where necessary, when grinding. | 9. STAND DIRECTLY IN FRONT OF a grinding wheel whenever a machine is started. |
| 10. TURN OFF COOLANT before stopping wheel to avoid creating an out-of-balance condition. | 10. grind material for which the WHEEL IS NOT DESIGNED. |
| 11. DRESS the wheel regularly to avoid loading. | 11. ROLL WHEELS ALONG THE FLOOR |
| | 12. BANG THE WORKPECE AGAINST THE WHEEL. |

SECTION 8.3.2

DRESSING THE WHEEL

IMPORTANT: Because a single point diamond is used in dressing, the movement should be unhurried to give a good surface finish, and the cut light to avoid ripping out and wasting the grit.

The purpose of dressing the wheel is threefold:

- 1) To produce a wheel profile identical to the stylus.
- 2) To compensate for wheel wear.
- 3) To open up the wheel for free cutting by presenting new sharp grains of abrasive to the surface.

The dressing unit is mounted near to the grinding position to avoid the need to remove guards when dressing takes place. The grinding wheel is reduced in diameter each time it is dressed and needs to be accurately realigned to the stylus. If this is not done carefully the cutters will be ground to irregular radial heights.

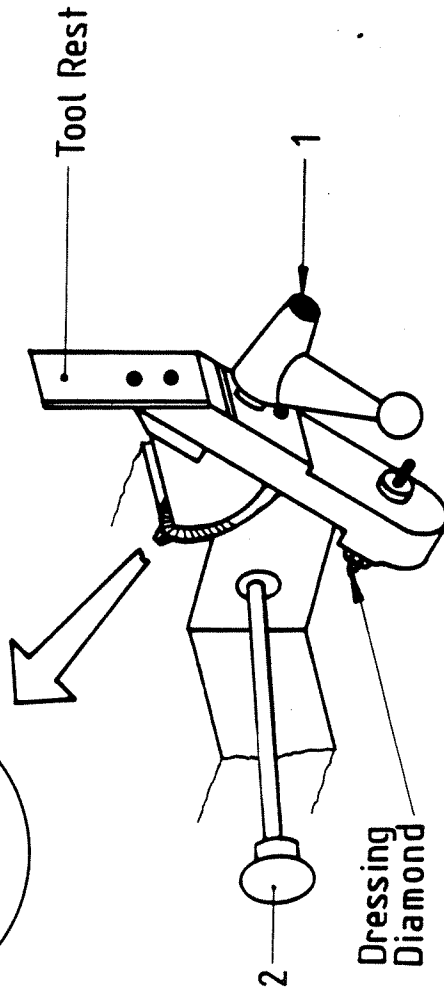
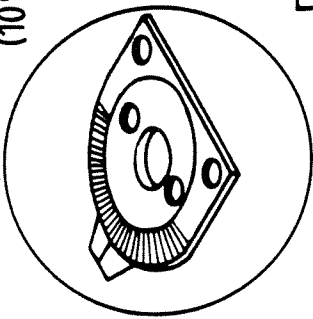
The NX grinder uses an automatic setting system whereby the dressing unit is mounted in a fixed position at the point of grind, fastened to the cutter rest. In dressing, the grinding wheel is moved towards the dresser. The grinding wheel may be adjusted relative to the diamond wheel dresser by means of a crank handle (coarse feed) and handwheel (fine feed). The maximum amount of travel allowed is 50mm. Using this method not only dresses and shapes the wheel but also precisely realigns it to the stylus. This guarantees repeatability and alignment.

The dressing diamond is mounted onto the end of a screw which allows for initial alignment, compensation for diamond wear, and can provide for variations in radius of dressing.

The dresser has two basic movements. One is a rotary movement with the centreline passing almost through the rim of the grinding wheel and is used when dressing the wheel to a rounded shape. This movement is engaged by loosening the hand wheel on the left hand side of the dressing unit. The diamond dresser may then be rotated through 90° , 0° , 90° left or right to the main grinding wheel axis. A calibrated scale is provided giving graduations in 10° increments. The second is a swivel movement about an axial point, used to form a flat surface onto the wheel. The hand lever on the front of the dresser unit is used to lock or unlock this movement.

Tool Rest / Dresser Unit

Calibrated Scale
(10° Increments)



1. Handlever To Engage Axial Movement
2. Handwheel To Engage Rotary Movement

Figure 8.3

8.3.2.1 WIDTH DRESSING

Because of the firing process in the manufacture of vitrified wheels, the wheel cannot be guaranteed to be perfectly flat and the right thickness. Although dressed and sized wheels may be purchased, truing is best carried out on the profile grinder.

Wheels are generally supplied at 5.0mm width and so the wheel must be sized to the selected stylus width (generally 4.7mm or 3mm wide). For this purpose the hand wheel should be released and the dresser unit rotated and set at 90° to the left or right. The hand lever is then released to allow the diamond dresser to move along the side of the grinding wheel.

The diamond dresser can then be wound in until it just touches the side of the wheel. The motor should then be switched on and the side of the wheel dressed along. The dresser is then rotated through 180° and the movement repeated on the opposite side of the wheel. The wheel width is then measured and compared to the stylus width. The difference between the two measurements is halved and this distance is the amount the diamond wheel will need to be moved in, in order to size the wheel. As a maximum cut of 0.1mm is recommended, successive dressings may be required to size the wheel. (NOTE: each graduation represents 0.05mm)

8.3.2.2 DRESSING SQUARE

To dress the wheel square the diamond dresser is set at 0° axially. The grinding wheel is adjusted so that its periphery just touches the diamond dresser. With the hand lever released the dresser may be swept across the front of the running wheel. Several successive small cuts should be made. This can be achieved by winding the wheel slightly back and incrementing forwards small amounts. Before making a final cut it is recommended that the head is locked into position. When the final cut is then made a datum point is fixed and no creep forward will occur which may happen if the head is locked after dressing has taken place.

8.3.2.3 DRESSING A RADIUS

To produce a radius the dressing wheel is moved 90° left or right and with the wheel running it is swept through 180° across the wheel. However, when producing a radius from a square form, several successive small cuts will be required. The dressing should be finished as described for dressing square.

Note: Diamond dresser manufacturers recommend the use of coolant when dressing to save diamond wear and to prevent dust formation.

SECTION 8.4

PRODUCING THE GRINDING BLANK TEMPLATE

The template should be made from a blank (part number NXT 6) supplied by WADKIN. It should always be made at least 20mm wider than the profiling knife and it should always be produced with at least two fixing holes 9.5mm diameter at 30mm centres.

Onto the blank an exact mirror image of the finished shape required is drawn. The blank is then cut out using a hacksaw and filed very accurately to shape. Due to the relatively thin steel used, this is easily achieved, although it still produces a stiff and stable template.

The template should fit precisely the wooden mould to be produced.

The finished template can now be fixed into its correct position on the machine carriage.

Note: Detailed instructions are provided as part of the WADKIN in-house training course on profile grinding. In addition, an instruction manual is included in the WADKIN template making toolkit (part number TBO 650).

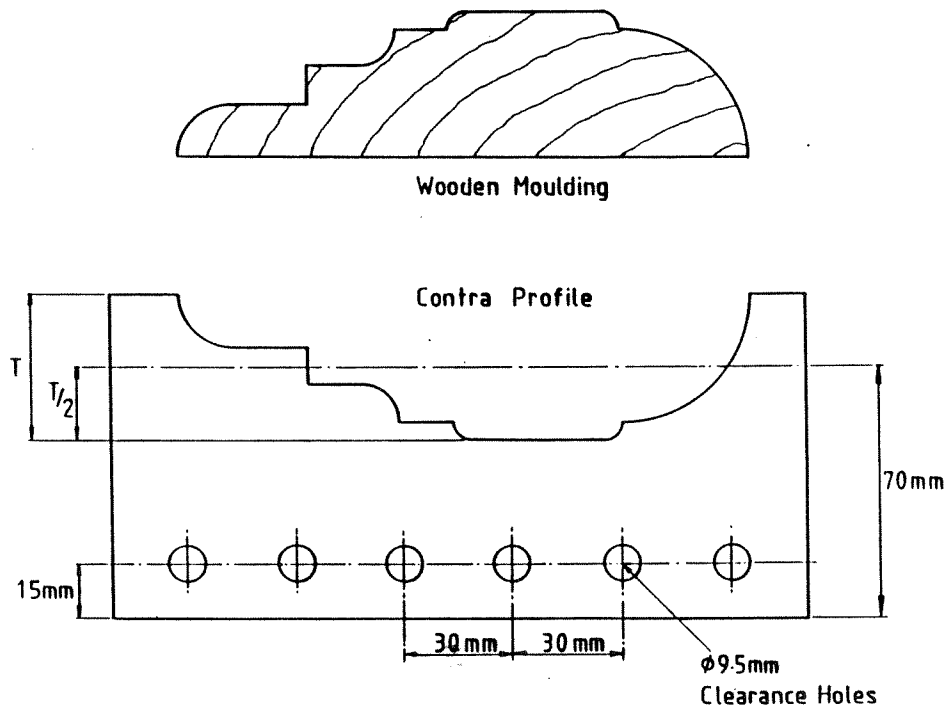
Template Example

Figure 8.4

SECTION 8.5

MACHINE SETTING8.5.1 GRINDING HEAD ADJUSTMENTS

The grinding head has three movements:

- A. The movement in and out, only used when dressing the grinding wheel.
- B. The adjustment to vary the clearance angle. This is accomplished by means of adjusting the rise and fall movement of the head. The amount of adjustment allowed is:
 - raising - 40mm
 - lowering - 20mm

A suitably calibrated scale is provided at the rear of the machine to facilitate this adjustment. On pre-ground cutters, a quick practical method is to position the grinding wheel so that it touches halfway on the edge of the cutter.

The amount of clearance between cutter heel and moulding remains consistent along the full width of the depth of mould. Increasing the clearance angle can give less build up of resin with softwood, allows more honing before re-grinding, and gives a narrower land when jointing.

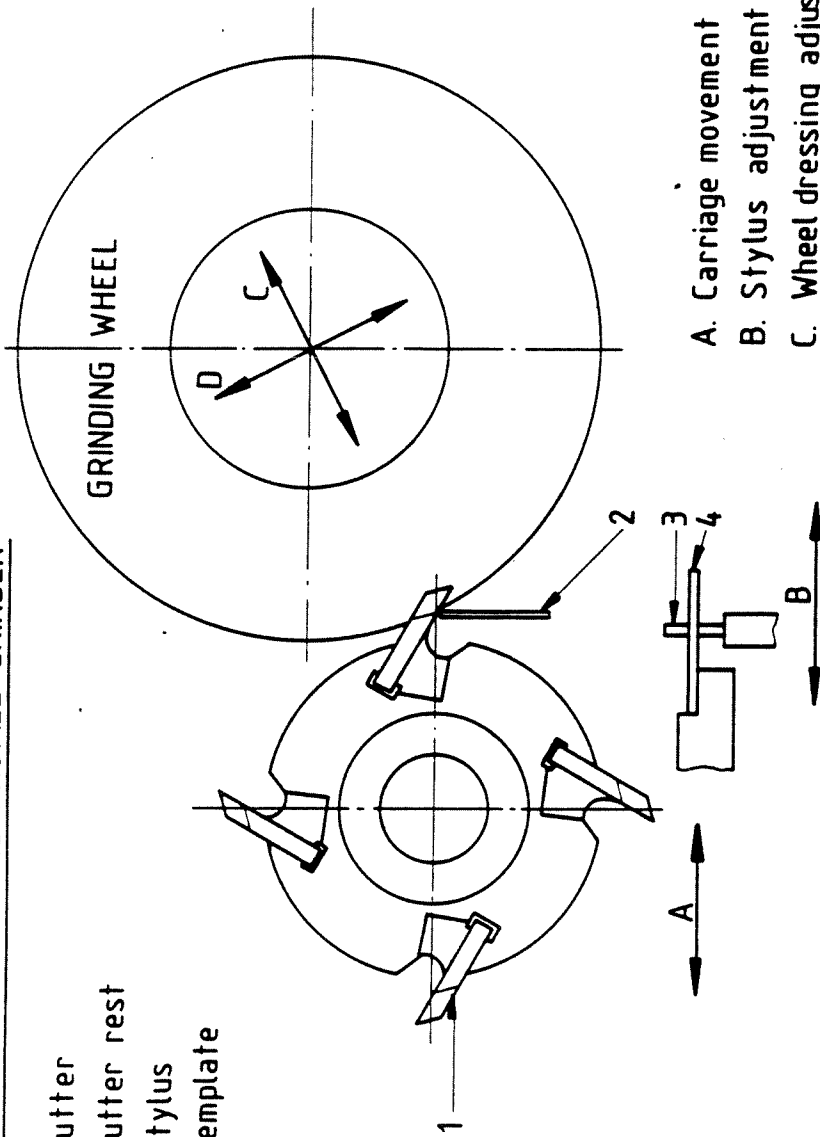
- C. The adjustment for grinding side clearance. This is achieved by canting the grinding head left or right 5° or 10°. To do this the locking lever is released, the tilt handle gripped with the right hand and the index plunger released with the left hand. The required angle of tilt is then selected from the index plate and the index plunger settled into the correct plate. The locking lever is then secured.

8.5.2 CARRIAGE ADJUSTMENTS

- A. Fit the cutterhead onto the machine arbor or, if the same arbor has been used on the setting stand, simply transfer it over to the grinder. Set the carriage so that the cutterhead can be moved well clear when checking the cutters.
- B. Align the template widthwise to the cutterhead. With the grinding wheel stationary and the template positioned opposite to, and parallel with, the horizontal centreline of the grinding wheel, wind in the linear carriage support slide until the outer diameter of the grinding wheel is set at half the depth of the profile on the template. Tighten the hexagonal nuts on the underside of the slide to lock the carriage rigidly in position. A calibrated scale is provided for re-setting purposes when regrinding cutters.

SECTION THROUGH THE PROFILE GRINDER

- 1. Cutter
- 2. Cutter rest
- 3. Stylus
- 4. Template



- A. Carriage movement
- B. Stylus adjustment
- C. Wheel dressing adjustment
- D. Grinding angle adjustment

Figure 8.5

8.5.3 POSITIONING OF THE STYLUS

With the cutterhead and template mounted onto the machine, the stylus needs to be positioned laterally, and transversely, so that the cutter shape will be in the correct position both in the length and depth of the cutter blank.

The standard stylus is 4.7mm in width, bull-nosed on one face and squared off on the opposite face. The stylus is fixed from below and may be adjusted to suit any angle generated by the profile template. This is accomplished by adjusting the screw and washer fitted on the underside of the stylus.

Stylus Angle Adjustment

1. Template Holder
2. Template
3. Stylus
4. Circlip
5. Adjusting Screw
6. Washer

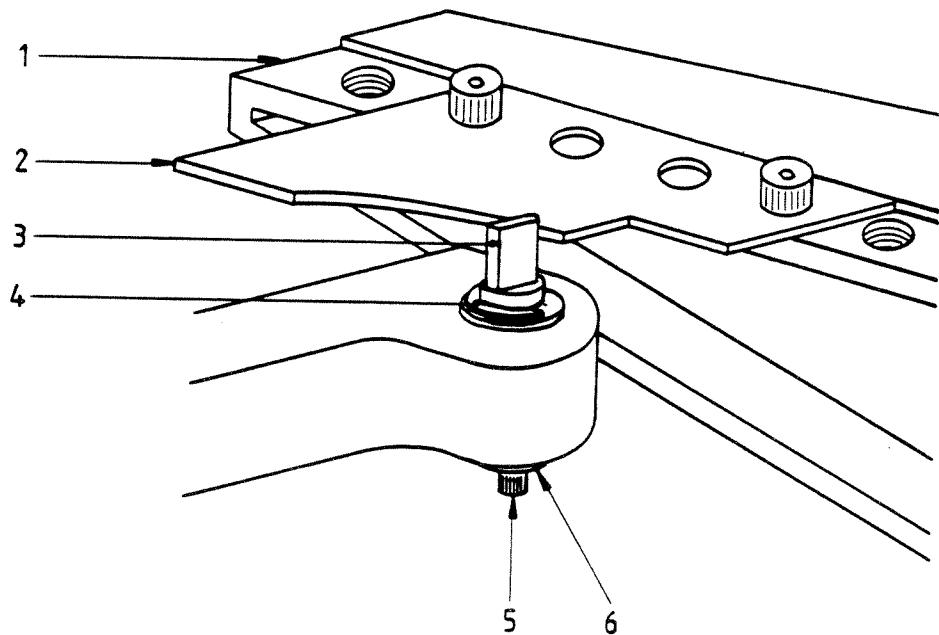


Figure 8.6

There is a full range of styli covering various single and double angles of varying degrees, along with a further bull-nosed/square faced stylus of 3mm width. In all, they enable a very wide range of shapes to be followed and cut.

Using the correctly dressed wheel a fixed datum point is established from which to work. With this datum established, the machine carriage, holding the cutterhead and template, is moved forward, and by rotating the arbor on which the cutterhead is mounted one of the blank cutters is brought into contact with the cutter rest.

The stylus may now be finally positioned sideways and moved in or out to give the correct depth of cut on the blank cutters. The stylus pin can be adjusted sideways (left or right) relative to the template by means of a handwheel located on the right hand side of the stylus carriage, and may be locked into position using the hand lever next to this adjustment handwheel. The amount of movement is 10mm (5mm each way).

A handwheel on the front of the stylus carriage operates the forwards and backwards (in and out) movement of the stylus over a maximum distance of 75mm. A suitably calibrated scale is provided to facilitate this adjustment.

STYLUS POSITIONING

- A. Carriage In/Out Movement
(Refer to 'A' - Figure 8-5)
- B. Carriage Left/Right Movement
- C. Stylus In/Out Adjustment
- D. Stylus Left/Right Adjustment
(Refer to 'B' - Figure 8-5)

- 1. Wheel Guard
- 2. Grinding Wheel
- 3. Cutter Rest
- 4. Arbor Clamp
- 5. Arbor Control Handle
- 6. Cutterhead
- 7. Arbor
- 8. Machine Carriage
- 9. Arbor Handwheel
- 10. Stylus
- 11. Template Holder
- 12. Template
- 13. Template Holder

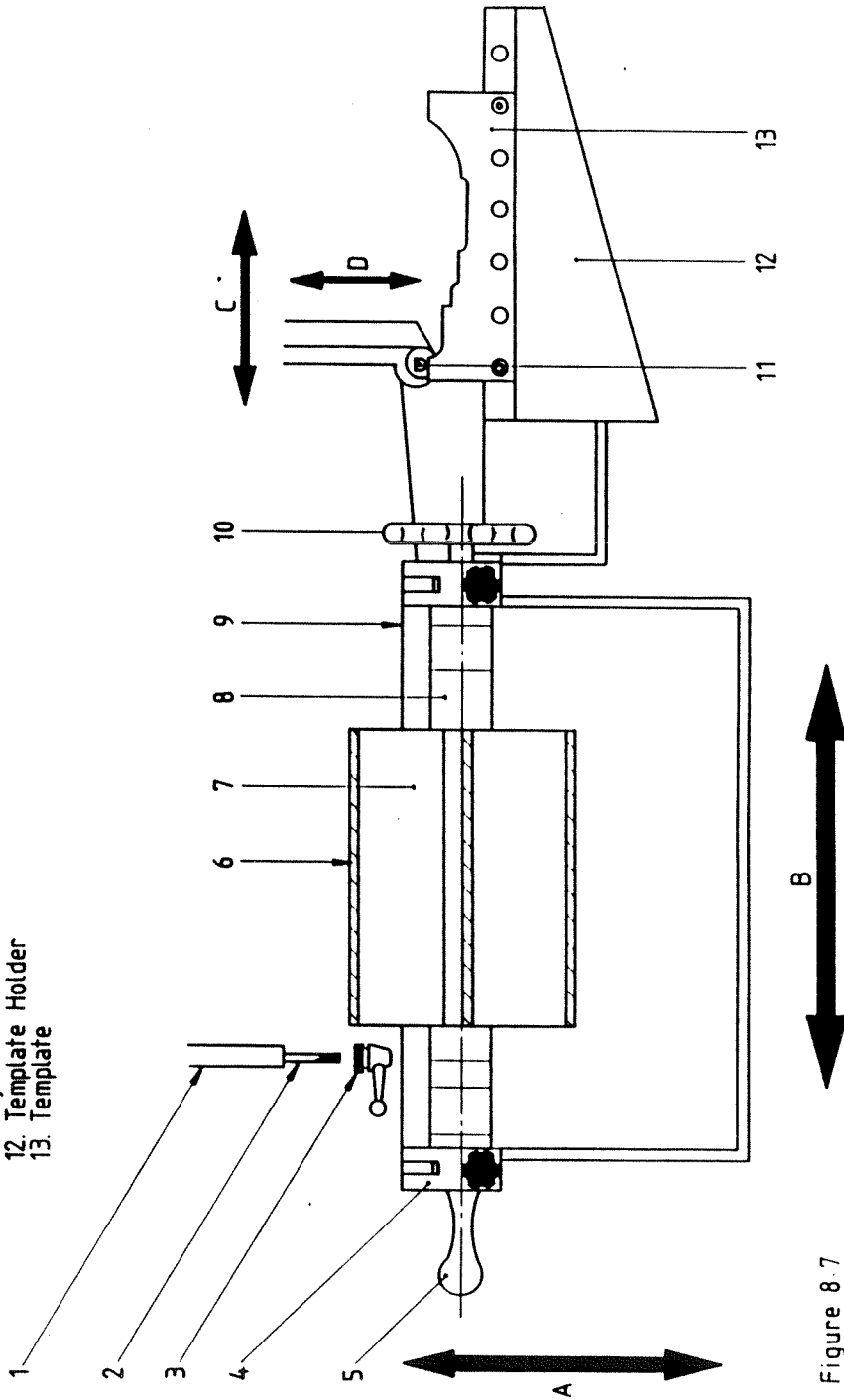


Figure 8.7

SECTION 8.6

PROFILE GRINDING8.6.1 GRINDING WHEELS

As a general guide, grinding wheels used for profile grinding are coarser and softer than those used for hand grinding, so a much faster grind is possible. A full width, half-round wheel should be used for most cutter profiles as this wears down more or less evenly. It may be used to rough and finish grind external corners, external curves, bevels, straight sections, and internal curves with a radius larger than that of the wheel.

A suitable small-radius or sharp edged wheel should be used to complete those parts that the half-round wheel cannot finish. The contact area of small-radius and corner grinding wheels is small, so it is advisable to use a harder wheel. When changing the grinding wheel it is essential to make sure that it matches the stylus and that it is aligned correctly.

A small amount of unevenness is not uncommon on wheels but a wheel will often bed down quickly and run true as the high spots wear down. To achieve the best results the spindle mounting and wheel should be kept clean and burr free. Care should be taken in mounting the wheel and it should be tightened only as recommended by the manufacturer. (Refer to SECTION 8.3 - Use of grinding wheels)

8.6.2 GRINDING CONTROL

The machine carriage may be moved around in order to reproduce the cutter profile to the depth allowed by the stylus and template. The handwheel on the cutter arbor is used to keep the cutter in contact with the cutter rest. The best control may be achieved by keeping both elbows in contact with the arm rest on the front of the carriage, while holding the handwheel with one hand and the control handle with the other.

Once the cutter is firmly in contact with the cutter rest watch the template and stylus (NOT the cutter) so as to anticipate the carriage movements needed. Grinding progress can then be gauged by the sound and feel of grinding. Grinding pressure should be light enough to allow the grinding wheel to cut freely. If necessary let the cutter ride lightly on the grinding wheel, leaving a gap between the template and stylus, which is narrowed during repeated grinding passes until the cutter is ground away. Keep the cutter moving at all times and in the smoothest possible manner.

8.6.3 ROUGH GRINDING

Lateral adjustment of the cutterhead relative to the grinding wheel is by a right/left sliding movement, with the total length of travel of the shaft within the carriage support being:

- a) model 230 - 250mm
- b) model 300 - 330mm

Before switching on the head, ensure that the grinding wheel is firmly fixed onto the spindle and the guard is securely clamped into position. Select the grinding wheel speed from the label on the drive belt cover and dress the wheel to the selected stylus form.

By running the grinding wheel, and by moving the template against the stylus, the template shape is ground onto the cutter blank. Always set the grinding wheel vertical when grinding out large amounts so that pressure is applied only to the rim of the grinding wheel. When roughing out, a nibbling action is adopted, ie. a series of parallel plunging cuts directly into the grinding wheel, to form a series of close slots. Avoid unnecessary sideways movement as excessive side pressure can cause wheel breakage. In addition it can cause wear to the side of the wheel, therefore causing it to become thinner than the stylus, and as a result insufficient material would be ground off the cutters.

When first using the profile grinder it may be an advantage to set the stylus to small grinding depth (say 3mm). Grind this out, then step back the stylus by a further 3mm to allow more grinding. Continue this procedure until the cutter is fully profiled. By using the stylus in this way a grind limiter is set, so allowing only a small amount to be ground off the cutter at any setting. This allows for more control so enabling confidence to be gained quickly. When the rough grinding has been completed to the finished form on all of the knives on the cutterhead, the wheel should be re-dressed to ensure equal amounts have been rough ground out of each cutter, and to re-establish the fixed datum.

A high pressure coolant jet is sprayed under the cutter at the point where the grinding wheel is operating. This ensures maximum cooling at the point where it is most needed, resulting in the cutter remaining at a constant cool temperature throughout the grinding operation, even when removing large amounts of steel from a cutter blank.

A jet wash from above also aids the cooling of the cutter, but, more importantly it washes away all the wheel and grinding dust, improving the health and safety of the operator.

NOTE: In cases where a cutterhead has several knives it is advantageous to 'rough out' all the knives at a single stylus setting. This procedure will necessitate frequent wheel dressing.

Grinding Wheel Speeds

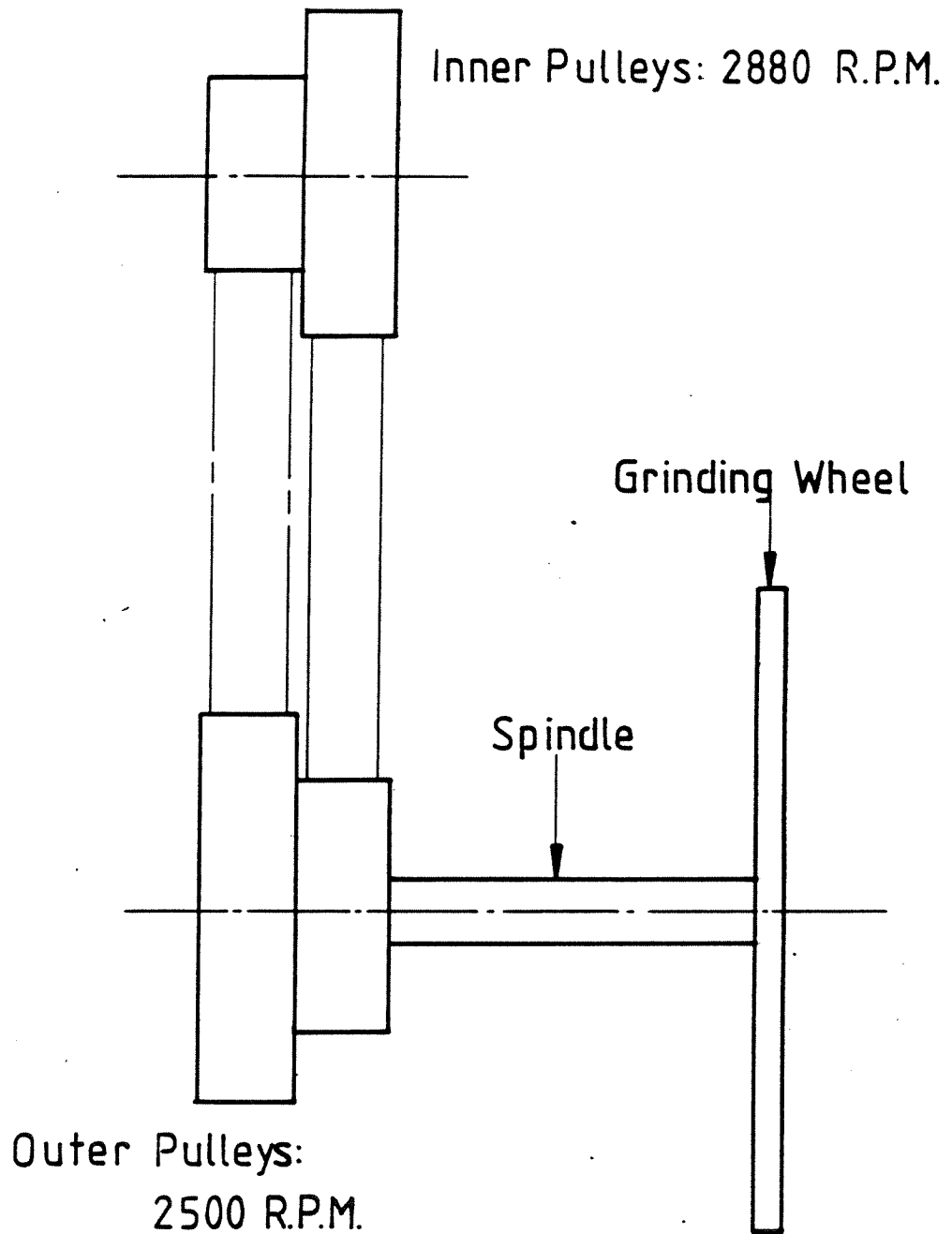


Figure 8-8

8.6.4 FINISH GRINDING

Once the rough grinding is completed on all of the cutters, the wheel should be dressed again to re-establish the datum. If desired, the stylus may be wound slightly back off the template to increase the amount to be ground off the cutters. The cutter can now be finished ground successfully using the soft roughing wheel (usually a 60 grit). As the finish cut is very small almost no wear will take place, therefore, all of the cutters are of the same shape and as near as possible in the same projection radially.

A finishing wheel (usually a 220 grit) is harder and less free cutting than a roughing wheel, however, they are less subject to wear and so retain their shape much longer. They are therefore ideally suited for producing very fine detail, or square corners, on the cutter.

Generally, a bull nosed shape will be used for grinding operations, however, any square corners which are required on the cutter will need the use of the squared off face on the stylus. The stylus is thus turned around and the 60 grit wheel replaced with a 220 grit finishing wheel. By dressing the wheel square the fixed datum point is achieved, and this allows the stylus to be just touched into the square corners on the template, and the wheel only removes the small radii in the corner left by the bull-nosed wheel. By dressing the wheel the depth of cut is automatically aligned to the previous depth, so ensuring that neither a small step or an undercut is left on the previous grinding produced.

NOTE: This procedure applies to all fine detailed work. The only point to remember is to ensure that the wheel is dressed to the exact shape and size of the stylus.

Profile Grinding

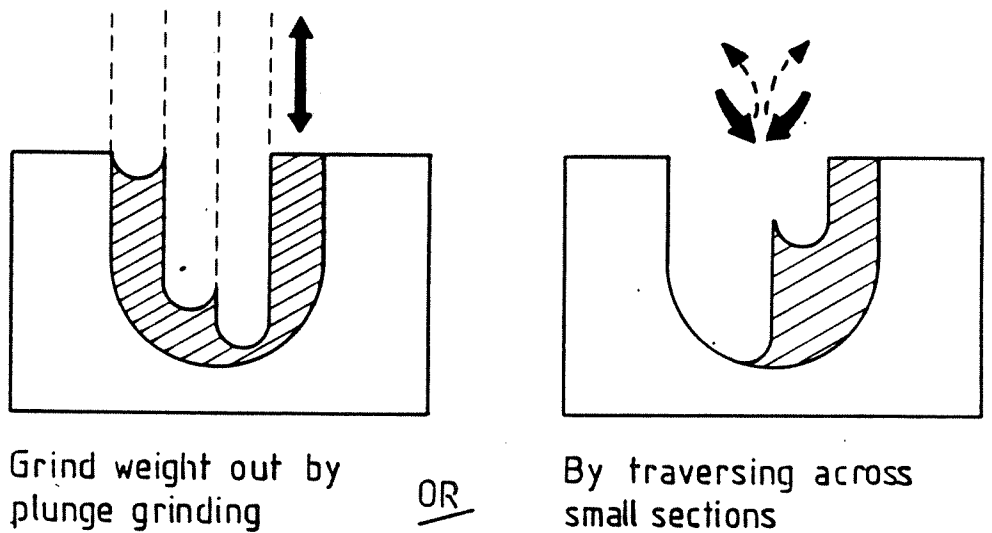
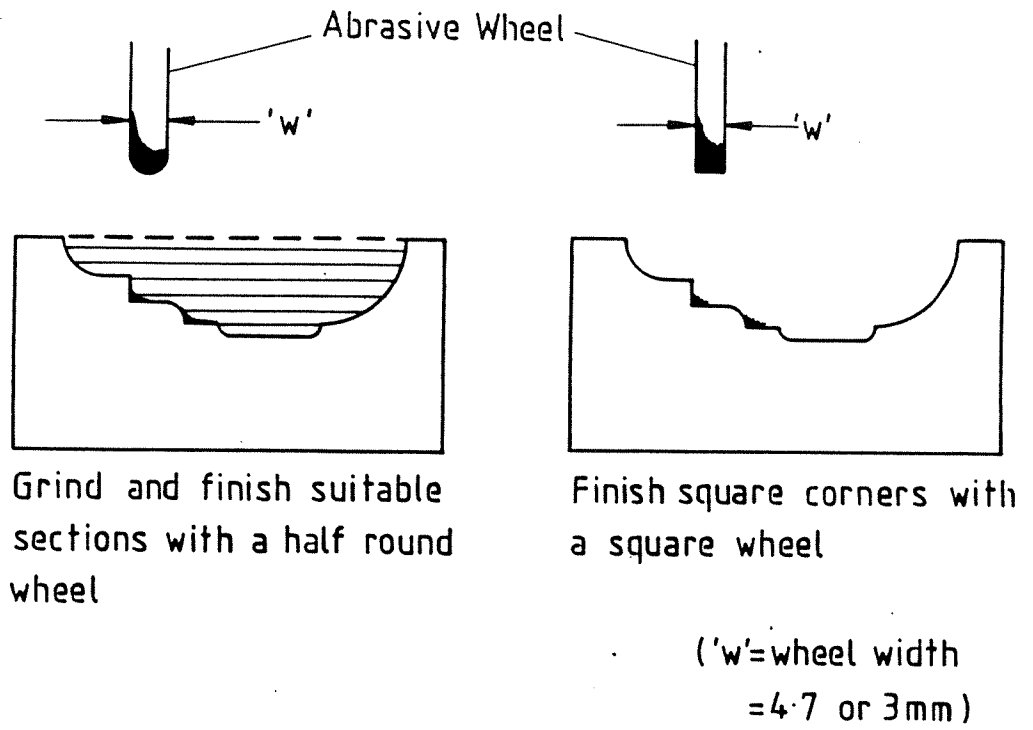


Figure 8-9

8.6.5 SIDE RELIEF

The cutter knives are almost complete, except for the need of side relief where there are steep edges or square rebates. Side relief is the cutting back of the cutter profile to stop rubbing as the back of the knife follows into the timber already cut.

Adjustments for side clearance are made by canting the wheel left or right through 0° , 5° , and 10° as described in 'MACHINE SETTING' (SECTION 8.5). The wheel should be dressed to the desired shape and the areas requiring side relief located on the template. As the wheel is canted over, then the back of the knife is ground away without grinding deeper at the cutting edge.

All knives are ground to give clearance on, say, the right hand side and then the whole operation is repeated with the wheel canted to the left hand side. This ensures all areas of the profile at 90° to the cutting action is given the required relief.

NOTE:

When dressing the wheel for side relief:

- a) a bull-nose should be shaped BEFORE the wheel is canted over to the right or left.
- b) a square face should be shaped AFTER canting.

The cutters should now be complete. Any grinding burr should be removed from the cutters to achieve the best cutting edge. The cutterhead, complete with profiled cutters, can now be mounted directly onto the moulding machine spindle which is to be used and run without further operation.

SECTION 9

ACCESSORIES AND ATTACHMENTS9.1 THE MAGNETIC COOLANT FILTER

A magnetic coolant filter is available as an optional extra. Its operation is as follows:

The liquid with ferrous contaminant flows directly into the back of the unit. The coolant is then guided around a castlated drum which houses permanent magnets. These magnets have an extremely high level of contaminant retention. The drum rotates in the opposite direction to the coolant flow and removes the particles from the liquid.

The particles are then removed from the drum by a scrapper blade which discharges them into a receptacle in a semi-dry condition. The coolant, now clean is weired into the clean compartment of the unit and flows directly out of the base outlet.

MAINTENANCE FOR THE MAGNETIC COOLANT FILTERSix monthly

1. check gearbox grease/oil level and replenish if required.
2. adjust chain drive between gearbox and drum drive shaft.
To do this:
 - a) Release slightly the gearbox hold down bolts.
 - b) Move the gearbox in an upward direction until the chain is tight.
 - c) Re-tighten the hold down bolts.

Shut down

Ensure that the top of the drum and the stainless steel blades are dirt free as some forms of contamination dry hard, thus jamming the drum on return of shut down.

The Magnetic Coolant Filter

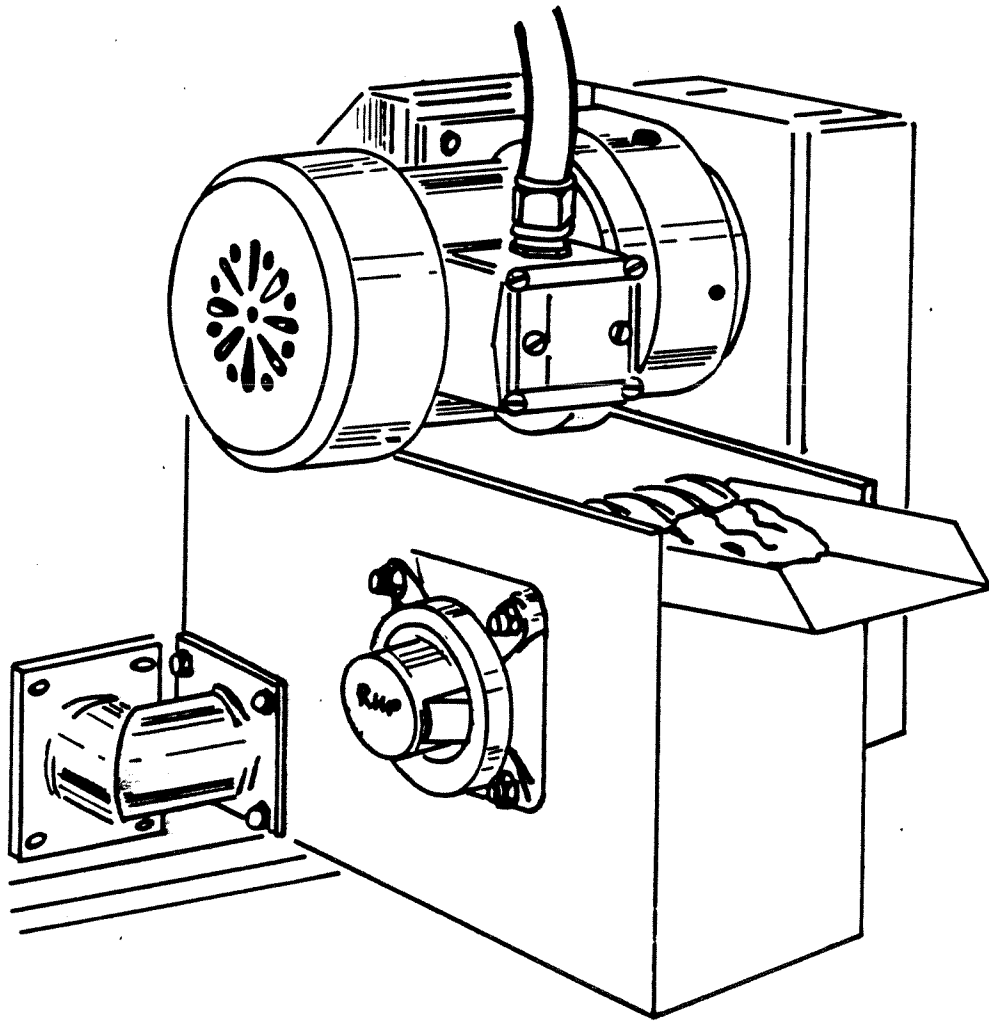


Figure 9.1

9.2 ROUTER CUTTER GRINDING UNIT

This unit is a valuable piece of additional equipment which gives the benefit of being able to profile grind router cutters in both HSS and TCT.

No major modifications are required to the machine to facilitate this attachment. Only the standard arbor which is normally in use has to be removed from the carriage. The router unit takes the place of the arbor and locates into the right hand housing of the carriage. The fixing clamps on the carriage are used to firmly hold the unit into position and it is ready for use.

Collet fixing in the unit allows for a wide range of metric and imperial shank diameters to be used, while indexing of the cutter is automatic and an inbuilt feature of the design. All remaining grinding procedures are the same as for normal practice on the grinding machine.

9.3 NARROW GRINDING FINGER

The standard cutter rest supplied with the machine allows most of the tooling to be properly ground. However, when built up sets of tooling with narrow spaces are placed onto the machine a section of the tooling may foul the cutter rest and so interrupt the grinding routine.

This problem may be overcome by using an alternative cutter rest in place of the standard unit. A narrow grinding finger rest is located in the machine after all the dressing assembly has been removed. The changeover is achieved in a few minutes and may be reversed when wheel dressing is required.

Router Cutter Grinding Unit

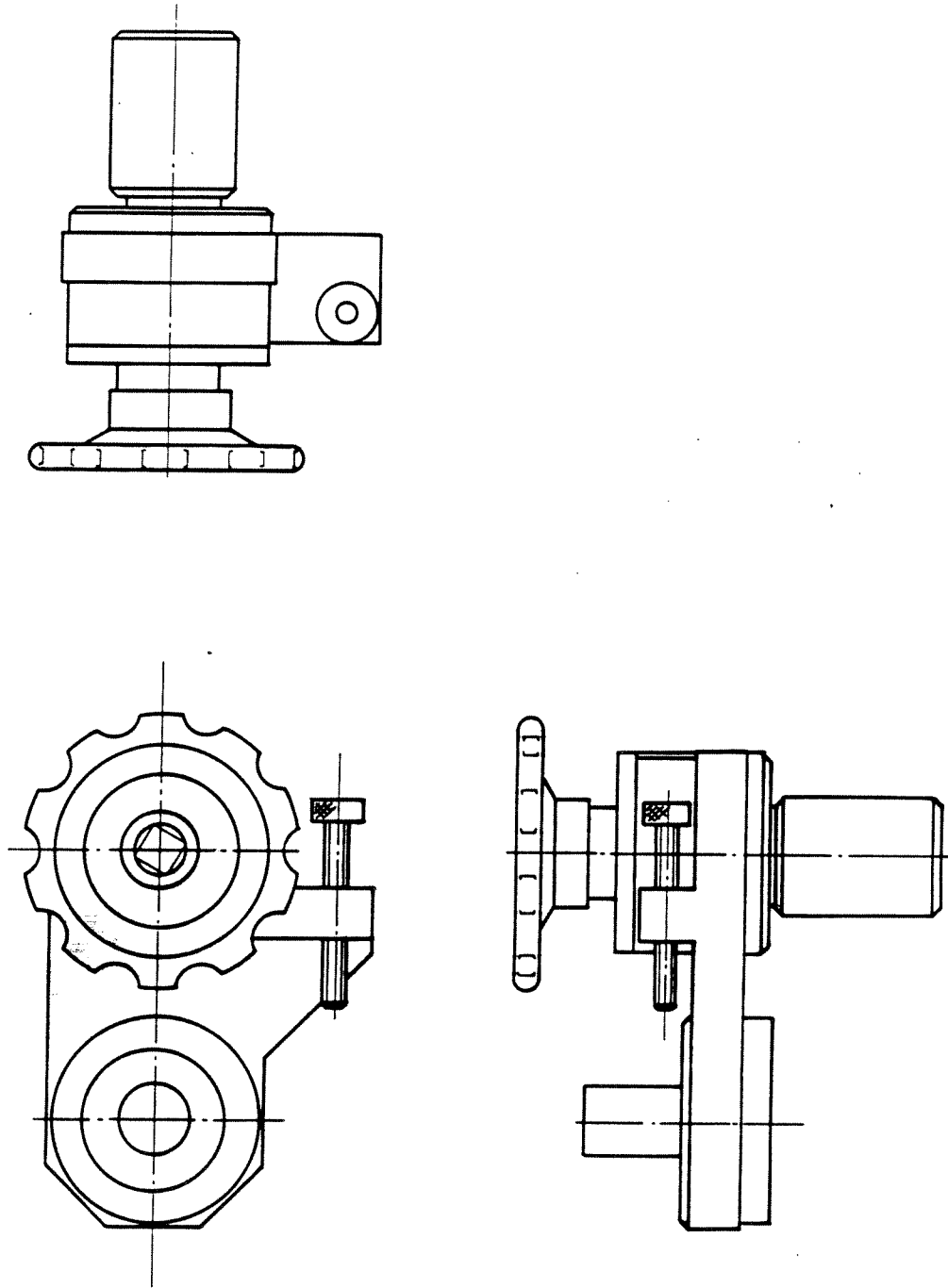


Figure 9.2

SECTION 10

LUBRICATION AND MAINTENANCE

Abrasive dust will damage any moving parts and slideways on the machine, therefore, to maintain the machine in good condition, it is essential to clean it regularly. This regular maintenance will keep the machine in a good operating condition, capable of producing good quality, trouble free work, with the minimum of downtime.

It is of paramount importance that the operator pays particular attention to machine cleanliness. A daily procedure should be implemented to ensure that the linear shaft and its associated bearing surfaces are kept free from grinding dust and dirt.

Compressed air SHOULD NOT be used to assist cleaning, as often the effect is to push debris into slides, screws and bearing surfaces. Similarly, washing down with coolant has the same consequences, with the added danger that although electric motors are splashproof, they are NOT designed to withstand constant jets of water.

The spindle unit is fitted with sealed bearings which are permanently lubricated and all bushes employed are 'bronze oil retaining type'.

Slides and screws should be examined periodically, cleaned, oiled, or re-greased. Where necessary, careful attention should be paid to moving parts that become stiff. If cleaning and lubrication do not resolve the problem, stripping the assembly should be considered. Carefully examine the particular assembly and always consider what dangers to alignment could be caused by poor re-assembly. If in doubt call on the services of a competent engineer.

There are 6 oil lubricating points on the machine which should be lubricated weekly with WADKIN Grade L4 oil.

ALWAYS QUOTE MODEL AND MACHINE NUMBER WHEN ORDERING SPARES.

Should spare parts be required due to breakage OR wear, full particulars, including machine number and test number, must be given. This information is on the machine nameplate and should be forwarded to the service manager.

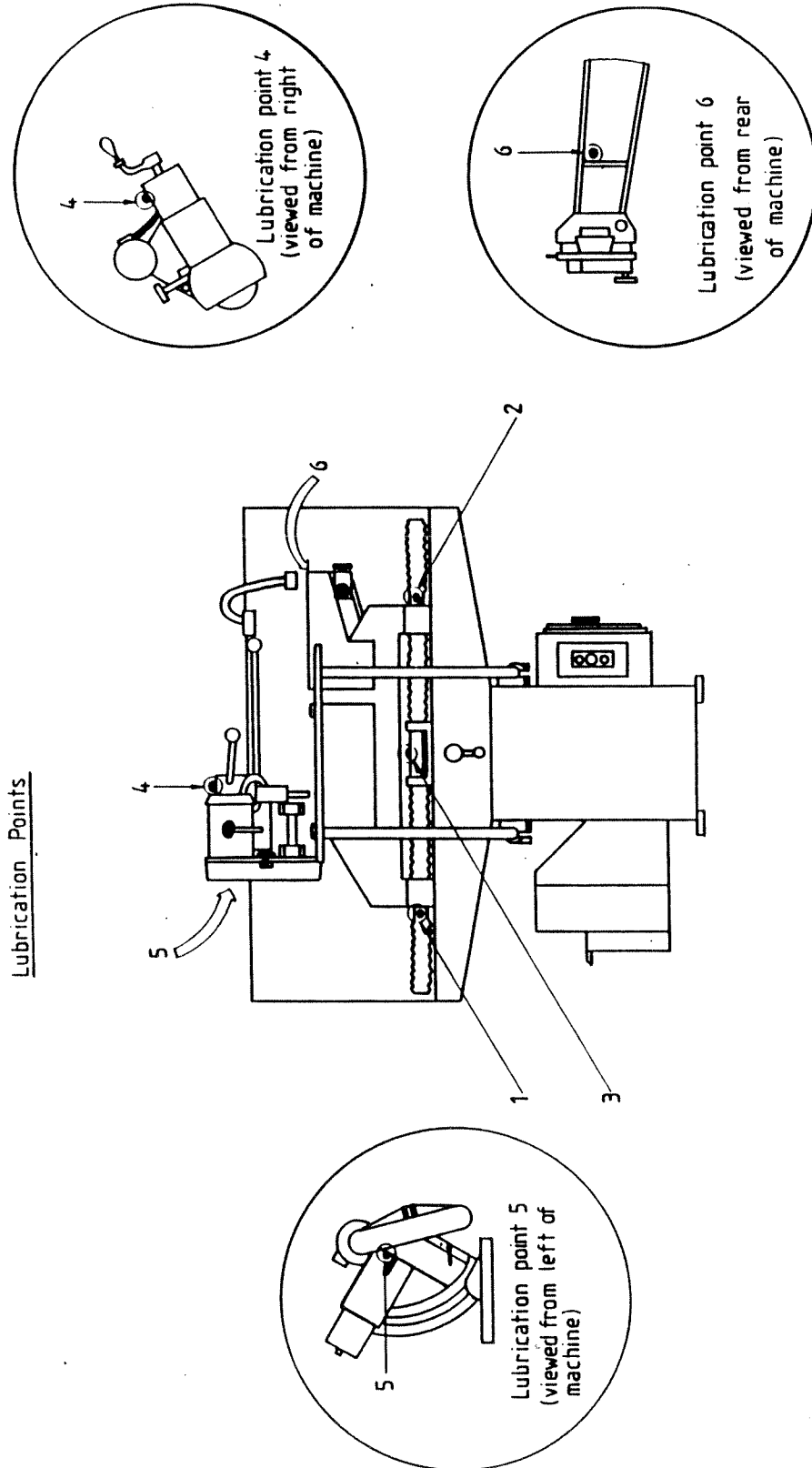


Figure 10-1

APPROVED LUBRICANTS

WADKIN	CASTROL	B.P.	SHELL	MOBIL	ESSO	GULF	CALTEX
L1	HYSPIN AWS 32	ENERGOL HLP 32	VITROL 32	DTE OIL LIGHT 24	NUTO 40 OR ESSTIC H44	HARMONY 43 AW	RANDU OIL HDA
L2	ALPHA ZN 150	ENERGOL HP150 OR CS150	VITREA 150	VACTRA EXTRA HEAVY	ESSTIC 65	SERVICE 13	URSA P40
L4	MAGNA 68	ENERGOL HP68 OR CS68	VITREA 68	VACTRAL OIL HEAVY MEDIUM	ESSTIC 50	SERVICE 51	URSA P20
L6	SPHEEROL AP3	ENER- GREASE LS3	ALVANIA GREASE NO.3	MOBIL- PLEX GREASE NO.48	BEACON 3	GULF- CROWN GREASE NO.3	REGAL STARTAK PREMIUM 3

L1	OIL	Hydraulic oil with anti-corrosion, anti-oxidation, anti-wear, anti-foam performance.
L2	OIL	Gear oil (Viscosity 150 centi-stokes at 40°C).
L4	OIL	Plain mineral oil (Viscosity 68 centi-stokes at 40°C).
L6	GREASE	Grease NLG1 No.3 consistency Lithium bearing grease.

SECTION 11

TOOLS AND ACCESSORIES SUPPLIED WITH THE MACHINEBASIC MACHINE MODEL NX 230 / NX 300

<u>Part Number</u>	<u>Description</u>	<u>Qty</u>
NXT 18	40mm diameter arbor (230 machine)	1
NXT 57	40mm diameter arbor (300 machine)	1
GW 202	Grinding wheel 230 * 5 * 1.25 (finishing)	1
GW 203	Grinding wheel 230 * 5 * 1.25 (roughing)	1
K3029906	Handle 3/4" SQ. hole * 4" CTS	1
K3041120	Set of "ALLEN" keys W3-W11	1
K3045280	Type MPF TECALMIT. oil gun	1
K3073702	5/16 * 3/8 Whit. double ended spanner	1
K3073724	Locknut spanner 46mm A.F.	1
K3073738	Double ended spanner 17 * 19 A.F.	1
K3073788	Single open ended spanner 30mm A.F.	1
NXT 6	Template blank 330mm LG	3
NXT 51	Coolant 1pt (1/2 litre)	1
QT 169	Assembly of wrench and pegs	1

SECTION 12

OPTIONAL EXTRAS

<u>Part No.</u>	<u>Description</u>
<u>Grinding wheels</u>	
GW 203	Spare roughing wheels, dual purpose, for solid HSS and HSS on Iron.
GW 202	Spare finishing wheels, dual purpose, for solid HSS and HSS on Iron.
GW 293	Grinding wheel specially formulated for HSS on Iron.
GW 294	Grinding wheel specially formulated for solid HSS.
GW 210	230mm dia. * 4.7mm thick round edge diamond wheel for grinding TCT cutters.
GW 211	230mm dia. * 3.0mm thick round edge diamond wheel for grinding TCT cutters.
GW 212	230mm dia. * 3.0mm thick square edge diamond wheel for grinding TCT cutters.
GW 213	230mm dia. * 3.0mm thick 60 deg taper edge diamond wheel for grinding TCT cutters.
GW 214	230mm dia. * 3.0mm thick 45 deg taper edge diamond wheel for grinding TCT cutters.
GW 215	230mm dia. * 3.0mm thick radius edge diamond wheel for grinding TCT cutters.
GW 216	230mm dia. * 4.7mm thick double 45 deg taper edge wheel for grinding TCT cutters.
GW 232	230mm dia. 8.00mm thick square edge wheel for straight knife grinding of TCT cutters.

<u>Part No.</u>	<u>Description</u>
<u>Arbors</u>	
NXT 15	35mm dia. arbor.
NXT 34	30mm dia. arbor.
NXT 40	50mm dia. arbor.
NX 98	1.1/4" dia. arbor.

NOTE: 40mm dia. arbor is already supplied with the machine as standard. (NXT 18 (230 m/c) or NXT 57 (300 m/c))

NXT 15, 34, 40 and NX 98 are suitable for locating plain bore and coned bore blocks with the appropriate loose cones.

NXT 42	1.13/16" dia. general purpose arbor.
NXT 44	2.1/8" dia. general purpose arbor.

NOTE: NXT 42 and NXT 44 arbors are suitable for WADKIN coned collet sleeve, plain and coned bore mounting blocks. These also have diametrically opposed keyways for blocks of other manufacturer.

NOTE: Other sizes of arbors can be supplied to suit requirements.

Styli

NX 110	90 deg point * 4.7mm wide stylus.	
NX 111	30 deg chamfer RH stylus.	
NX 112	30 deg chamfer LH stylus.	
NX 131	45 deg chamfer RH and LH stylus.	
NX 133	3mm wide radius and square stylus.	
NX E18	Ball bearing stylus. } to be	
NXT 123	Trued template. } used	
		} together.
NX G01	New stylus assembly.	

<u>Part No.</u>	<u>Description</u>
<u>Alternative tool rests</u>	
NX 134	Narrow tool rest.
NXT 78	Curved narrow tool rest for narrow width tena disc sets or narrow segmental type circular cutterheads.
<u>Collets</u>	
LS 6795	12mm bore mark 3 type collet.
LS 6706	14mm bore mark 3 type collet.
LS 1247	1/2" bore mark 3 type collet.
LS 1265	9/16" bore mark 3 type collet.
<u>Grinding coolant accessories</u>	
T30 49102	Hand held refractometer for measuring concentration of grinding fluid.
NX H02	Magnetic filter to suds tank. Note: strongly recommended for swarf removal.
NX S18	Magnetic filter electrics.
NXT 48	Anti bacterial flushing concentrate for cleansing tank when replacing grinding fluid. (1 pint (1/2 litre))
NXT 49	Semi-synthetic grinding fluid in concentrate form. (1 pint (1/2 litre))
<u>Template accessories</u>	
TBO 650	Template making kit.
NXT 6	Extra 305mm (12") length of template steel.
<u>Dressing accessories</u>	
DD 1	Spare diamond for grinding wheel dresser.

<u>Part No.</u>	<u>Description</u>
<u>Setting stands</u>	
MSS 230	Modular setting stand - 230 capacity.
MSS 300	Modular setting stand - 300 capacity.
MSS 230 EL	Modular setting stand - 230 capacity, with Computer Aided Setting System.
MSS 300 EL	Modular setting stand - 300 capacity, with Computer Aided Setting System.
<u>Grinding aids</u>	
NXT 101	Router cutter grinding unit to profile grind. TCT and HSS router cutters excluding collets.

SECTION 13

SUGGESTED SPARES

<u>Part No.</u>	<u>Description</u>
<u>Grinding spindle</u>	
NX 57	"HASABIT" type 'F1' endless belt 727mm LG * 15mm wide for operation at 60 Hertz.
NX 56	"HASABIT" type 'F1' endless belt 745mm LG * 15mm wide for operation at 50 Hertz.
NX 45	Spindle unit.
T3074101	Outer flange.
T3041152	Woodruff key.
NX 449	Locknut.
NX 84	Front flange.
<u>Lighting</u>	
NX 50133	Worklamp.
K 3017100	Spare reflector.
K 3017102	Spare glass.
K 3017105	Retaining spring.
K 1203418	12 Volt 20 Watt bulb.

<u>Part No.</u>	<u>Description</u>
<u>Stylus and template</u>	
NX 40	Stylus 2.35mm rad * 4.7mm square.
NXT 6	Template blank - 12" LG (2 off).
<u>Dresser unit</u>	
NX 134	Narrow cutter rest.
NX 454	Standard cutter rest.
DD 1	Diamond dresser 3/8" B.S.F. * 1.1/2" LG.
NX 119 }	Barrel locks for rest and dresser pivot pin. (required as a pair)
NX 120 }	
<u>Pumps and motors</u>	
NX S0203	Pump 50Hz.
NX S0503	Pump 60Hz.
T30-09-252	Terminal cover for NX S0203 and NX S0503.
NX S0603	Pump 60Hz CSA.
NX S1202	Motor 50Hz.
NX S0502	Motor 60Hz.
NX S0602	Motor 60Hz CSA.
T30-09-251	Terminal cover for motors.
T30-41-151	Shaft key for motors.
K30 50 101EM	Seals for pump motor (1 set).

<u>Part No.</u>	<u>Description</u>
<u>Carriage</u>	
<u>MODEL 230</u>	
NX 128	Outer bellows.
NX 154	Inner bellows.
NX 187	Rotolin bearing ML 40 55 250.
NX 115	Shaft.
<u>MODEL 300</u>	
NX 186	Rotolin bearing.
NX 305	Inner bellows.
NX 306	Outer bellows.
NX 155	Shaft.
<u>MODELS 230 and 300</u>	
T 30 73 205	Oil seal - 2 per bearing.
K 30 09 404	Worm drive clips.
NX 139	Slide cover.
T09 50 102	Oil nipple.
K09 50 103	Angled adaptor. (Required as one)
K05 50 133	Cone sealed oiler.
T05 10 503	2 ba lock nut. (Required as one)
K05 30 320	Handwheel for arbor clamp. (2 per machine)
K30 05 665	Swing bolt for arbor clamp.

10 Make initial check of template against drawing or wood sample in order to note any deviations or corrections necessary.

11 Finish template shape by using needle files and emery paper to achieve smooth, accurate shape. **Note:** When filing into either a right angled corner (Fig. A) or an acute "V" profile (Fig. B), use of a one-sided needle file is recommended.

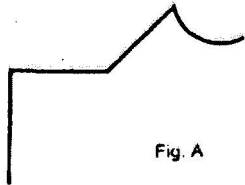


Fig. A



Fig. B

12 Remember . . . The accuracy and quality of your profile ground cutters will depend strongly on the care and attention given to the making of the template.

13 Straight Knife Grinding. Included in the kit is a precision machined template (part number NXT 123) for use specifically to grind straight knives. Please maintain this template in excellent condition and do not substitute for the standard template blanks.

Wadkin Tooling

Division of Wadkin plc

WADKIN TOOLING · 331 HUMBERSTONE LANE · LEICESTER LE4 7LH · ENGLAND
Telephone: (0116) 2769111

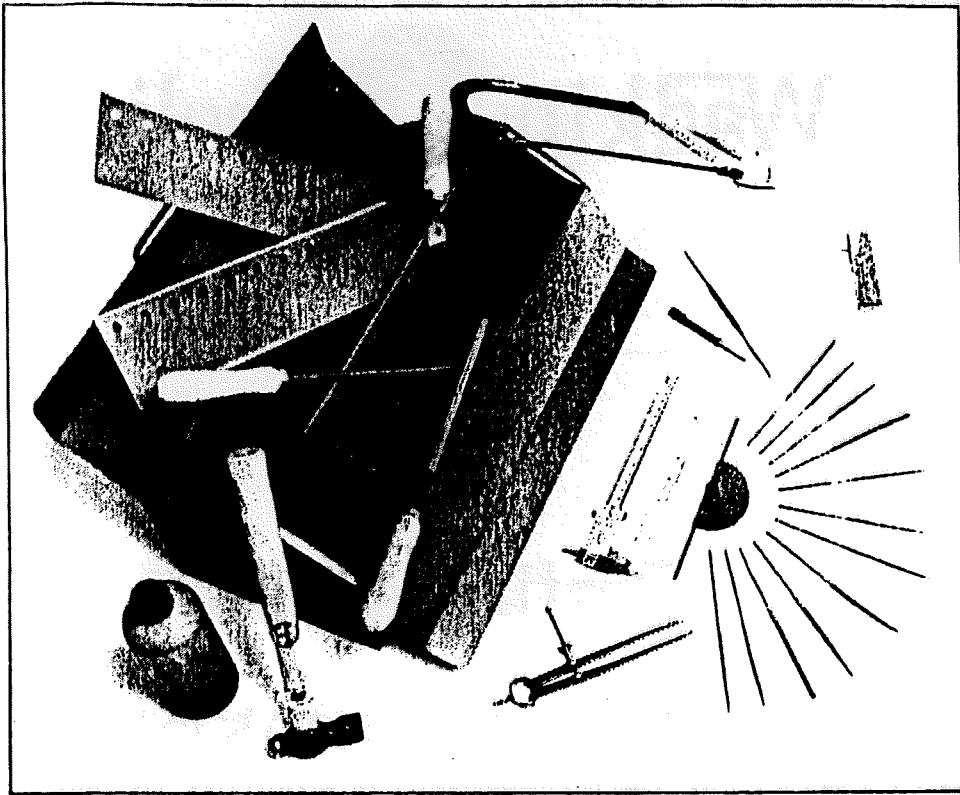
Wadkin Tooling

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NX Profile Grinder

TEMPLATE MAKING TOOL KIT

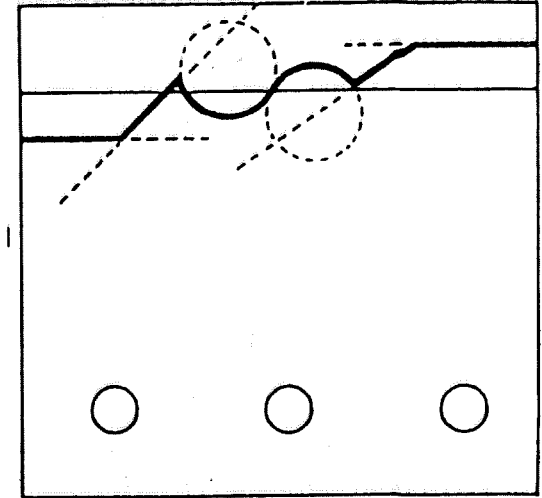
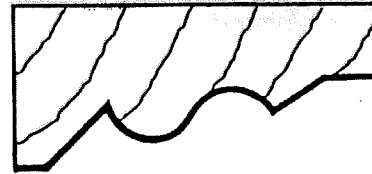
INSTRUCTION MANUAL



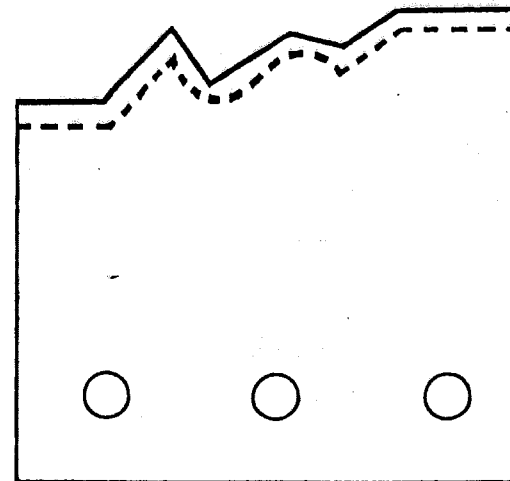
TOOL KIT CONTENT (Part No. TBO 650)

- | | |
|-------------------------------------------------|--------------------------------------------------------------------|
| Engineer's Scribe | 16cm Needle File (Set of 12) |
| 6" Engineer's Square | Hacksaw |
| 6" Steel Rule | Hacksaw Blades (18T and 24T) |
| Protractor | 5 Sheets Silicon Paper |
| 6" Vernier Caliper | 2 300mm Template Steel (NXT6) |
| 6" Compass (Dividers) | 1 300mm "Trued" Template (NXT123)
(For straight knife grinding) |
| 1/2lb Ball Pein Hammer | Tin Marking Blue |
| Centre Punch | Toolbox c/w Lock |
| 8" Half Round 2nd Cut File | |
| 8" Round 2nd Cut File | |
| 8" Flat 2nd Cut File
(Complete with handles) | |

8d Scribe over only those relevant lines in order to highlight and detail the actual mould shape.

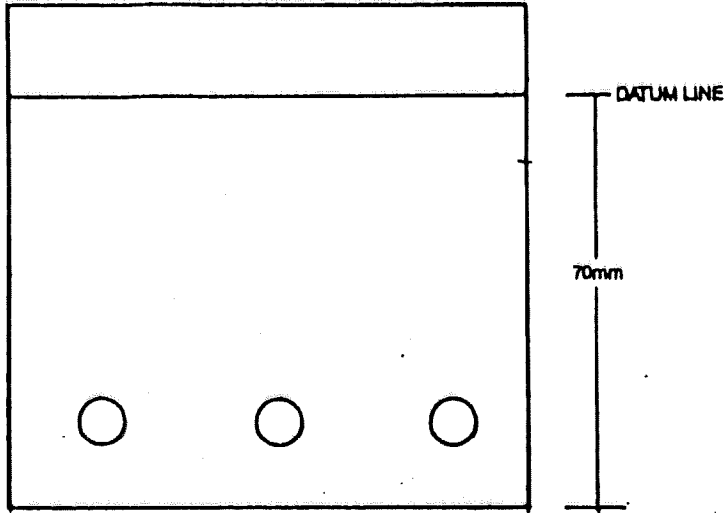


9 Secure template in a bench vice and cut out unwanted metal to produce a rough profile shape. Use roughing files to shape template just to scribed lines and not beyond.

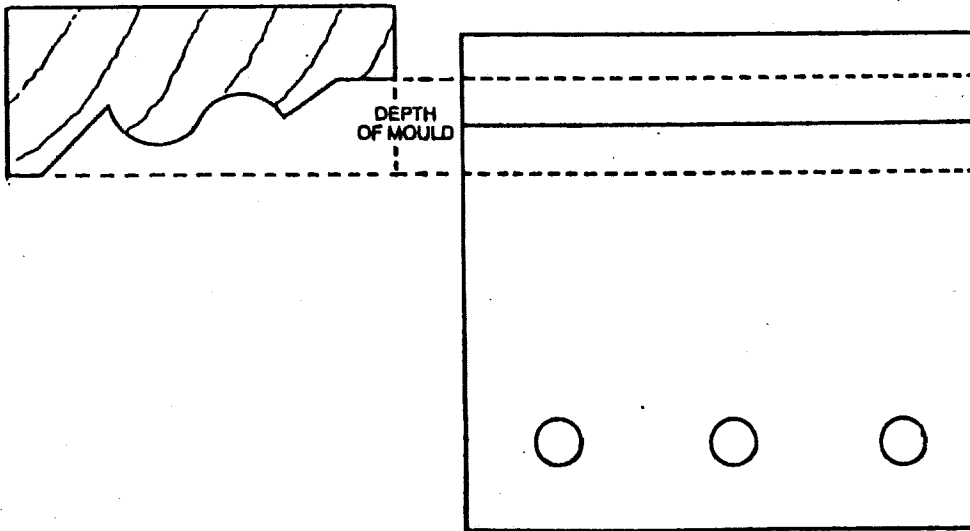


4 Stain one side of the template with marking blue which will help to produce clear distinct lines when scribed.

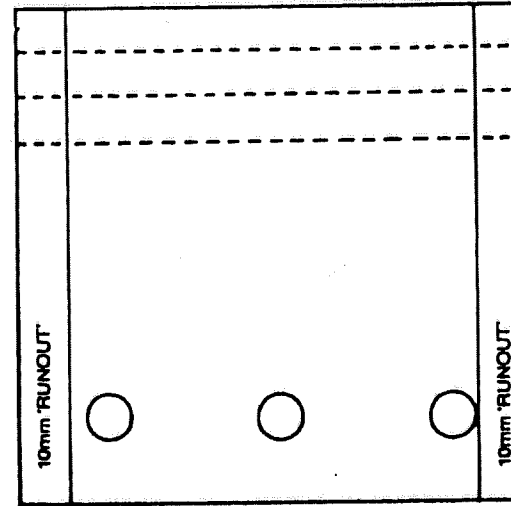
5 Using a scribe, mark a line 70mm from the back edge. Ensure that this line is **parallel** as it will become your datum (i.e. the line or point on which all measurements and dimensions will be calculated).



6 Measure the depth of mould and scribe two lines equal distance and parallel to the datum line. Required mould depth should be 50% either side of the datum.

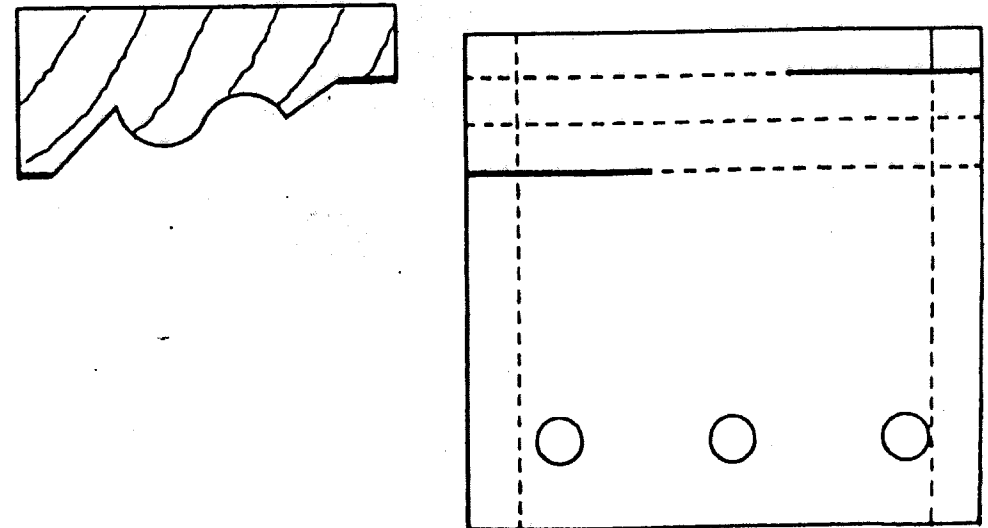


7 It is essential to produce a "runout" on the template by allowing for 10mm clearance on either side of the desired mould shape. This runout is necessary in order to maintain template/stylus contact beyond normal cutter width thus preventing a sudden dropping and possible damage of the arbor and/or block onto the grinding wheel.

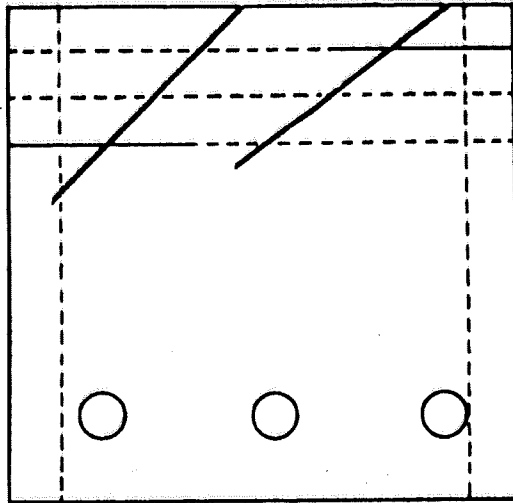
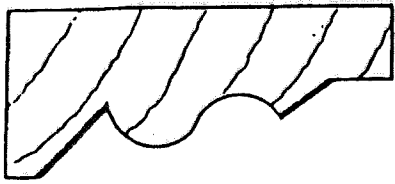


8 Profile shape can now be transferred onto the template by breaking down the mould shape into its simple components (i.e. straights, bevels, curves). As it is the cutter shape that is produced from the template, the final template shape should be an exact replica in a contra profile (mirror image) of the wooden mould to be produced.

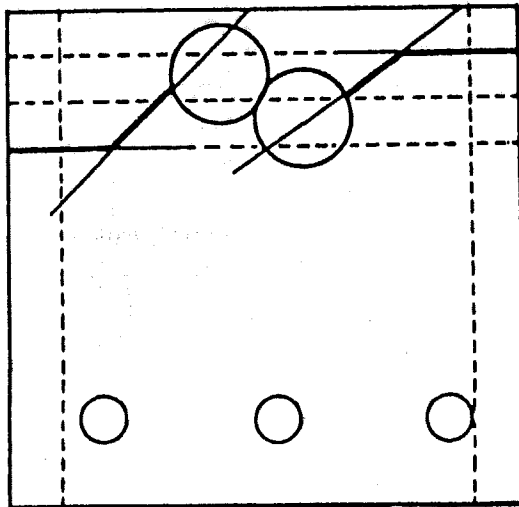
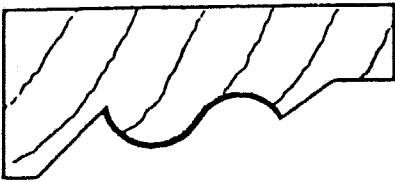
8a Measure and scribe all **straights** of the profile shape onto the template using a square rule. Check and ensure that all straight lines are either parallel to or at right angle to the rear edge of the template.



8b Measure and scribe all bevels of the profile shape using protractor set to the appropriate angle.

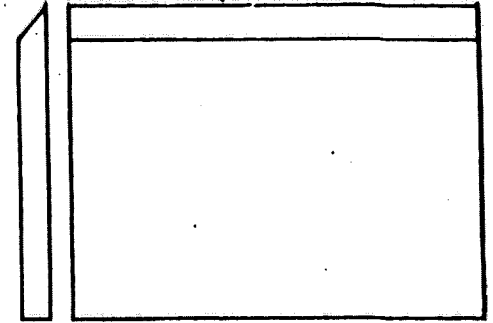
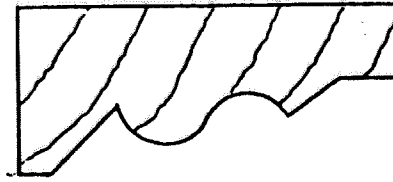


8c Measure and scribe all curves by using a centre punch and compass (dividers) for reproducing all radius dimensions.



PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE COMMENCING MANUFACTURE OF TEMPLATE

1 Select cutterblank for mould shape required, bearing in mind the maximum cutter projection permitted as determined by cutter thickness. Mould shape may be reproduced using either detailed drawings or actual wooden mould, providing sample is free from defects.



2 Cut a length of template steel at least 20mm longer than cutterblank selected and with a minimum of two fixing holes. Templates should always be made from blanks supplied by Wadkin Tooling (part number NXT 6). Failure to do so could result in poor or inaccurate reproduction of profile shapes.

3 File and dress template steel to bring side edges into square with the back edge. Check using an Engineer's square as a precise right angle is required for setting the stylus on the profile grinder square to the mould shape and parallel to the grinding wheel.

