DIAFORM
OPERATING
INSTRUCTIONS

VERTICAL MODELS

DIAFORM

OPERATING INSTRUCTIONS.

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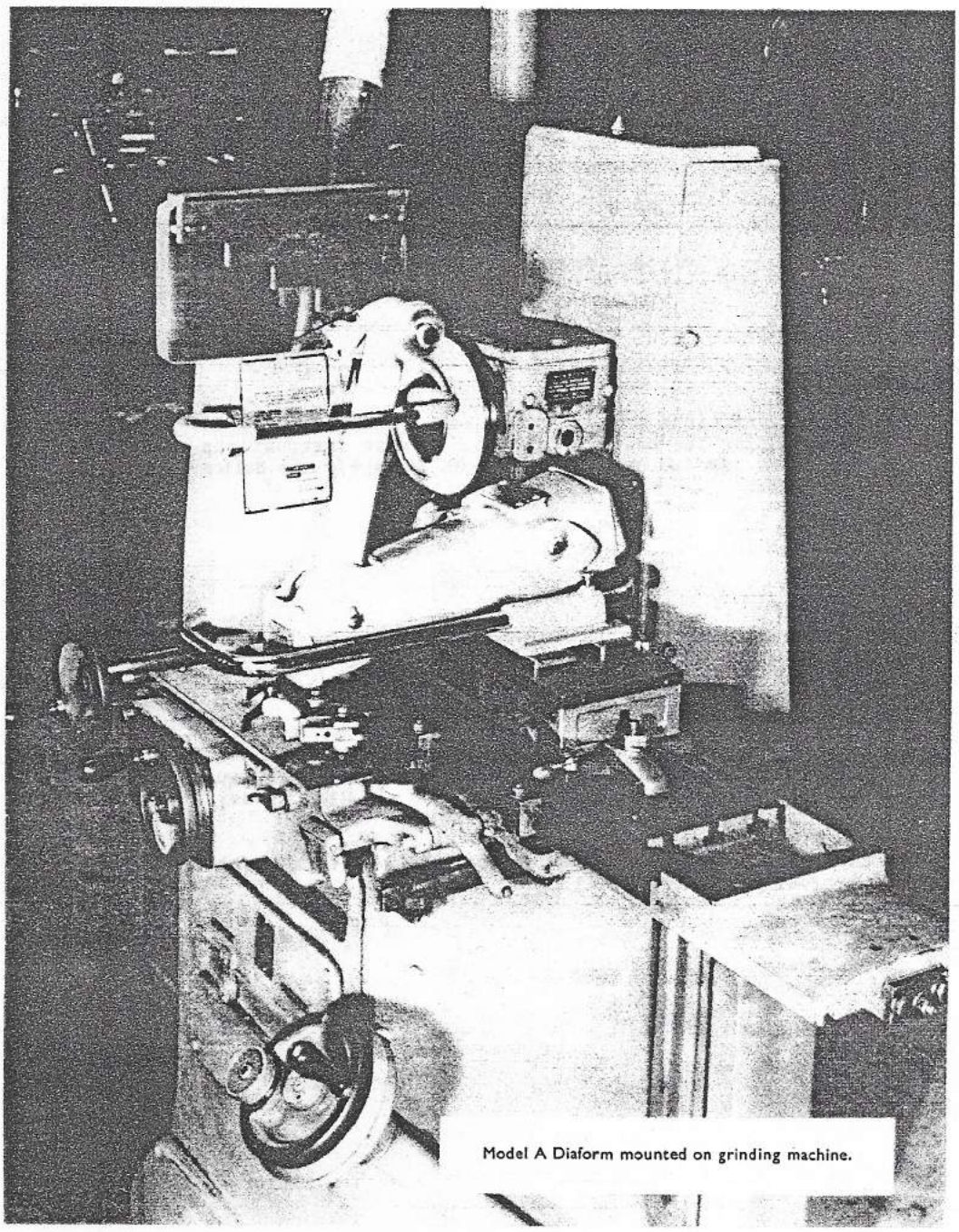
OPERATING INSTRUCTIONS



Model A Diaform mounted on grinding machine.

OPERATING INSTRUCTIONS

UNPACKING

Full instructions for unpacking the Attachment will be found inside the Diaform Cabinet. These instructions should be carried out in order not to impair the delicate mechanism.

STORING

Numbered, felt padded wooden blocks and screws are supplied to screw inside the cabinet. With these in position the Diaform is securely held.

For proper support of the vertical arm, utilize the vertical arm brace.

WHEEL CHOICE.

The choice of the correct grinding wheel is very important. The harder and coarser wheels commonly used in form grinding should be avoided, as they will certainly cause excessive wear or damage to the fine truing diamonds used.

Generally a fine grit, soft grade wheel gives best results. Aluminium oxide grit is particularly suitable for high speed steel and hardened tool steel. It has the additional advantage of causing less diamond wear, and creates less heat in the work piece than does silicon carbide. The white aluminium oxide (WA) Wheel has been found most efficient.

Grit Size

General sizes 100 to 220.

A grit size of 100 gives the best results on most profiles. A finer grit size may be necessary for small radii and sharp corners, and causes no appreciable difference to the factor of the wheel truing. Using Whitworth thread forms as an easily remembered guide, the following table gives the grit sizes recommended.

6 to 12 T.P.I.	requires	100 to 150 grit,	Grade G.V.
12 to 18 T.P.I.	"	150 to 180 grit,	" G.V.
18 to 24 T.P.I.	"	180 to 220 grit,	" G.V.

Wheel Grades.

General guide G to J grade (in no circumstances harder than J). Grade G to H is most suitable for high speed steel and hardened tool steel, giving a free cutting action even with the finer grit sizes. As the Diaform affords a rapid and easy means of re-truing any profile, the harder wheels commonly used in conventional form generation can be avoided. A vitrified bond is at all times preferable for form grinding.

Having mounted the selected wheel, it should be carefully balanced and dressed true on all faces in the normal way before attempting to use the Diaform.

ILLUSTRATION (C.2874)

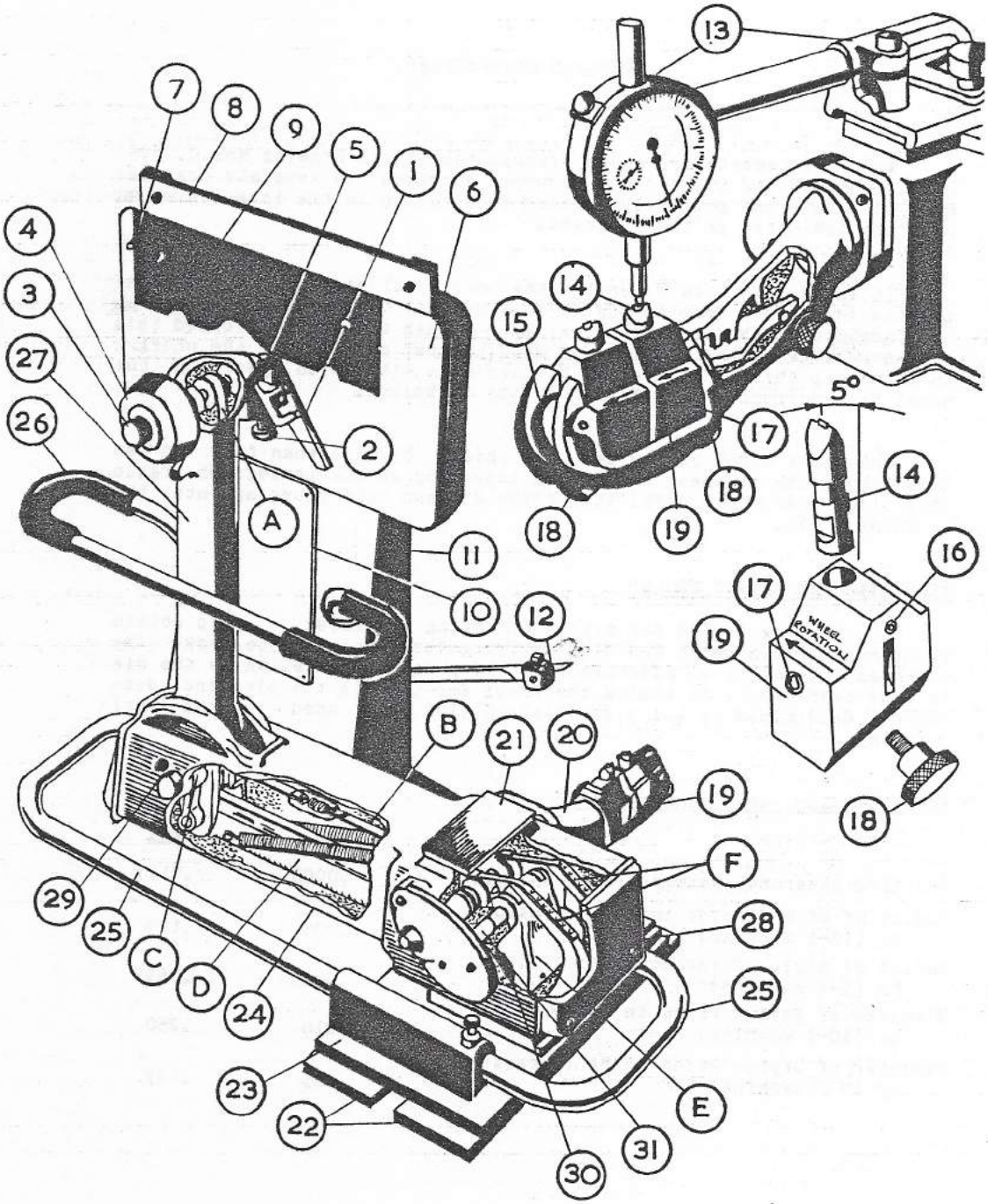
KEY TO NUMBERED PARTS

Throughout this Handbook reference numbers are composed of the illustration number followed by the item number applicable to that page. Reference to Left and Right hand are all taken from the Diaform Operators position.

Part No.	Ref. No.		Part No.	Ref. No.	
D/A.408/9	1	Diamond Flank Guards 42°			
D/A.406/7	1	Diamond Flank Guards 62°		17	Diamond Shank Locating Screw
169	2	Flank Guard Clamping Screw.	D/A.170	18	Retaining Screw Diamond Block
402	3	Stylus Point Draw Bolt.	D/A.430	19	Diamond Block (A or B)
439	4	Stylus Hand Wheel	415	20	Diamond Spindle
D/A.426	5	Stylus Point.	137	21	Dial Gauge Mounting Plate
422	6	Template Carrier Plate	120	22	Sole Plates (A or B)
	7	Template Location Pin	420	23	Base Casting
	8	Top Location Beam (Template)	424	24	Body Casting
	9	Template	D/A.121 122	25 25	Lifting Rail (R.H.) Lifting Rail (L.H.)
234	10	Instruction Plate		27	Vertical Arm
	11	Template Carrier Casting	419	26	Guard Rail (Vertical Arm)
	12	Wheel Centering Unit		28	Body - End Cover
AT. 428	13	Dial Gauge Mounting Unit		29	Grub Screws, Cone Bearing Adjustment
	14	Chisel Diamond Tool		30	Cone Adjustment Screw
	15	Adjusting Screw Diamond Centering		31	Cone Adjustment Screw
	16	Locking Screw (Diamond Block)		32	
417	A	Vertical Driving Tape	412	D	Long Linkage
416	B	Horizontal Driving Tape	107	E	Short Linkage
	C	Bearing	D/A.418	F	Spring Balance Tapes

No M8 / IN /C. 2874.

GENERAL ARRANGEMENT FOR MODEL AT.



TEMPLATE MANUFACTURE.

The requirements are shown diagramatically on Drawing Nos.C.2875 and C.2895, 96 and 97. For accurate location the template profiles must be square and precisely located in relation to the location and datum edges indicated on the diagrams.

It is advisable to determine the horizontal distance at which the profile is pitched from the Datum edge and to mark this dimension on the template or the template drawing. When the wheel is trued this left-hand edge of the template is used to true one side of the wheel. In grinding, this side face may be used as a witness to position the wheel form correctly in relation to the workpiece.

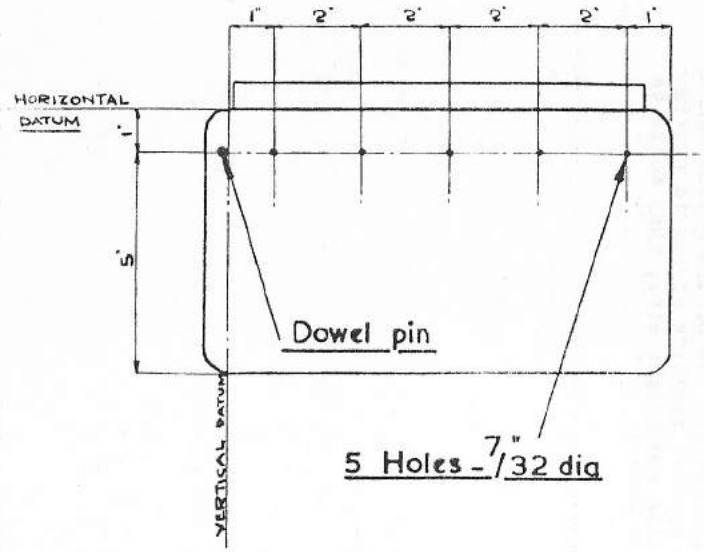
The total width of the template should be more than five or ten times the width of wheel being used depending on the pantograph ratio. This eliminates the possibility of the diamond tool plunging into the grinding wheel.

TEMPLATES FOR 'PRESS TOOLS'

See drawing C.2898 for method of mating templates. To obtain clearance between punch and die, a recognised method is to make the punch as accurately as possible from the punch template, while the die is made oversize. In truing the wheel for the die the clearance desired is determined by the size of the Stylus Point used in the final dressing.

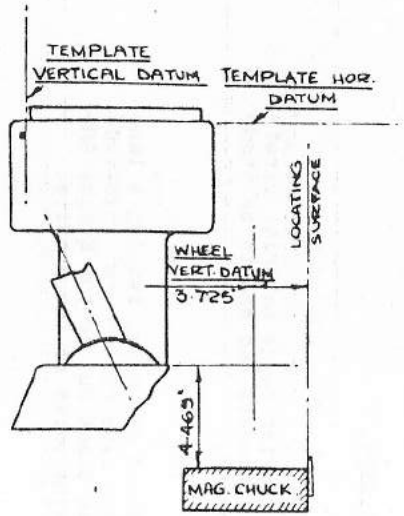
EXAMPLE: 10-1 and 5-1 PANTOGRAPH

	ins.	mm.
Required clearance between Punch and Die	.0005	.0127
Radius of Stylus Point to be increased by (10-1 machine)	.005	.127
Radius of Stylus Point to be increased by (5-1 machine)	.0025	.0635
Diameter of Stylus Point to be increased by (10-1 machine)	.010	.250
Diameter of Stylus Point to be increased by (5-1 machine)	.005	.127



THE TEMPLATE of 3/32 or 1/16 steel sheet, is secured to the TEMPLATE CARRIER (shown above) by means of screws thro' two of the holes. The required profile of the wheel (10X actual size) must be parallel or at the required angle to the horizontal datum. The profiled portion of the template may be positioned at any convenient distances from the datum edges to bring it approx. central on the carrier plate.

GUIDE TO TEMPLATE MANUFACTURE.



The form on the wheel will be positioned from the above wheel datum lines 1/10 of the distances at which the form on the template is positioned from the template datum lines.

(NOT TO SCALE)

SETTING DIAGRAM

MODELS AT & BT - TEMPLATE MANU. & SETTING

No MB / IN / C. 2875

TEMPLATES FOR 'R' MODELS

See Drawing C.2895.

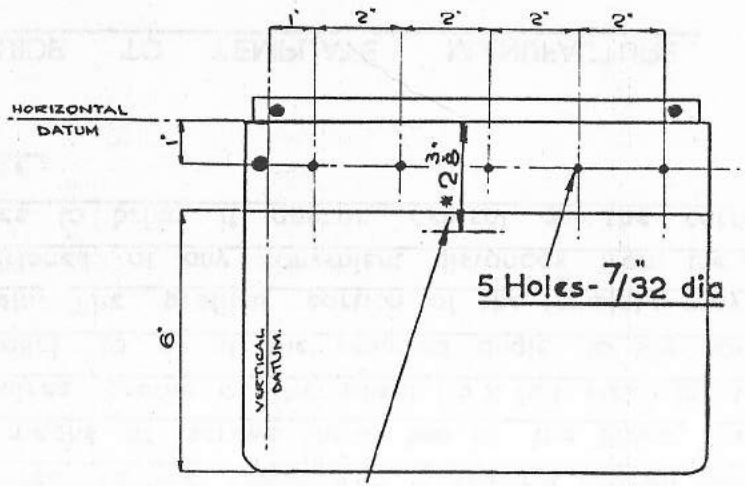
These templates should be made of heavier gauge material (preferably Steel) than those used on standard models and should be absolutely flat, as they are not fully supported.

The template profile should be tapered one side, leaving a land of approximately .020", particularly when side-relief is involved. Distortion to the finished form can take place due to the Stylus following on front and rear edges in opposing parts of the profile.

NOTE:

When carrying out the roughing operation on an 'R'Model Diaform, the roughing chisel is set .005" low against the 60/.10 radius Stylus, i.e. Setting height + .005" as no special roughing stylus is provided with these Attachments. (Due to size and weight etc., they would be of little value).

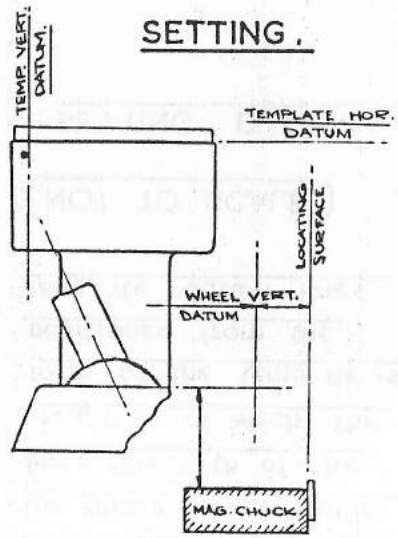
GUIDE TO TEMPLATE MANUFACTURE.



Distance from horz. datum to the deepest cavity in template must not be less than $2\frac{3}{8}$".

THE TEMPLATE of $\frac{3}{32}$" or $\frac{1}{8}$" steel sheet, is secured to the TEMPLATE CARRIER (shown above) by means of screws thro' at least two of the holes. The required profile of the wheel (5 or 10 times full size, according to model) must be parallel or at the required angle to the horizontal datum. The profiled portion of the template may be positioned at any convenient distances from datum edges to bring it approx. central on carrier plate - when compensating for side relief, it is necessary to ch'r profile edge to leave a min. operative temp. thickness.

SETTING.

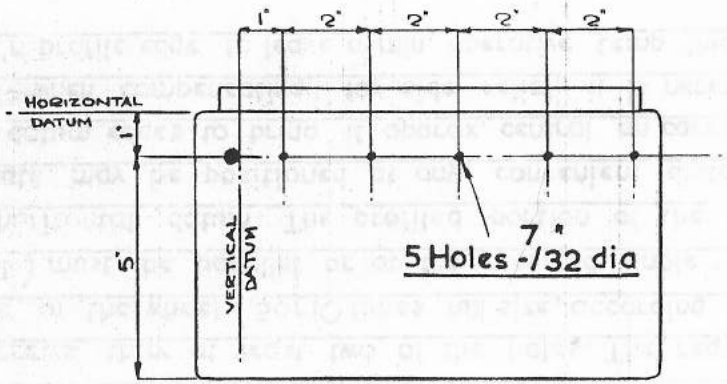


The form on the wheel will be positioned from the above wheel datum lines 1/10 or 1/5 of the distances at which the form on the template is positioned from the template datum lines.

Pantograph Reduction

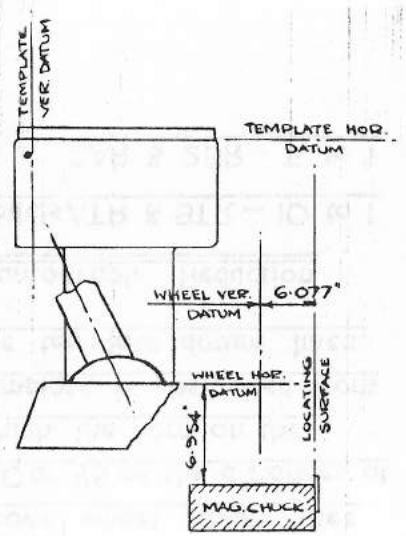
Models ATR & BTR – 10 to 1

2AR & 2BR – 5 to 1



THE TEMPLATE of 3/32" or 1/16" steel sheet is secured to the TEMPLATE CARRIER (shown above) by means of screws thro two of the holes. The required profile of the wheel (5 X full size) must be parallel to, or at the required angle to the horiz. datum. The profiled portion of the template may be positioned at any convenient distances from the datum edges to bring it approx. central on the carrier plate.

GUIDE TO TEMPLATE MANUFACTURE.

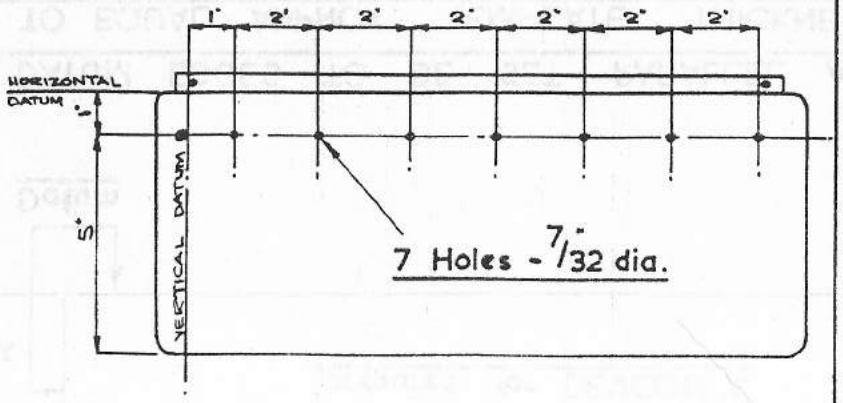


The form on the wheel will be positioned from the above wheel datum lines one fifth of the distances at which the form on the template is positioned from the template datum lines.

(NOT TO SCALE.)

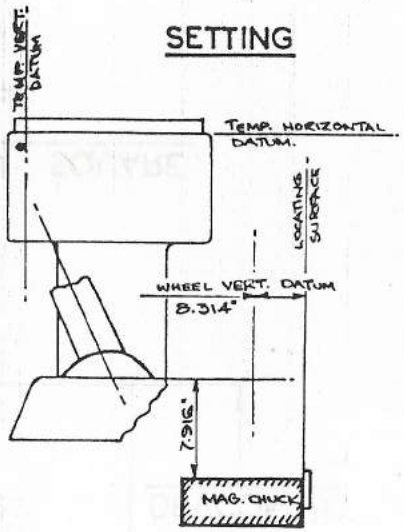
SETTING DIAGRAM.

GUIDE TO TEMPLATE MANUFACTURE



THE TEMPLATE of 3/32" or 1/8" steel sheet, is secured to the TEMPLATE CARRIER (shown above) by means of screws thro' at least two of the holes. The required profile of the wheel (5X actual size) must be parallel or at the required angle to the horiz. datum edge. The profiled portion of the template may be positioned at any convenient distances from the datum edges to bring it approx. central on the carrier plate.

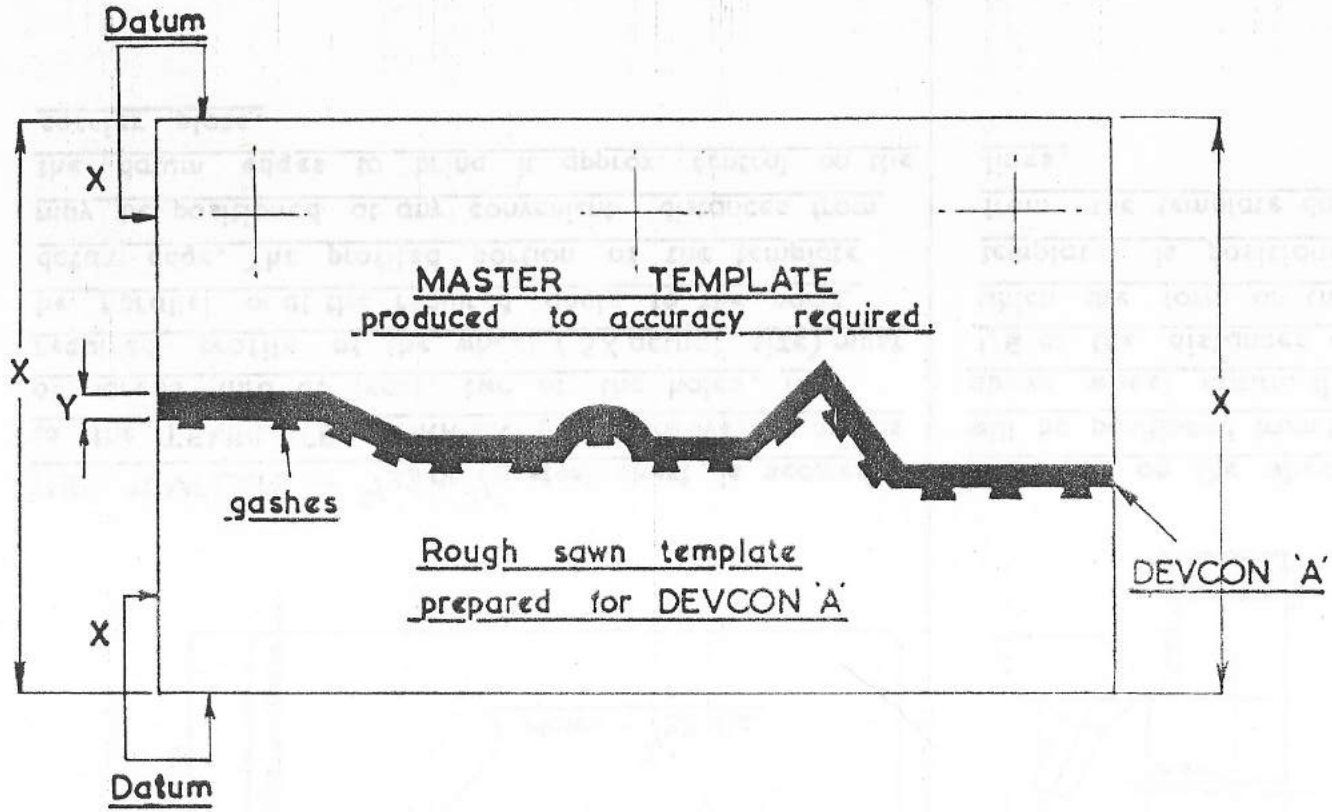
SETTING



The form on the wheel will be positioned from the above wheel datum lines 1/5 of the distances at which the form on the template is positioned from the template datum lines.

TEMPLATE MAKING WITH DEVCON 'A'

PREPARATION DIAGRAM.



X DATUM EDGES TO BE SET PARALLEL AND SQUARE.

Y TO EQUAL APPROX. TEMPLATE THICKNESS.

TEMPLATE MAKING WITH DEVCON 'A' & MASTER.

No M8 / IN / C.2898.

SIMPLIFIED METHOD OF DIAFORM TEMPLATE MANUFACTURE.

Where two templates are required for matching forms as are often required for press tool punches and die sections, a simplified method of template manufacture is available as shown in accompanying diagram. With this method, the template which is the easier of the two to make by orthodox methods, is selected and used as a master for producing the opposite.

To produce this opposite, a template is cut roughly to shape with a band-saw or any other free-hand method, allowing a gap of approximately the thickness of the template. This edge should be left rough excepting for removal of face burrs and in addition it should be gashed to provide a key for the plastic metal.

The material for producing the true contour on this template is known as "DEVCON A". It is a hard quick drying plastic with a high powder-metal content and is manufactured by the DEVCON CORP.- DANVERS - MASSACHUSETTS - U.S.A. It is available in most countries through normal engineers' supply channels. Similar materials may be available, but "DEVCON A" has been thoroughly tested and proved in use, and these instructions are for this specific material. Where other materials are chosen the maker's instructions should be closely followed.

The master template is produced to the accuracy required, and the edge of the profile made smooth and polished to a good quality finish to ensure smooth tracing, as a rough template edge will reproduce poor grinding finishes.

This template should be made perfectly clean and dry. The profile edge and base faces are then evenly covered with a smear of the release agent to prevent "DEVCON" from bonding.

This template is then clamped to a flat surface which has also been treated with release agent and the rough cut template positioned to give opposite true datum face and similarly clamped.

The "DEVCON" is then puddled into the gap between the templates and left to dry. This drying period should not be accelerated by heating as normal room temperature will provide most accurate results, and the normal period for this setting is strongly recommended.

After the "DEVCON" is set hard the templates can be transferred to the grinding machine magnetic chuck, and a light grinding pass taken to remove the surplus "DEVCON" from the uppermost faces thus enabling it to be reversed on the Diaform template-carrier where necessary. The datum edges of the composite template can be finally corrected by surface grinding if necessary.

"DEVCON" is available in Grear Britain from :-

E.P. Barrus Ltd.,
12 - 16, Brunel Road,
Acton,
London W.3.

OPERATING INSTRUCTIONS.

SHARP EXTERNAL CORNERS ON WORKPIECE

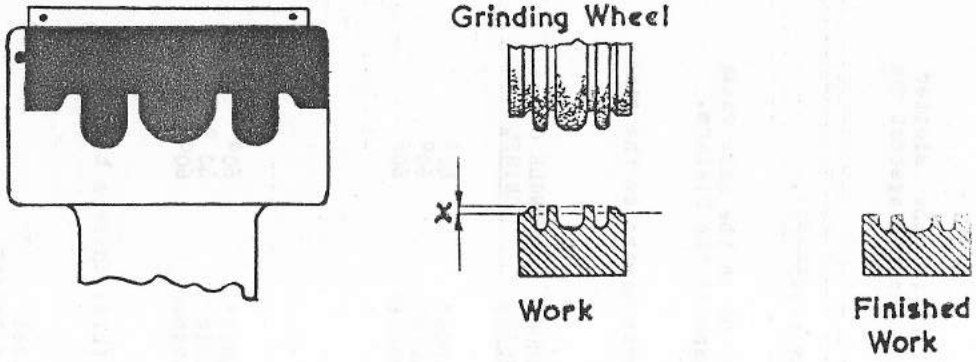
Sharp external edges on the workpiece can be obtained by the method shown on C.2899. This is achieved by undercutting the wheel to a depth equal or slightly greater than the radius of the diamond tool used. Projections of this amount then appear on the workpieces (denoted by 'x'), and these can be removed by a straight-dressed wheel to leave the desired sharp edge as shown in the same diagram.

FORMS REQUIRING NARROW SLOTS IN WHEEL

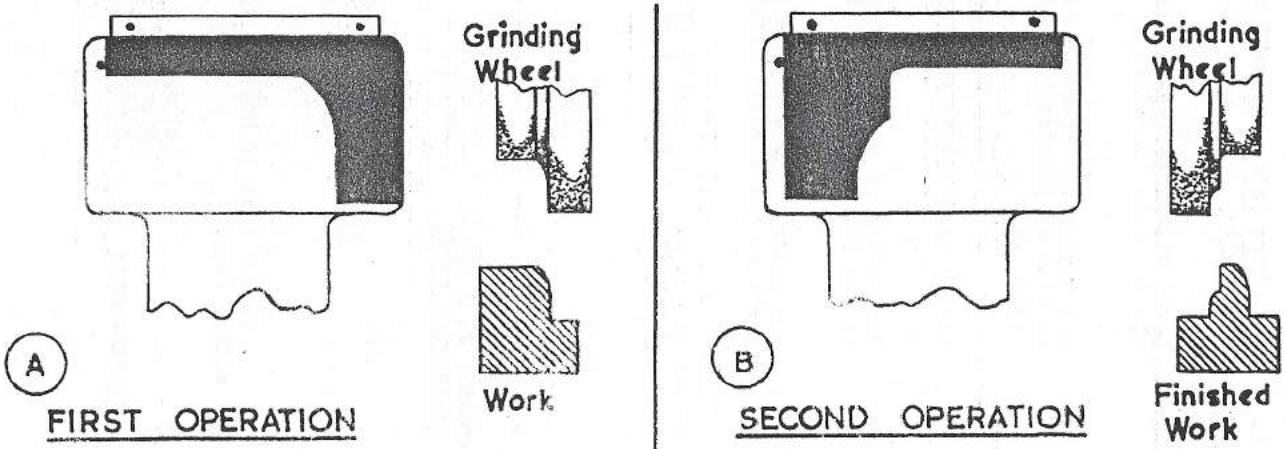
Certain forms requiring deep, narrow slots in the wheel cannot be produced directly by the diamond chisel. In such cases templates can be super-imposed to dress wheels for grinding the form in two or more operations.

Diagram C.2899 illustrates a method of producing a deep, narrow form by the use of two templates. The wheel or wheels are dressed as shown in 'A' and 'B' for the two operations necessary.

TO OBTAIN SHARP EXTERNAL CORNERS ON WORK.



TO OBTAIN FORMS REQUIRING NARROW SLOTS IN WHEEL.



ASSEMBLY OF STYLUS POINTS AND FLANK GUARDS

1. Make sure that the taper on the Stylus Point is clean and free from grit.

2. Mount Stylus in the vertical arm Stylus head and secure with the Drawbolt (C.2992/5).

3. The Tangential Flank Guards are assembled in the slotted carrier by pushing inwards until properly located against the Stylus Point.

4. Fix in position with clamp bar and screw (C.2992/7).

5. The radius of the stylus point used must be in the same ratio to the Diamond radius as is the pantograph of the Diaform.

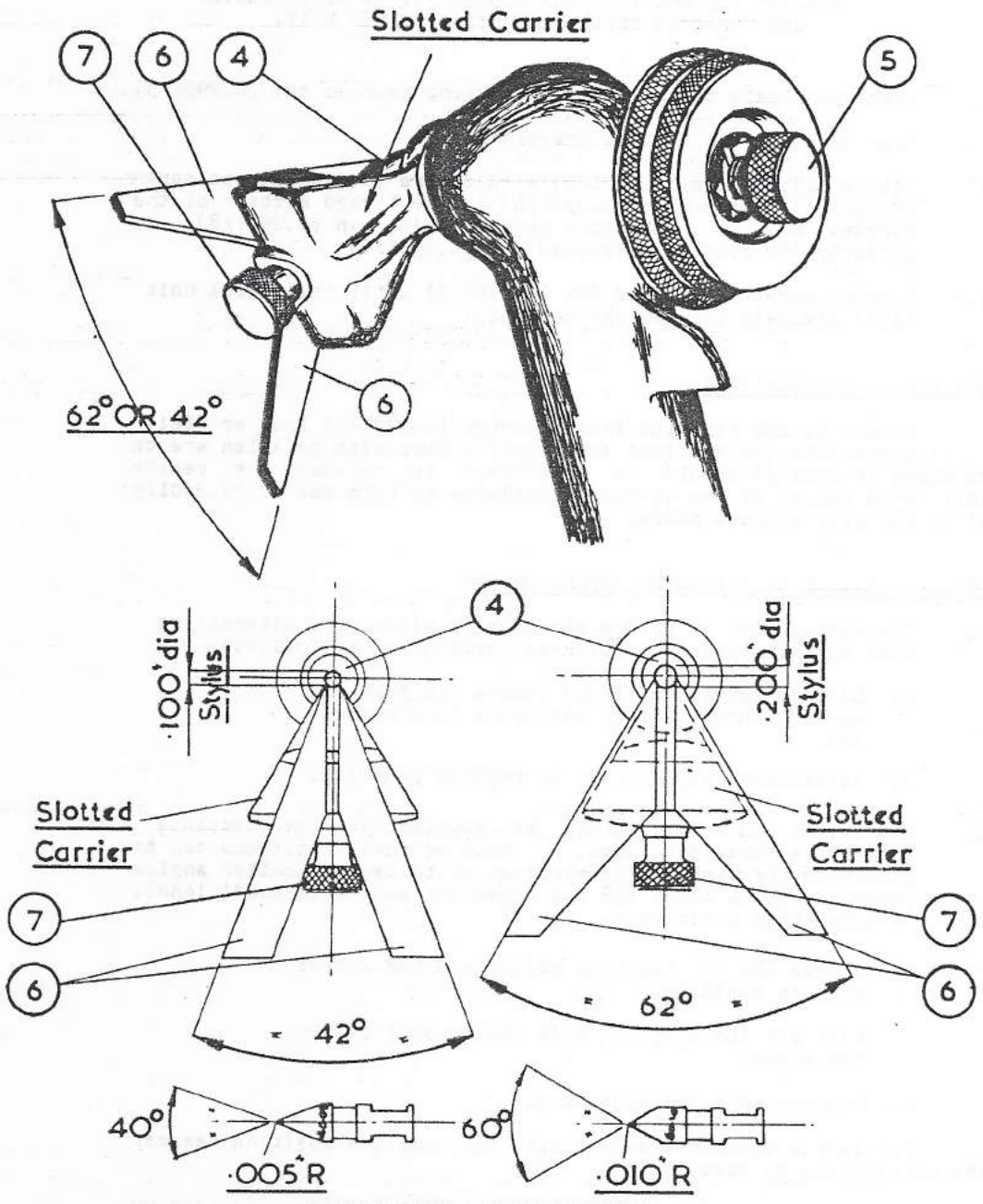
The nominal angle of the Flank Guards must always be the same as the angle of the Diatipt Chisel used.

MODELS AT and BT PANTOGRAPH RATIO	STYLUS POINT RADIUS	STYLUS POINT DIAMETER	DIAMOND RADIUS	ANGLE OF CHISEL
10-1	.050"	.100"	.005"	40°
	.100"	.200"	.010"	60°
	-	.600"	Rougher	60°
MODELS 2, 3 and 4 PANTOGRAPH RATIO				
5-1	.050"	.100"	.010"	60°
	.050"	.100"	.010"	40°
	-	.300"	Rougher	60°

In the case of Models 4A and 4B all three chisels have a 60° angle, i.e.

	.010"/60°	Finishing Chisel
	.010"/60°	Semi-Finishing Chisel
An approximate	.020"/60°	Roughing Chisel

ASS'Y – STYLUS POINTS & FLANK GUARDS.



MOUNTED DIAMONDS

(MODELS SUFFIXED 'R')

SPECIAL INSTRUCTIONS FOR MODELS FITTED WITH "RELIEF COMPENSATING DEVICE" MOUNTING STYLUS UNIT.

a. Withdraw female centre (C.2901/4) using knurled nut (C.2901/5).

b. Make sure all the centres are clean.

c. Locate male centre (C.2901/2) with centre (C.2901/1) and centre (C.2901/3) with centre (C.2901/4) in the forked member of the vertical arm. Make sure that location pin (C.2901/8) is properly positioned in slotted pin (C.2901/6).

d. Finally screw up knurled nut (C.2901/5) until the Stylus Unit is firmly held between the centres.

ADDITIONAL INSTRUCTIONS

Should at any time the female centre (C.2901/4) lock or fail to withdraw into the Vertical Arm, half a turn with an Allen wrench in screw (C.2901/7) should be sufficient to release the centre. This could happen if the operator continues to turn the nut(C.2901/5) after the centres have mated.

"SPREADING WEAR ON 'R' MODEL STYLUS UNITS"

1. The stylus unit is reversible thus providing two alternative wear areas. This operation is carried out as follows:-

   a. Dismount stylus unit and remove pin from one end of centre casting and press into reverse end.

   b. Re-assemble stylus unit in reverse position.

2. The swivel and tilt unit can be mounted on the template carrier in three positions. Each of these positions can be used when the template is vertical or tilted to smaller angles (normally up to about 15° but dependent on actual conditions). To vary these positions:-

3. a. Remove the two top nuts which lock the swivel unit in position.

   b. Lift off the complete unit and reposition the two studs.

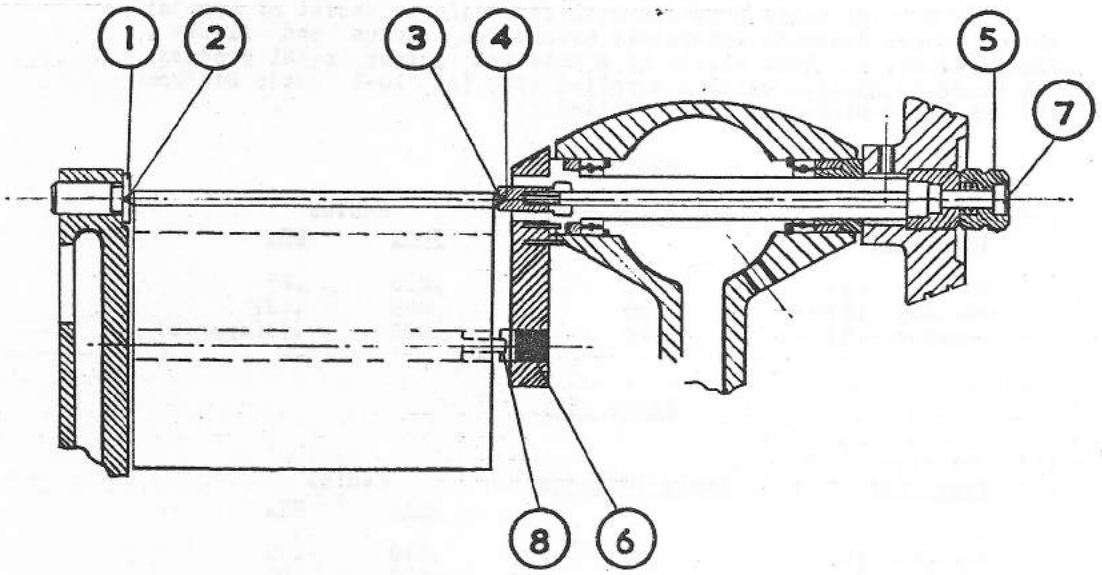
   c. Replace unit and lock nuts.

For larger clearance angles only the template position nearest the carrier can be used.

20. Alternating through these three positions spreads wear over the whole stylus length. Maximum stylus life can be obtained by combining one and two.

No M8/IN/C.2901.

'R' MODEL STYLUS UNIT ASSEMBLY.



MODELS	STYLUS UNIT		DIAMOND RADIUS
	RADIUS	DIAM.	
ATR & BTR (10/1 PANTOGRAPH REDUCTION)	.050"	.100"/40°	.005"/40°
			.010"/60°
	.100"	.200"/60°	Rougher – set chisel .005" low.
No 2, 3, & 4R (5/1 PANTOGRAPH REDUCTION)	.050"	.100"/40°	.010"/40°
	.050"	.100"/60°	.010"/60°
	.100"	.200"/60°	Rougher – set chisel .005" low.

DIAMOND TOOLS.

The Diatipt tools supplied with the Diaform consist of special chisel shaped diamonds accurately ground on radius and flanks. These are set in steel shanks by a patented powder metal process. The standard Diatipt chisels supplied with (a) 10-1 ratio Diaforms (b) 5-1 ratio Diaforms, are as follows:-

RATIO 10-1

(a) Diatipt Type Ref	Angle (Degrees)	Radius ins.	Radius mm.
60/.010 (S)	60	.010	.25
40/.005 (S)	40	.005	.127
Rougher (S)	60	.020	.50(approx)

RATIO 5-1

(b) Diatipt Type Ref	Angle (Degrees)	Radius ins.	Radius mm.
60/.010 (L)	60	.010	.25
40/.010 (L)	40	.010	.25
Rougher (L)	60	.020	.50(approx)

For further details see Data Sheets 5/1, 5/2, 3, 4 and 7.

With these standard Diatipt Chisels (C.2874/14) the majority of profiles can be obtained. The approximate form should always be produced first with the Roughing Tool. It is then recommended that the largest finishing tool which can be accommodated in the profile should be used.

SETTING UP DIATIPT TOOLS

It will be seen that the hole in the diamond block (C.2874/19) is at an angle of 5°. This provides relief behind the actual cutting edge of the chisel shaped diamond.

To locate accurately the axis of the chisel radius, small flats parallel to this axis are provided on the shank of the tool. A flat ended screw (C.2874/17) locates these flats.

Each attachment bears an instruction plate giving the "centre line setting height". This dimension is from the diamond spindle platform to the centre of rotation of the diamond spindle. The diamond tool must be set in the block so that the axis of the radius is on the same line as the spindle centre line. The exact dimension from the base of the block to the tip of the Diatipt Chisel is thus the sum of the "centre line setting height" plus the radius of the Diatipt Chisel being used. (See illustration C.2992).

OPERATING INSTRUCTIONS

The height should be set with a micrometer, taking great care when contacting the comparatively delicate diamond chisel edge with the micrometer anvil.

Example:

	ins.	mm.
Assume "centre line setting height"	1.7553	44.585
Finishing diamond radius	.005	.127
Overall height	1.7603	44.712
Assume "centre line setting height"	1.7553	44.585
Finishing diamond radius	.010	.250
Overall height	1.7653	44.835
Assume "centre line setting height"	1.7553	44.585
Roughing diamond radius (see below)*	.025	.625
	1.7803	45.210

This height is adjusted by means of the backing up screw in the base of the diamond block. Before attaching the block to the Diaform, lock with the grub screw (C.2874/16) in the back of the block. Set up the Roughing Tool for initial forming of a new profile, and the appropriate finishing tool.

* The Diatipt Roughing tool has a tip which only approximates a radius of .020" (.5 mm). It is recommended that the Roughing Tool is set at the "centre line setting height" plus .025" (.625 mm). This setting when used in conjunction with the standard .6"(15.0 mm) Stylus point (10-1 ratio) or the .3" (7.5 mm) Stylus point (5 - 1 ratio) removes the bulk of wheel stock but ensures that sufficient remains for satisfactory final finishing with the accurately polished finishing tools.

NOTE:-

Diamond blocks 'C' and 'D' used on 4A and 4B Attachments are precisely 0.500" larger than blocks A and B. Therefore when setting Diatipt tools in these blocks 0.500" (12.7 mm) should be added to the setting height.

OPERATING INSTRUCTIONS.

MOUNTING DIAMOND BLOCK ASSEMBLY :-

a. Carefully clean diamond block and the platform of the diamond spindle.

b. The arrow on the diamond block indicates the direction of wheel rotation: ensure that when mounted, the arrow and wheel rotation are in the same direction.

c. Lightly but firmly secure blocks to spindle by means of fixing screws (C.2874/18). The Roughing Chisel should be nearest the Attachment body.

d. Fit Dial Indicator Unit on its mounting plate (C.2874/21). (An eccentric shaft is incorporated in the Indicator Unit for adjusting the anvil height).

e. Secure with knurled screw.

f. Obtain sufficient pressure on the Indicator anvil by adjusting the eccentric shaft and secure by the clamping screw. Great care must be exercised when the dial Indicator anvil contacts the Diatipt Chisel edge.

g. Rock the diamond spindle about its axis by means of the Stylus Actuating Knob (C.2874/4). This will show amount and direction of eccentricity of the diamond radius.

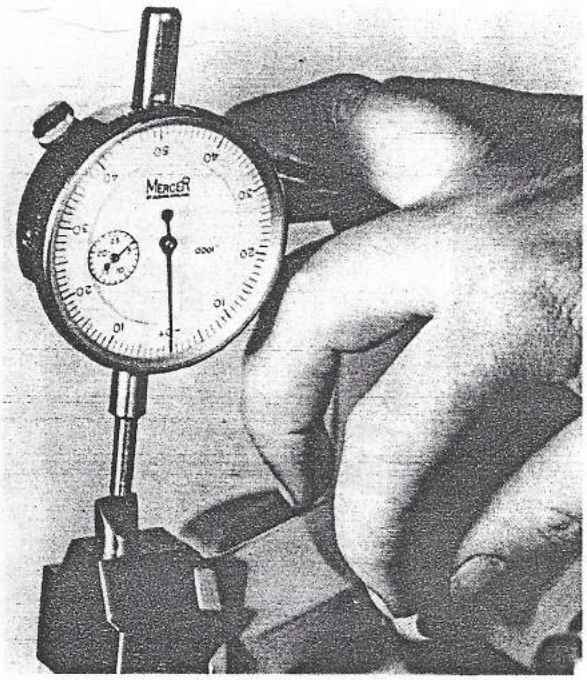
h. Correction of this is achieved by manipulation of adjusting screws (C.2874/15). The dorrect position is shown when the Dial Indicator pointer remains stationary or has only slight but equal movement to the minus side only of zero as the diamond spindle is rocked.

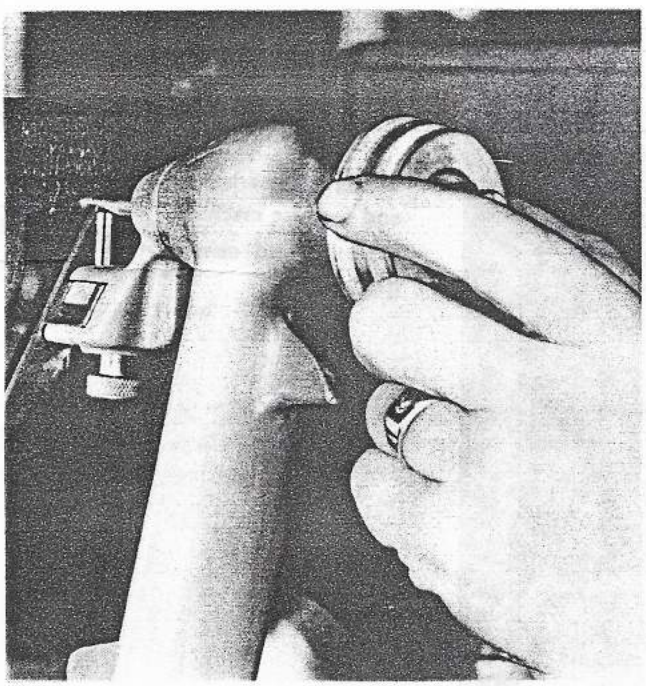
i. Check concentricity finally before removing Dial Indicator Unit from its mounting plate.

CAUTION

Rocking of Diamond Spindle must only be performed with the Stylus Actuating Knob. NEVER with the Diamond Spindle itself.

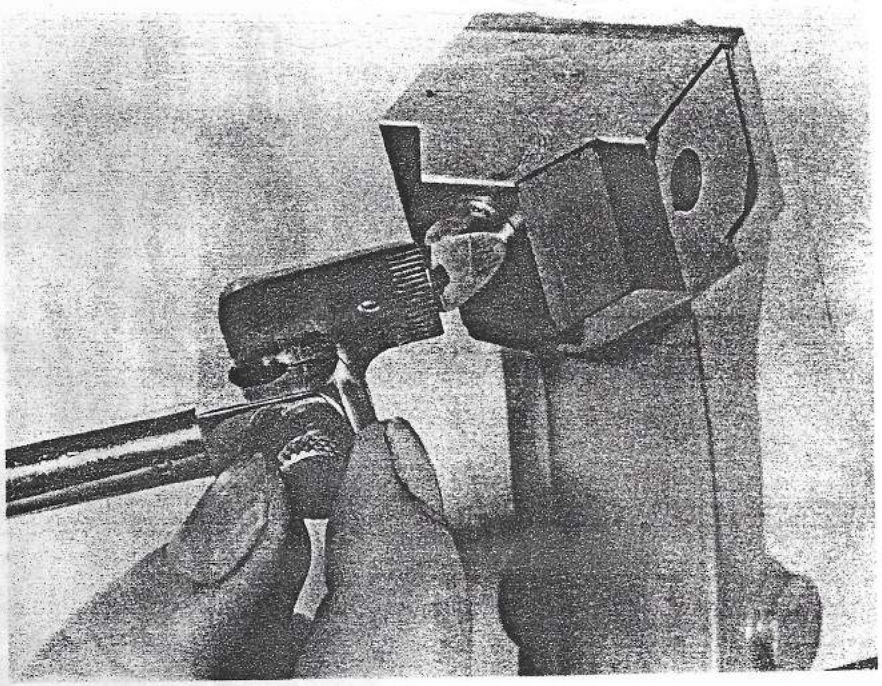
Set concentric with knurled screw and lock with screw in the underside of spindle.

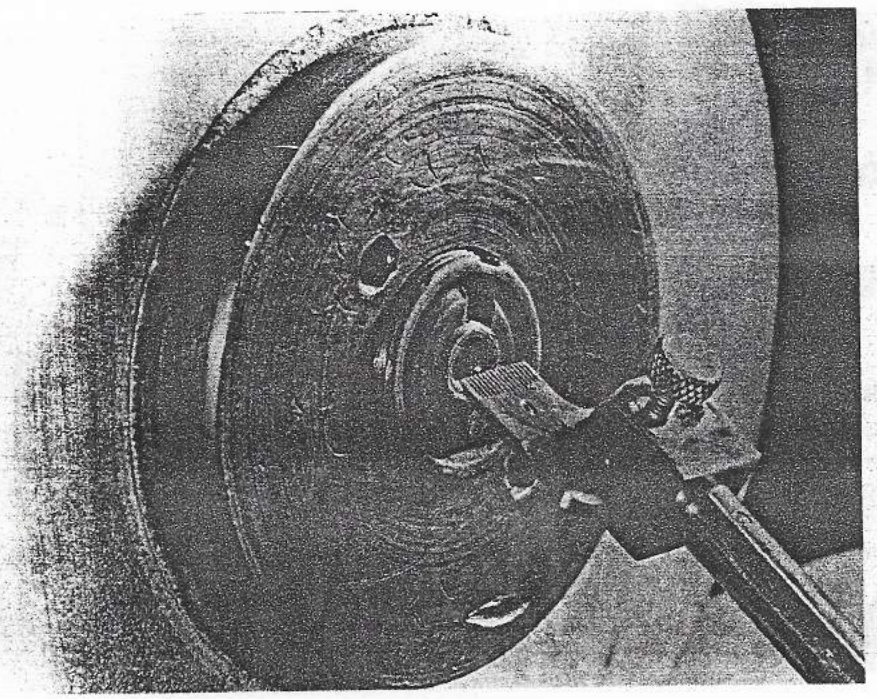




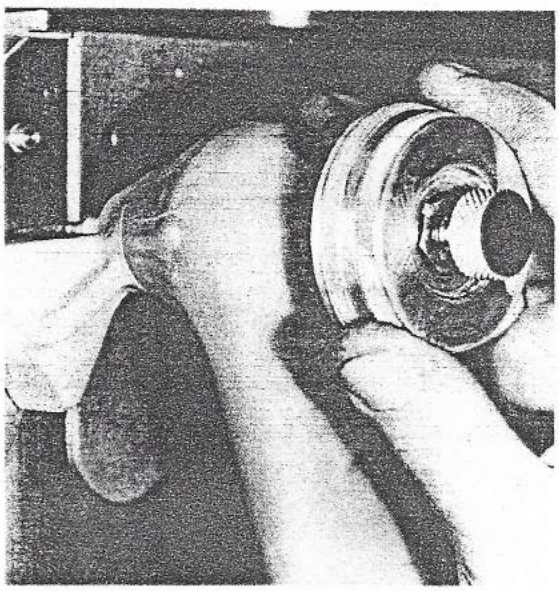
Transmit rocking motion with stylus hand-wheel.

Set zero line in gauge 9 to leading edge of diamond.

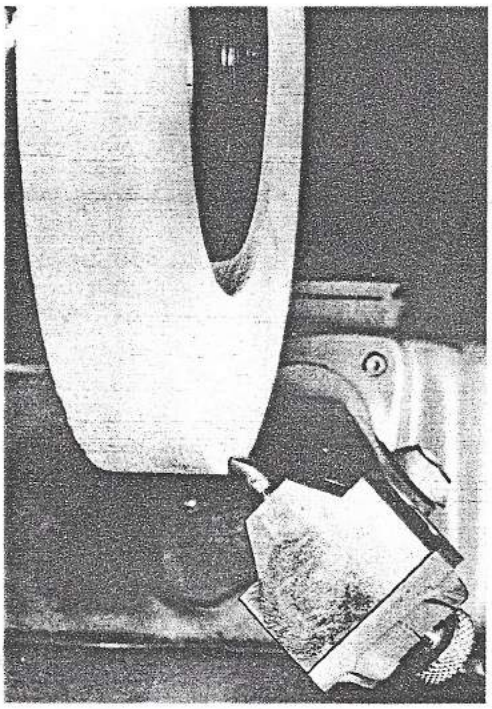




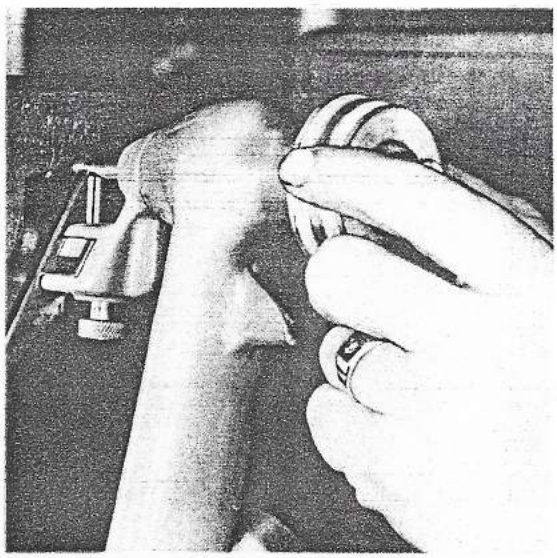
Swing gauge arm up and traverse machine table to find centre line of wheel.



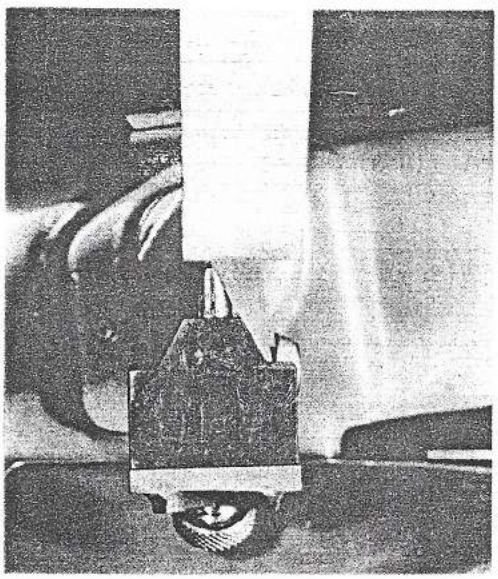
Hold stylus against vertical datum edge.



Feed in cross slide until diamond just cuts front face of predressed wheel when running. Raise wheel clear of attachment.



Hold stylus in deepest female position.



Lower grinding wheel to contact diamond.

MOUNTING DIAFORM ON SURFACE GRINDER

1. Ensure the wheel-head end-float on the grinding machine is adjusted to a minimum.

2. Make sure the work surface of the Magnetic Chuck or table is clean and flat. The back plate must be clocked parallel to the wheel. (where no chuck is used extended Sole plates (C.2874/22) are provided for clamping to the machine table.)

3. Mount Diaform on Magnetic Chuck making sure that the back edge of the sole plate is located flush against the back-plate on the chuck. Where an electro-magnetic chuck is used it is also advisable to use a small clamp as an additional safety measure. " A small flat is machined on the base of the Diaform for this purpose".

4. Present the Wheel Centering Unit to the chisel tool cutting edges, set each zero mark to a leading edge and lock with clamping screws.

5. Swing Centering Unit upwards and align roughing diamond tool to the wheel spindle centre line, using machine traverse to obtain alignment. (Misalignment will result in a distorted form.)

PRESENTING THE ROUGHING DIAMOND TO THE WHEEL FOR INITIAL FORMING

1. Hold roughing stylus firmly against the vertical datum edge of the template, then move the cross-slide of the machine until it is found that the diamond touches the front face of the wheel.

2. Still holding the stylus in this position on the template raise the grinding wheel well clear of the chisel diamond.

3. Place the stylus in the deepest cavity of the template profile, and lower the wheel until the chisel edge touches the periphery of the wheel.

ROUGH FORMING THE GRINDING WHEEL.

Starting from the deepest part or parts of the template hold the stylus head lightly but firmly to the profile. Traverse towards the shallower parts of the form until the cut runs off. Apply a cut of approximately .002" (.05 mm.) to .003" (.075 mm.) and repeat. Continue until the diamond contacts the wheel over the whole form. During all these operations the direction of the diamond must be adjusted with the Actuating Knob so that as far as possible the flanks of the diamond are used. The radius should where possible always be in the trailing position. Amplification of this point is made in the plate diagram fixed to each Diaform. When the roughing operation has been completed bring the finishing chisel central with the grinding wheel and remove the roughing diamond block from the spindle.

NOTE:

Where a worn finishing chisel is available this can be used as a semi-finishing tool, between the roughing and finishing operations. Set this in one of the spare diamond blocks provided .001" or .002" below its normal setting height, then mount on Diamond Spindle in the roughing tool position.

The inclusion of a semi-finishing operation reduces to a minimum the amount of stock left to be removed by the final truing diamond, thereby extending its accurate life considerably.

FINISH DRESSING THE WHEEL

a. Raise the Grinding Wheel well clear of the diamond chisel.

b. Assemble the stylus point and flank guards appropriate to the finishing chisel to be used.

c. Check with wheel Centering Unit that the dressing edge of the finishing chisel is correctly aligned with the wheel.

d. Place the stylus point in that part of the template profile where most wheel stock remains to be removed.

e. Carefully lower the Grinding Wheel until it contacts the Diamond.

f. Carry out the same dressing procedure as when roughing, only with cuts of between .0005" and .001"(.0125 mm and .025 mm)

g. When the whole form has been dressed in the wheel, take one or two very light cuts across the form using as near the tip of the chisel radius as possible. Work from one side of the template to the other with one steady movement.

In subsequent dressings, unless the wheel form is very worn it is not usually necessary to re-dress with the roughing diamond.

NOTE:

High Standards of accuracy and finish are dependant on the care taken during the final truing operation. Avoid use of the radius tip as much as possible until the final passes across the form.

CONTROL OF DIAMOND WEAR.

By correct use of the rocking motion that is transmitted by steel driving bands from the tracer point to the diamond , it is possible to reduce Diamond wear to a minimum. When tracing along the template the operator must develope the habit of turning the stylus actuating knob so that the chisel radius is trailing, never leading, in the direction of dressing. Used in this manner the bulk of the wheel stock is removed by the flanks of the chisel diamond. This avoids undue wear to the accurately polished radius.

Periodically adjust the truing diamond to recover the original setting height. When set at the correct height the dial indicator will record any irregularity of the radius due to wear. The operator can then within reasonable limits control this wear.

When the first cutting edge of the diamond is eventually worn too much to correct in this way, release screws (D.2874/16) and (D.2874/17) in the diamond setting block then turn the chisel 180° so as to bring the other edge of the chisel into the dressing position. Reset the diamond in the block at the correct height and check with Dial Indicator.

When the Diatipt Chisel edges are worn to the extent that neither are any longer accurate enough for the finish truing operation, they can be used for semi-finishing, between roughing and finish truing operations.

After reasonable service as semi-finishing tools they should be returned to the Diamond Tool Manufacturers for servicing.

ALWAYS REMEMBER the control of Diamond wear is of the utmost importance in obtaining the best results from the Diaform Wheel Dresser, even when soft grinding wheels are used.

POSITIONING OF THE WORK PIECE TO THE DIAFORMED WHEEL.

The removal and repositioning of the attachment and the work piece is necessary for checking the latter and retruing the formed wheel. The method used to position the Diaform and work piece initially in relation to the wheel determines the ease with which this is done. The following example indicates one satisfactory method.

First dress the front face of the wheel relative to the datum edge of the template. The approximate dimension from the face of the wheel to the location face of the back strip on the magnetic chuck would then be 3.726" or 94.620 mm. on 10-1 models. (See table below). Using this approximate starting dimension put a test block on the chuck setting it away from the backplate by means of slip gauges. Use a starting figure something more than 3.726". Lower the grinding wheel so that it is in a position to side grind the vertical edge of the test-block. Then by reducing the slip-gauges a touch is obtained and this figure may be noted and used as a constant setting figure.

Being aware of the fact that the left-hand vertical edge of the template represents the front-face of the grinding wheel, and knowing the measurement from the face of the wheel to the back-plate, a basic dimension is established for locating the workpiece in relation to the wheel. This eliminates the need to move the cross slide of the machine once the wheel has been dressed.

NOTE:

If this method is to provide accurate alignment end-float in the wheel spindle bearings must be held to a minimum.

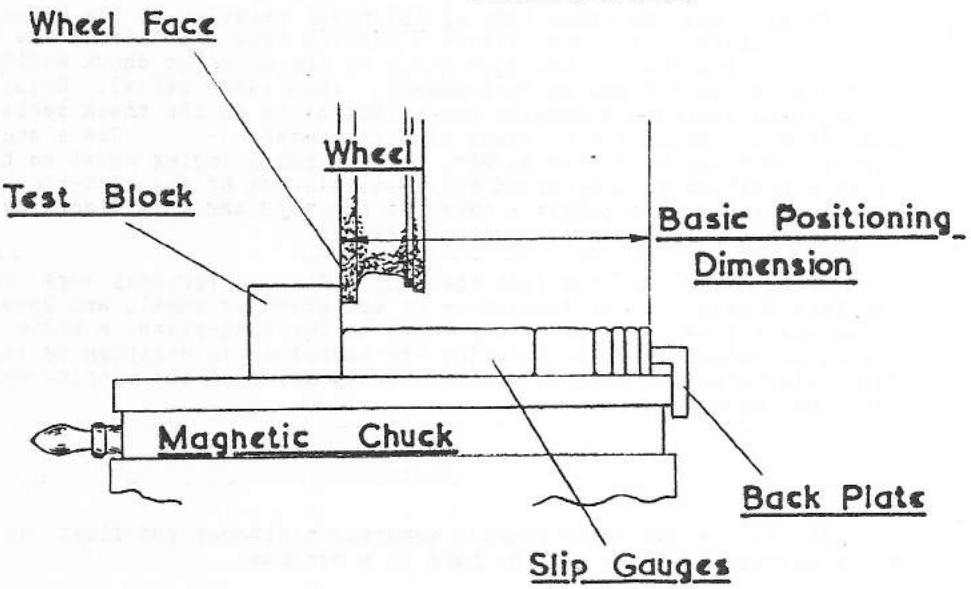
It is also advisable to run the wheel spindle for an hour or more before attempting to find the basic dimension.

AT-BT	Approximate setting dimension	3.726"	94.620	mm.
2A-2B	" " "	7.505"	190.625	mm.
3A-3B)	" " "	10.9425"	279.48	mm.
4A-4B)				

No M8/IN/C.2902.

POSITIONING WORK TO DIAFORMED WHEEL.

METHOD USED TO OBTAIN BASIC SETTING DIMENSION.



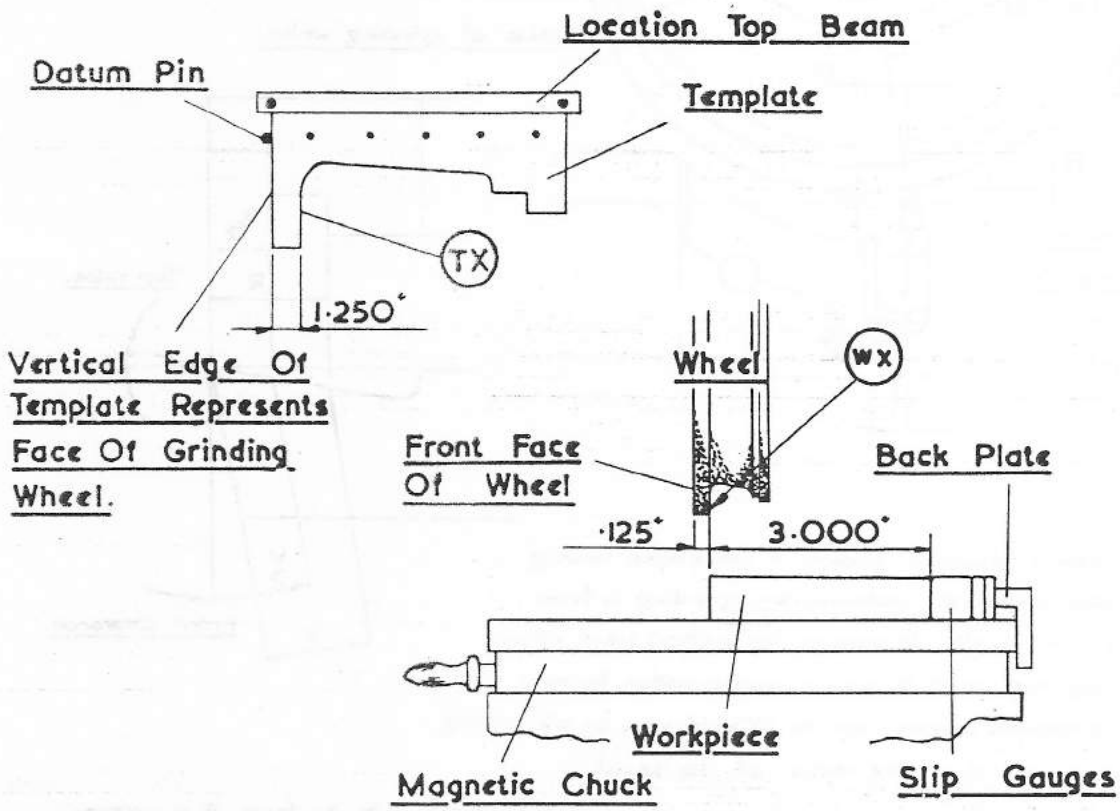
APPROX. FIGURES FOR VARIOUS MODELS ARE AS FOLLOWS —

MODEL	INCHES	M.M.
AT — BT	3.725	94.618
2A — 2B	6.077	154.356
3A — 3B	8.314	211.176
4A — 4B	8.314	211.176

No M8/IN/C.2990.

ALIGNING WORKPIECE TO WHEEL.

SET UP AND TYPICAL EXAMPLE.

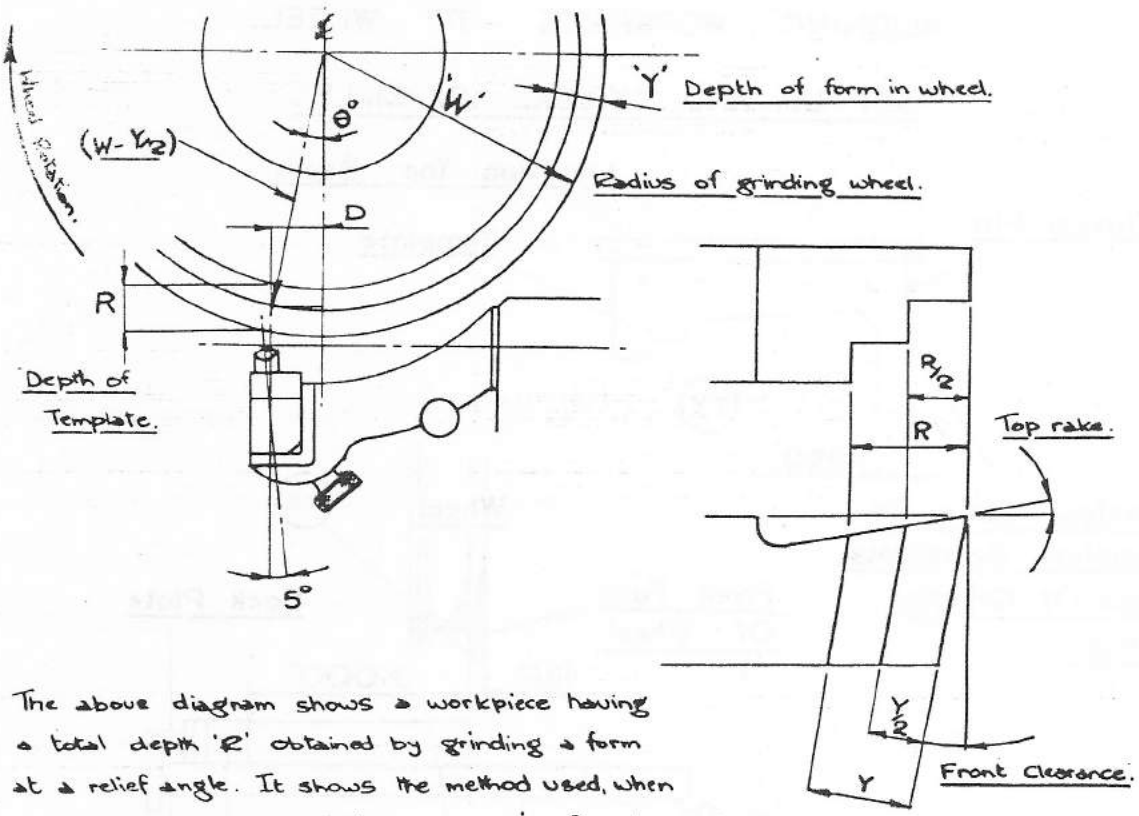


TO ALIGN FORM EDGE TX ON WHEEL TO EDGE OF WORKPIECE.

ASSUME Basic Setting Dimension To Be	3·727"
Less The Dimension From Wheel-face To WX	·1250"
	3·602"
Less Width Of Workpiece	3·000"
∴ Slips Needed To Align Wheel To Work	·6020"

No. M8/IN/C. 3025.

COMPENSATING FOR RAKE & CLEARANCE.



The above diagram shows a workpiece having a total depth 'R' obtained by grinding a form at a relief angle. It shows the method used, when dressing the wheel to obtain compensation for rake and clearance angles up to 10° maximum by off-setting the diamond from the centre of the wheel.

To determine the dimension 'D' for dressing the wheel with its form it is necessary to know, the depth of the form 'Y', and the radius of the grinding wheel 'W'.

Therefore, $\cos\theta^\circ = \frac{R^2 + Y(4W - 3Y)}{2R(2W - Y)}$

and 'D' $= (W - Y/2) \times \sin\theta^\circ$

Alternative method:

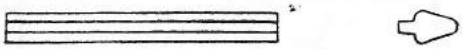
Sine of angle of clearance on tool × wheel radius = 'D'.

Note: Both the above are approximations, which are sufficiently accurate for most general applications.

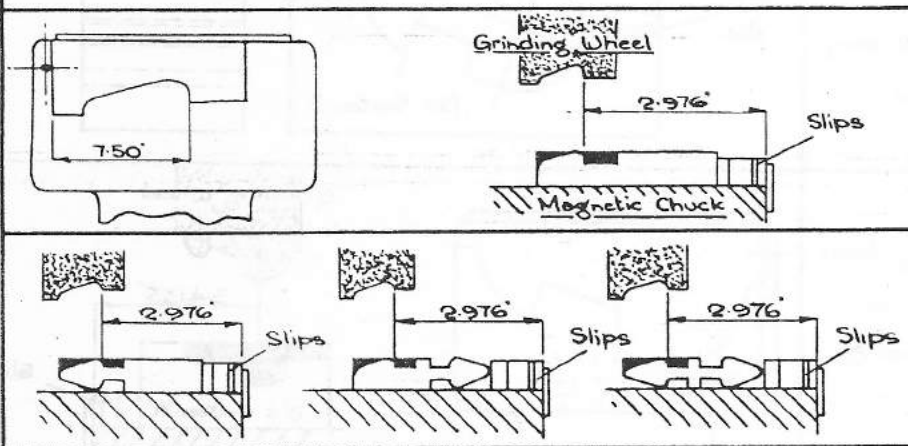
No M8/IN/C. 2991

EXAMPLE SET-UP FOR PUNCH GRINDING.

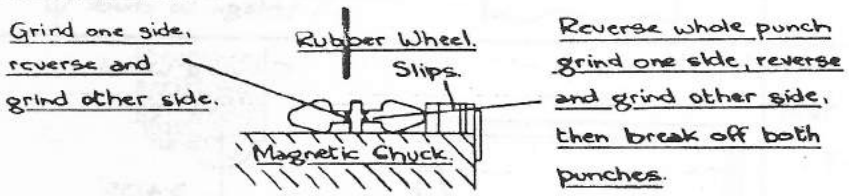
1. Punch to be produced.



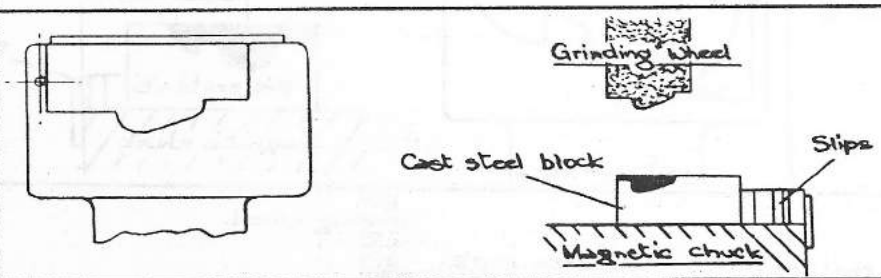
2. Showing two punches being form ground from one strip of material, in four operations.



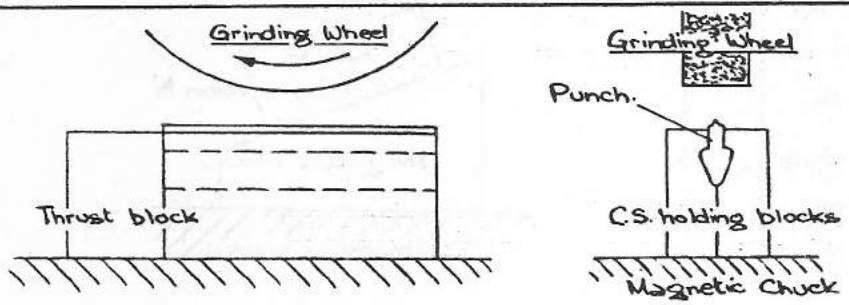
3. Showing parting off of punches.



4. Showing form being ground in a pair of cast steel blocks to hold punches for OP. 5.



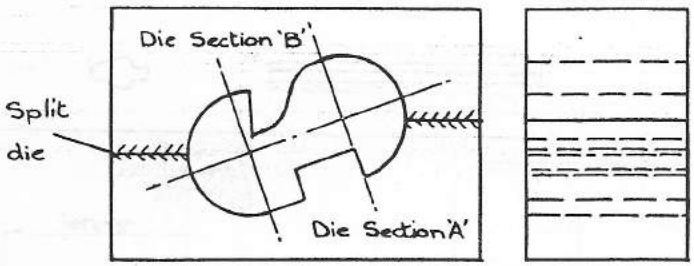
5. Showing finish grinding of parting off face.



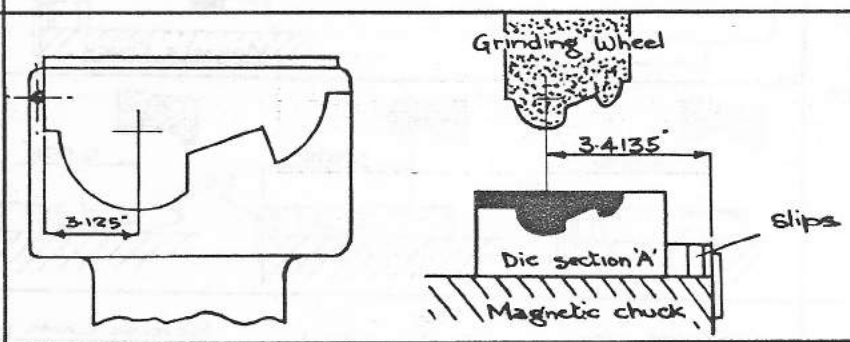
No M8/IN/C.2997.

EXAMPLE OF FORM GRINDING A DIE.

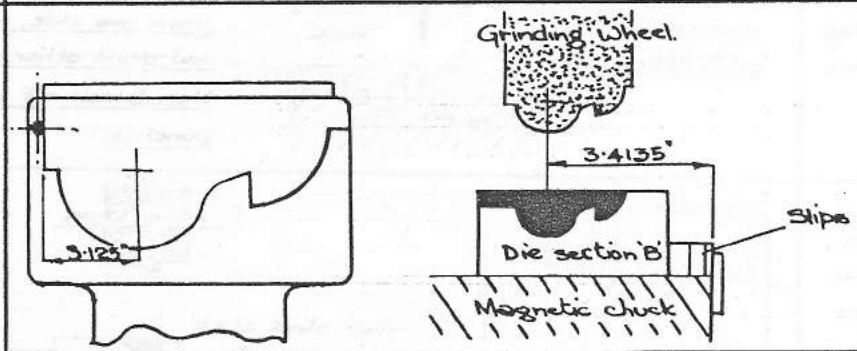
1. Showing die sections to be produced assy together.



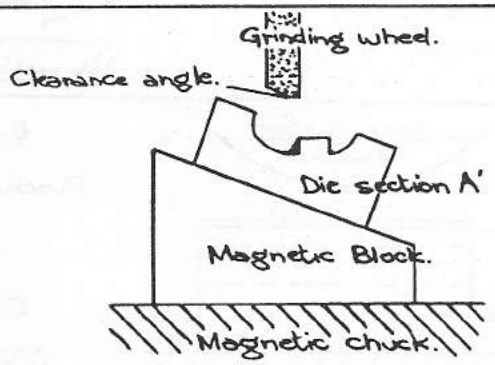
2. Showing form grinding of die section 'A'



3. Showing form grinding of die section 'B'



4. Showing the grinding of corner in die section 'A' which could not be done at 2.

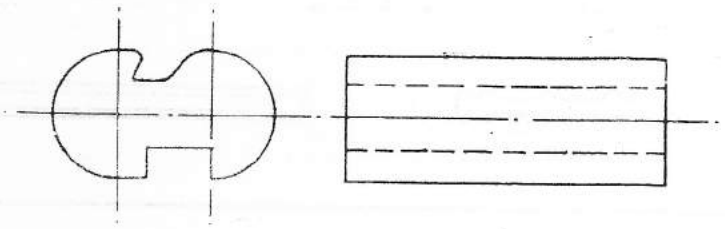


No M8 / IN / C.2998

EXAMPLE OF PUNCH GRINDING.

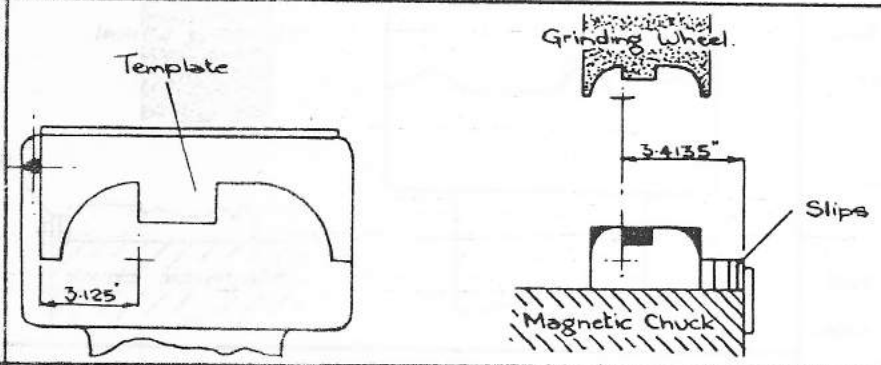
1.

Showing punch to be produced.



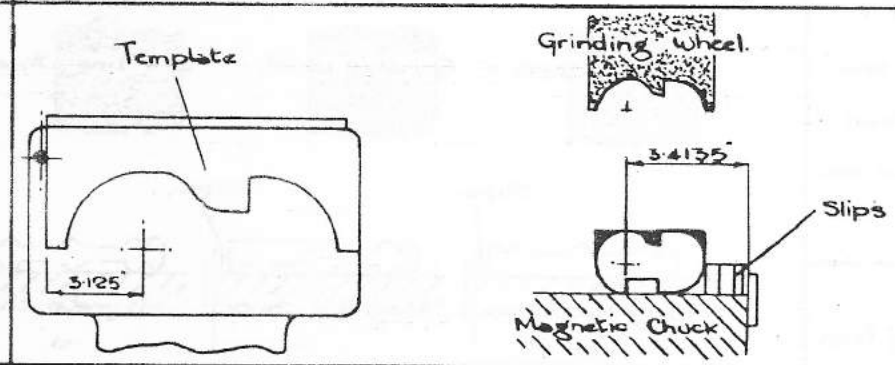
2.

Showing form grinding one side of punch.



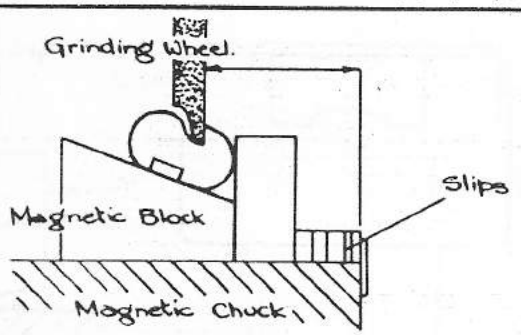
3.

Showing form grinding of reverse side of punch.



4.

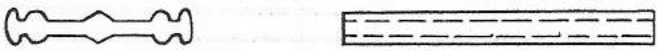
Showing the grinding of corner in punch which could not be done at 3.



No M8/IN/C.2999.

SET UP – REVERSIBLE JOB OVER 1" WIDTH.

1. Punch to be produced to pierce centre of razor blade.



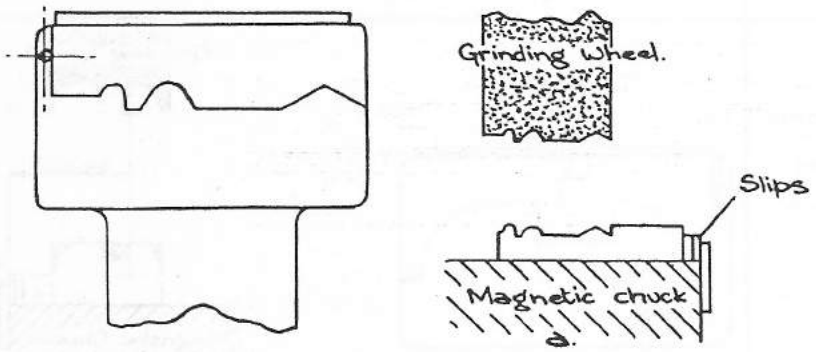
2. Showing form grinding of punch.

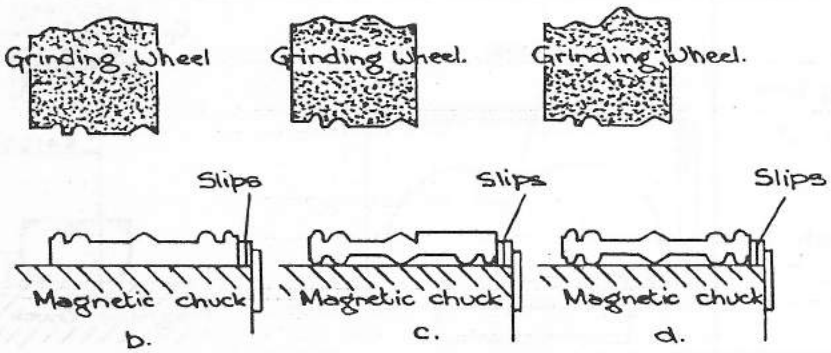
a. Half one side.

b. Other half of same side.

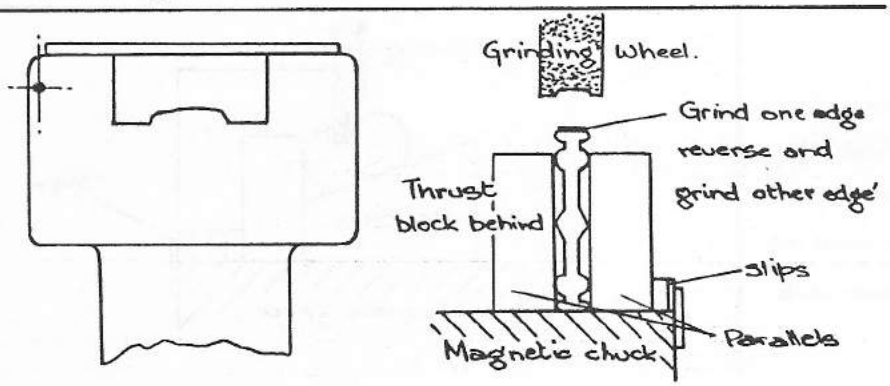
c. Half of opposite side.

d. Other half of opposite side.





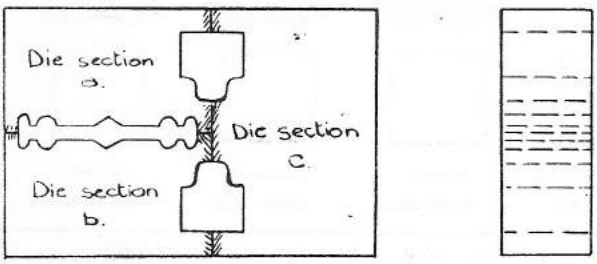
3. Showing form grinding ends of punch, held between parallels and a thrust block placed against rotation of grinding wheel.



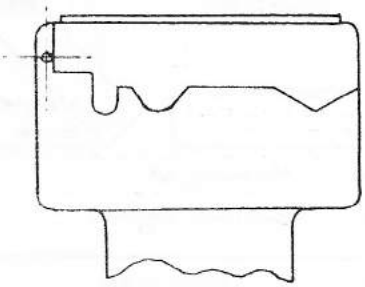
No M8/IN/C.3000.

EXAMPLE OF FORM GRINDING A DIE.

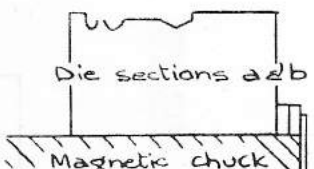
1. Assembled dies for notching end & piercing centre of razor blade.

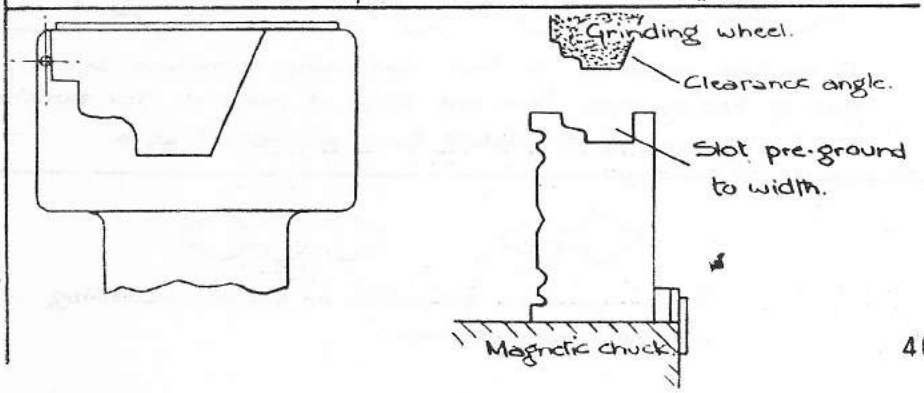


2. Showing form grinding of die sections a & b for centre piercing of blade.



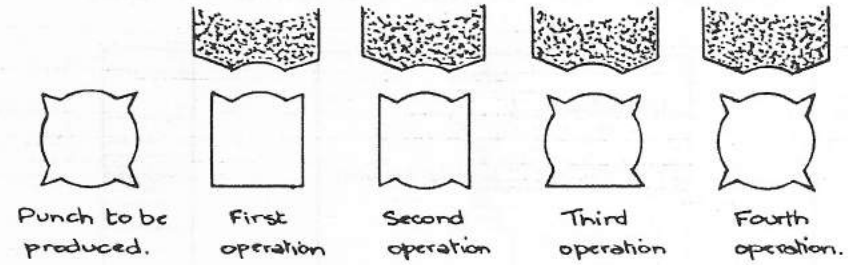
3. Showing form grinding of die sections a & b for notching ends of blades N.B. Slot is preground to width as shown. same form is used for grinding die section C.

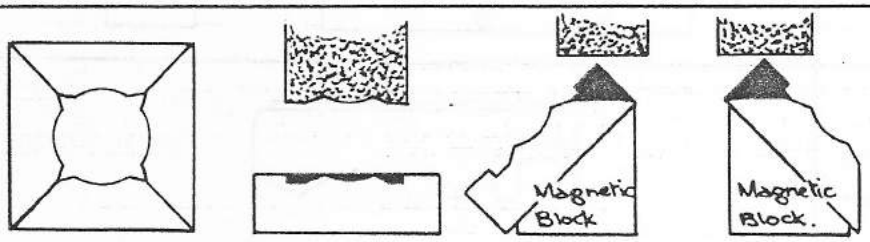




No M8/IN/C.3001.

FURTHER PUNCHES & DIES BY 'DIAFORM'.

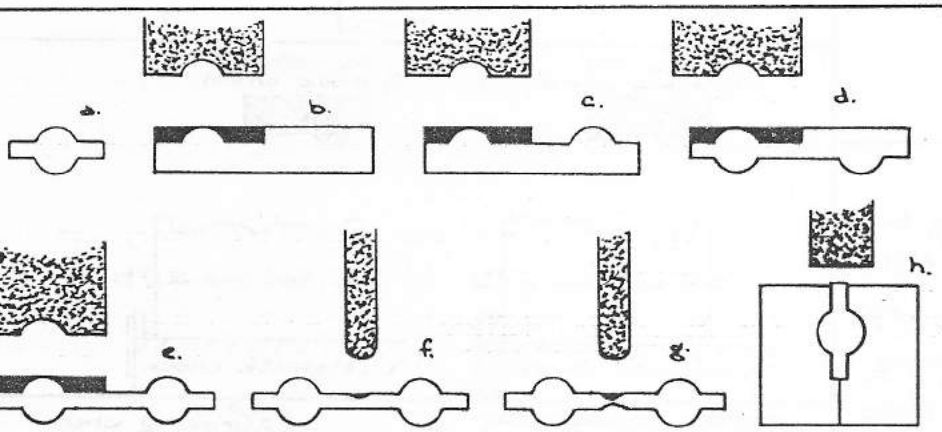




Die required - four sections. To mate with above punch.

Forming all sections together

Grinding mating angles on sections.



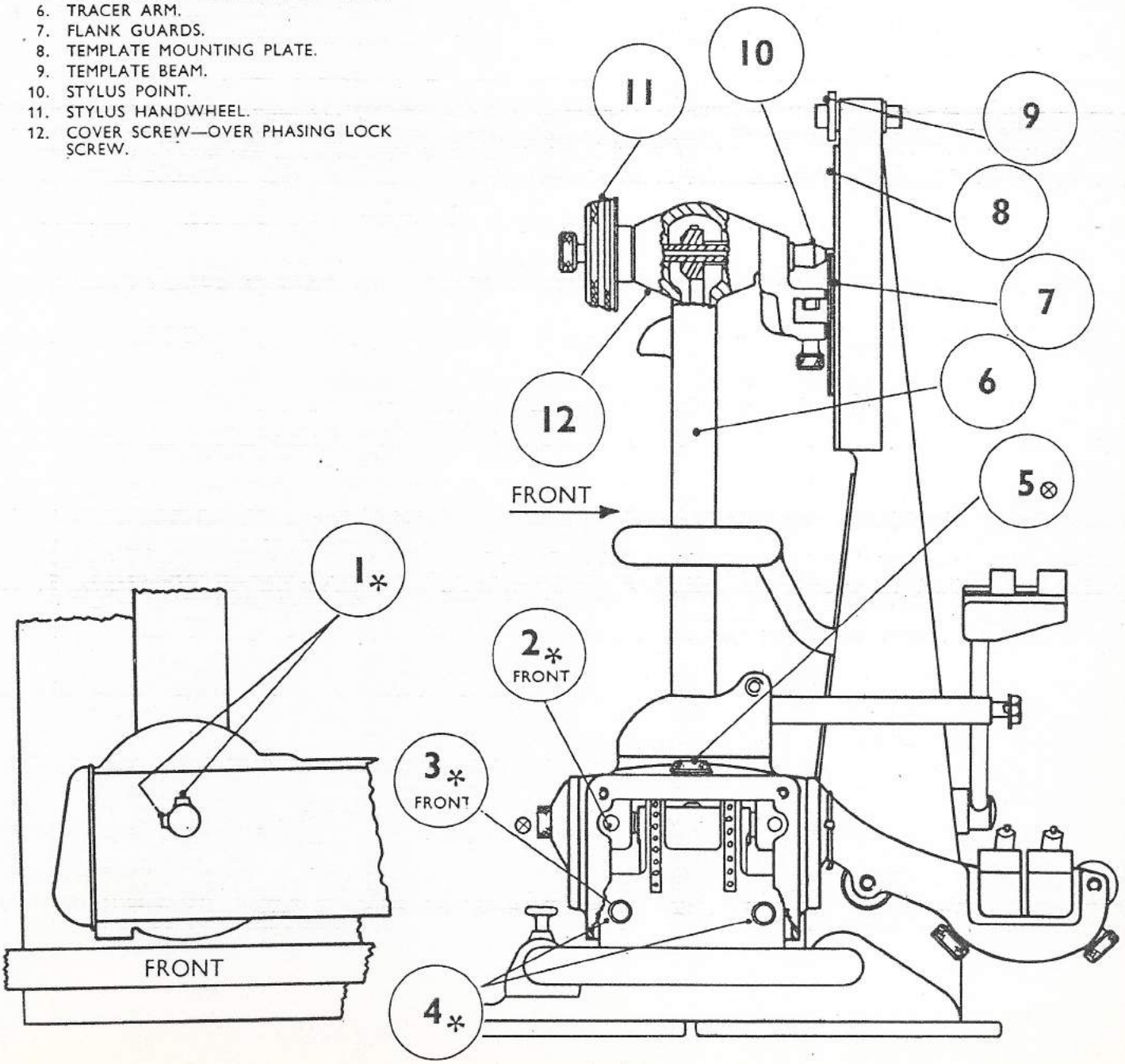
To produce punch a. in four diaforming operations b. c. d. & e., that is making two punches from one strip of material. The punches, parted off at f. & g. and rough parting faces ground off at h.

These punches produced in similar diaforming operations as the above punches.

IMPORTANT

ADJUST UNDER WORKING CONDITIONS,
i.e. ON MAGNETIC CHUCK, ETC.

1. ' FRONT ' GRUB SCREWS (1 OR 2).
2. CAP HEAD SCREW ' FRONT '.
3. CAP HEAD SCREW.
4. CAP HEAD SCREW ' FRONT '.
5. COVER SCREW FOR MAIN OIL NIPPLE.
6. TRACER ARM.
7. FLANK GUARDS.
8. TEMPLATE MOUNTING PLATE.
9. TEMPLATE BEAM.
10. STYLUS POINT.
11. STYLUS HANDWHEEL.
12. COVER SCREW—OVER PHASING LOCK SCREW.



ADJUSTMENT OF PIVOTS

⊗ FIRST OIL THE MACHINE THOROUGHLY AT 2 OILING POSITIONS

* THEN ADJUST PIVOTS IN THE FOLLOWING ORDER.

1. Release ONE screw (or TWO according to the particular model), describe a few circles with the stylus head over the template area leave at rest and re-tighten the screw/s.

2. Release ONE screw, describe a few circles as previously and re-tighten.

3. Release ONE screw, proceed as previously and re-tighten. (TAKE CARE NOT TO TIGHTEN THIS SCREW EXCESSIVELY.)

4. Stylus end should just contact the template mounting plate. If this is not so the TWO screws shown should be released and the whole pantograph unit tapped over under light finger pressure into position, then tighten both screws evenly but not excessively.