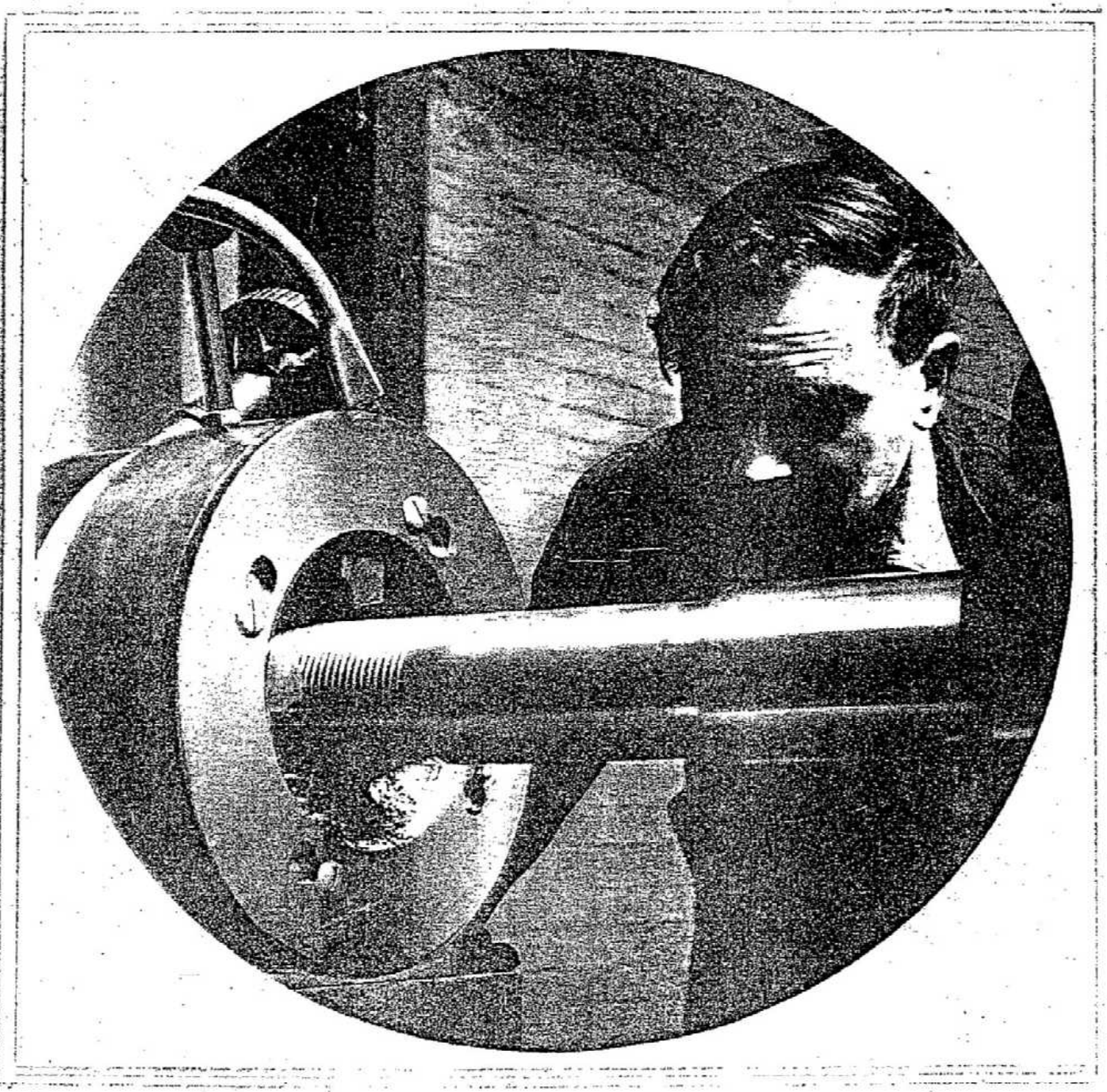
The Book of the COVENTRY DIEHEAD



25th Edition

ALFRED HERBERT LTD COVENTRY ENGLAND

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INTRODUCTION

Coventry Self-Opening Dieheads are the ideal tools for cutting threads accurately and quickly. Dieheads are designed to give the greatest simplicity in use and setting. Dies can be quickly inserted, withdrawn for sharpening when necessary, and replaced. By using the latest model of the Die Grinding Fixture, the throats of all four dies are sharpened to the correct cutting angle, together with the rake angle.

By following the instructions in this book, everyone can learn in a short time, how to use the diehead and to sharpen the dies.

Several factors must be considered when threads are to be cut.

1. **What size of diehead should be used? See page 8.**
2. **What type of material is to be threaded? See page 26.**
3. **What type of dies should be used? See pages 25 and 26.**
4. **Are threads to be cut close to a shoulder? See page 28.**
5. **What cutting speed should be used? See page 19.**
6. **What cutting lubricant should be used? See page 19.**

As it is impossible in an instruction book to deal with all the varied queries that may arise in thread cutting, we shall be glad to give assistance in obtaining satisfactory results. For this purpose, our specialists visit users' works free of charge.

We guarantee that all the threading equipment which we supply will cut accurate threads in all materials that can be threaded, and we shall welcome opportunities of proving this in customers' works.

IMPORTANT

All dieheads are marked with a Serial No. which should always be quoted for identification purposes.

THE COVENTRY SELF-OPENING DIEHEAD

The following styles and sizes of Dieheads are dealt with in this book:—

STYLE C.H.S. Eight sizes: $\frac{1}{4}$", $\frac{3}{8}$", $\frac{1}{2}$", $\frac{3}{4}$", 1", $1\frac{1}{4}$", $1\frac{1}{2}$" and 2".

STYLE C.H. Ten sizes: $\frac{1}{4}$", $\frac{5}{16}$", $\frac{1}{2}$", $\frac{3}{4}$", 1", $1\frac{1}{4}$", $1\frac{1}{2}$", 2", 3" and $4\frac{1}{2}$".

FINE THREAD DIEHEADS. $2\frac{1}{2}$" and $3\frac{1}{2}$" for cutting threads of Vee form, 11 per inch and finer, of restricted length. Any length may be screwed when dieheads are fitted with special flanged adaptors.

COVENTRY ROTATING DIEHEADS. For use on revolving spindles. Eleven sizes: $\frac{1}{4}$", $\frac{5}{16}$", $\frac{3}{8}$", $\frac{1}{2}$", $\frac{3}{4}$", 1", $1\frac{1}{4}$", $1\frac{1}{2}$", 2", $2\frac{1}{2}$" and $3\frac{1}{2}$".

STYLE X.T.2. Mainly for use on Brown & Sharpe type single-spindle automatics, for close-to-shoulder threading and short thread lengths. Three sizes: $\frac{1}{4}$", $\frac{5}{16}$" and $\frac{1}{2}$".

HERBERT SOLID-ADJUSTABLE DIEHEADS. Eight sizes: $\frac{1}{4}$", $\frac{1}{2}$", $\frac{3}{4}$", 1", $1\frac{1}{4}$", $1\frac{1}{2}$", 2" and $2\frac{1}{2}$". See pages 24 to 25 and 78.

OVERSIZE THREADS

All Coventry Dieheads, except Solid-Adjustable Types, will cut short threads of fine pitch a little larger than their nominal capacities.

Sizes which can be accommodated in Styles C.H.S. and X.T.2 Dieheads are shown on page 72. All style C.H. Dieheads, except the $\frac{1}{4}$", can be fitted with bored-out bodies to cut fine pitch threads of limited length. See page 78.

TAPER THREADING

Taper threads, both right- and left-hand, can be cut with taper dies used in a standard diehead where the length of the taper does not exceed the width of a new die minus the throat. Longer tapers necessitate the use of a Taper Threading Diehead. (See pages 20 to 23). Rotating Dieheads can also be arranged to cut taper threads. (See page 17).

LEADING FEATURES

Compactness. Intelligent design permits dieheads to be used on capstan lathes, in which the height of the tool holes above the slide is limited.

Interchangeability. Close control of components enables replacement parts to be promptly supplied and easily fitted. (See page 41).

Roughing and Finishing Device. This refinement is built into all stationary-type Dieheads except $\frac{1}{4}$" and $\frac{5}{16}$" style C.H. and X.T.2 Dieheads. (See page 20).

Accurate Pitch. This factor is assured by the guiding action of the leading or non-cutting portion of the dies. (See page 25.)

Adjustability. Fine regulation of diameter is provided.

The variation of helix angle with diameter necessitates, for accurate work, the use of a separate set of dies for each diameter. For certain work, the adjustability of Coventry Dieheads, combined with the straight cut system of producing Coventry Dies, allows a small variation in diameter to be cut with one set of dies.

Clean and Smooth Threads. Because dies have cutting angles ideally suited to materials being threaded, good finish is assured.

Parallel Threads. This quality is derived from the very efficient support of dies in the diehead.

Ease of Grinding Dies. A set of dies can be ground together, to definite angles and uniform for all sizes of dies and dieheads.

Right- or Left-Hand Threads. Dieheads function equally well whether using right- or left-hand dies.

IMPORTANT

The Coventry Dies used in these dieheads are not interchangeable. A set of new dies must always be used together. When taken from the diehead, the set should be retained in its box until required again.

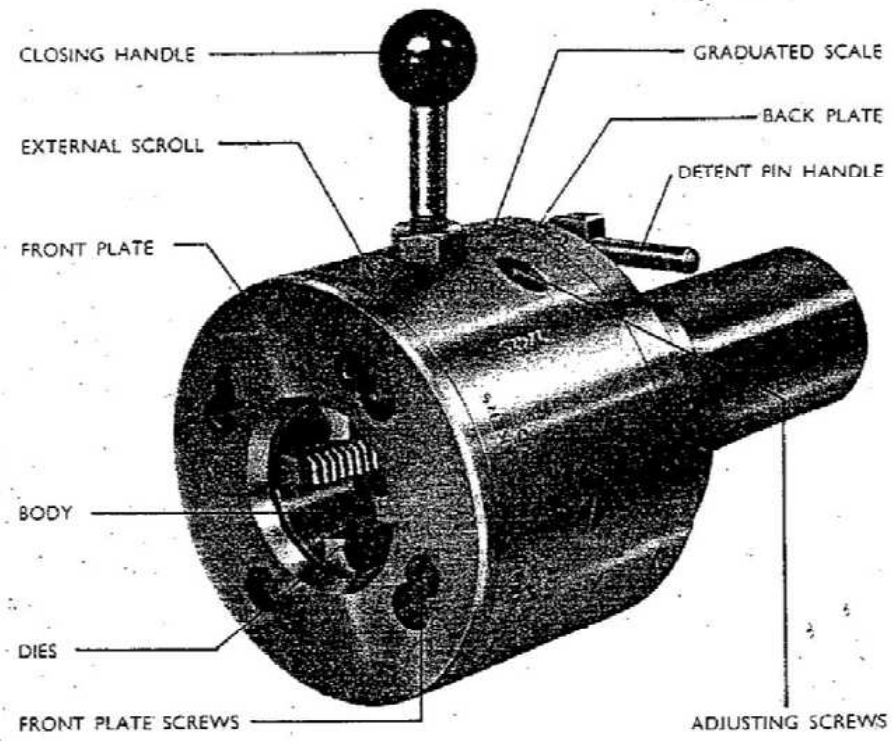


Fig. 1. Style C.H.S. Coventry Diehead

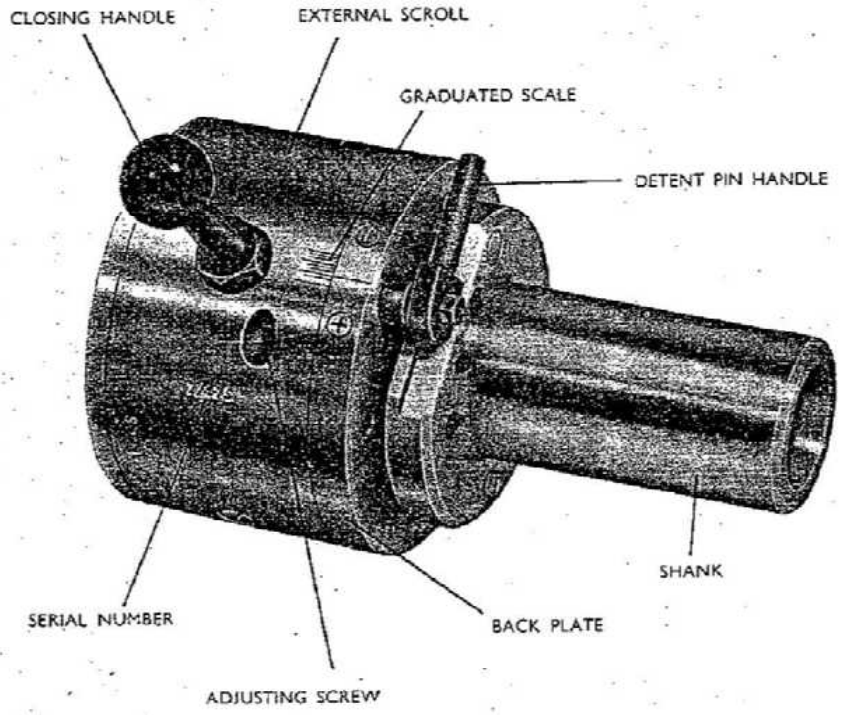


Fig. 2. Rear view of Style C.H.S. Coventry Diehead

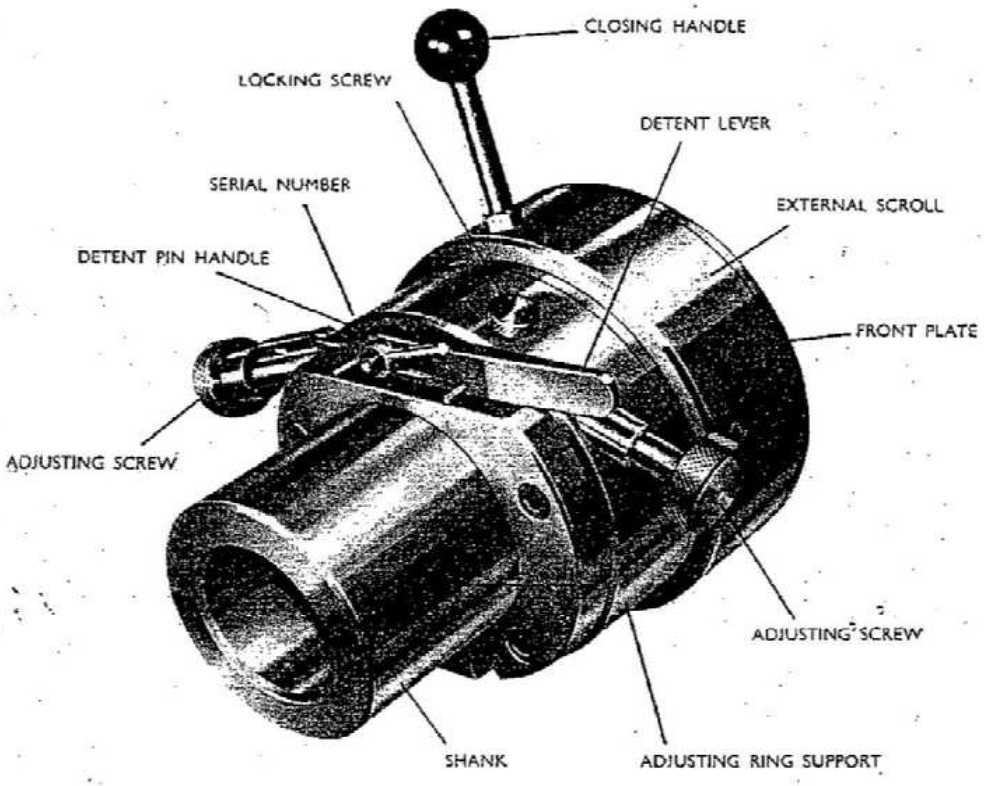


Fig. 3. Coventry Diehead, 3" Style C.H.

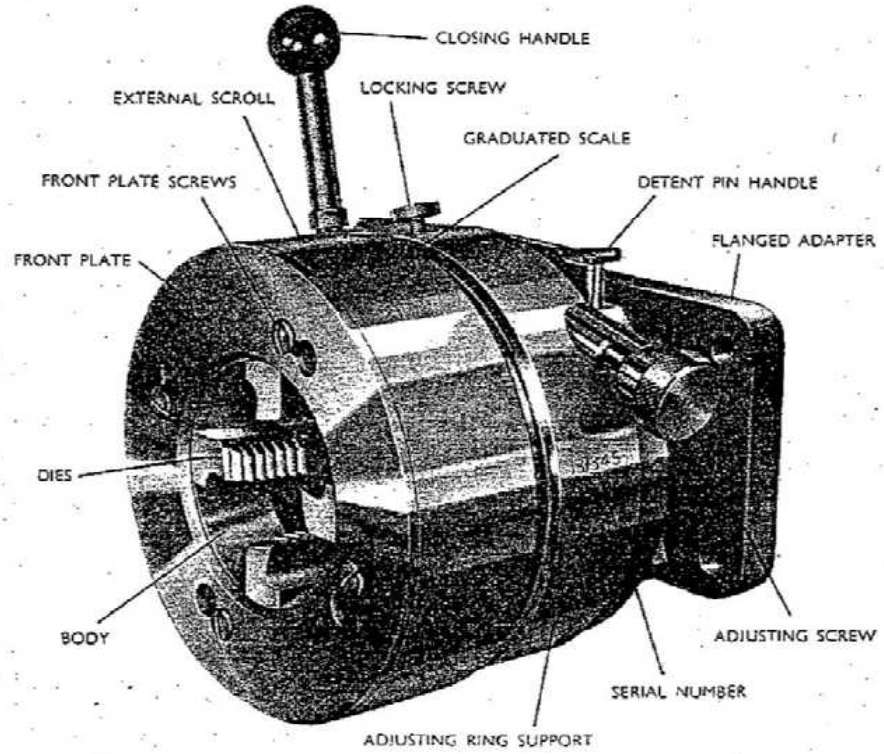


Fig. 4. Coventry Diehead, 4½" Style C.H.

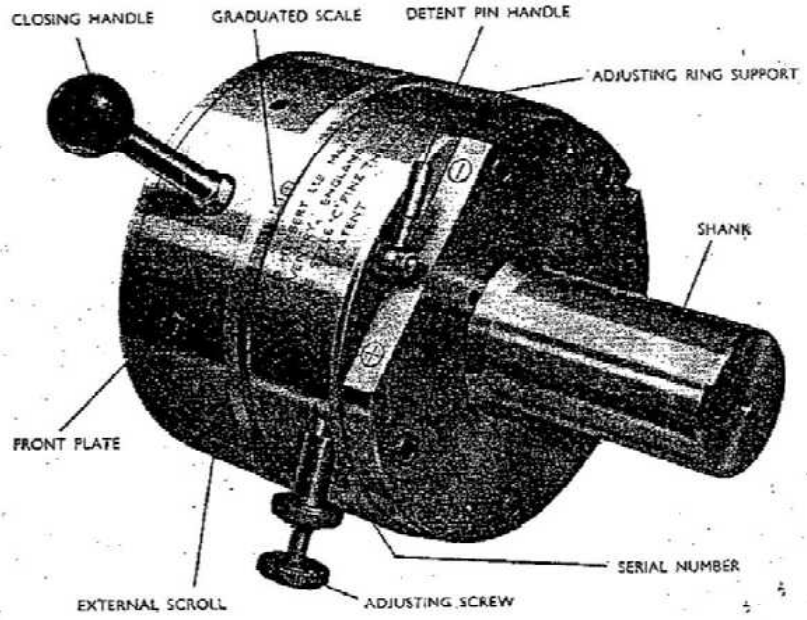


Fig. 5. Fine Thread Coventry Diehead

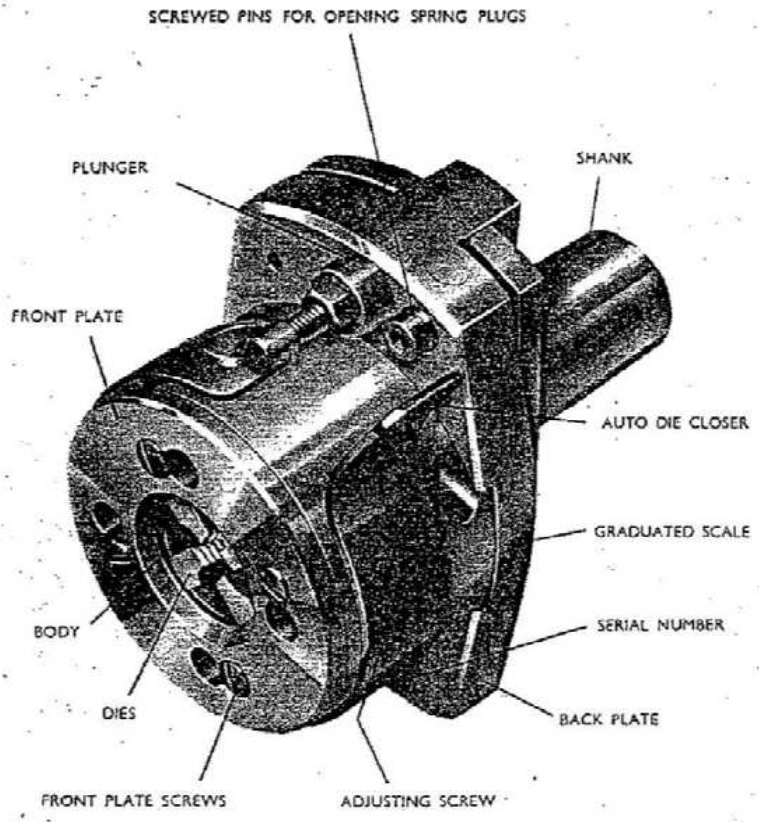


Fig. 6. Style X.T.2 Coventry Diehead

SELECTION OF DIEHEAD

It is not good practice to use a diehead continuously at its maximum capacity, owing to the strain and wear on the working parts. Conversely it is not economical to thread small diameters with a large diehead owing to the cost of the dies.

A $\frac{1}{2}$" Whitworth thread could be cut with a $\frac{1}{2}$", $\frac{3}{4}$", 1", $1\frac{1}{2}$" or 2" diehead.

If the majority of screws to be cut are $\frac{1}{2}$" diameter, it is advisable to use a $\frac{3}{4}$" diehead. This allows a little extra capacity for larger threads and permits the economical purchase of dies for any smaller threads which have to be cut.

Consideration must also be given to the capacity of the machine on which the diehead is to be used. If large diameter threads are to be cut on a capstan lathe, it often occurs that the diehead suitable for the application will not swing over the back of the capstan slide. This problem can be overcome by the use of an elevating holder which raises the diehead clear of the slide as the capstan rotates. See Figs. 8 and 9.

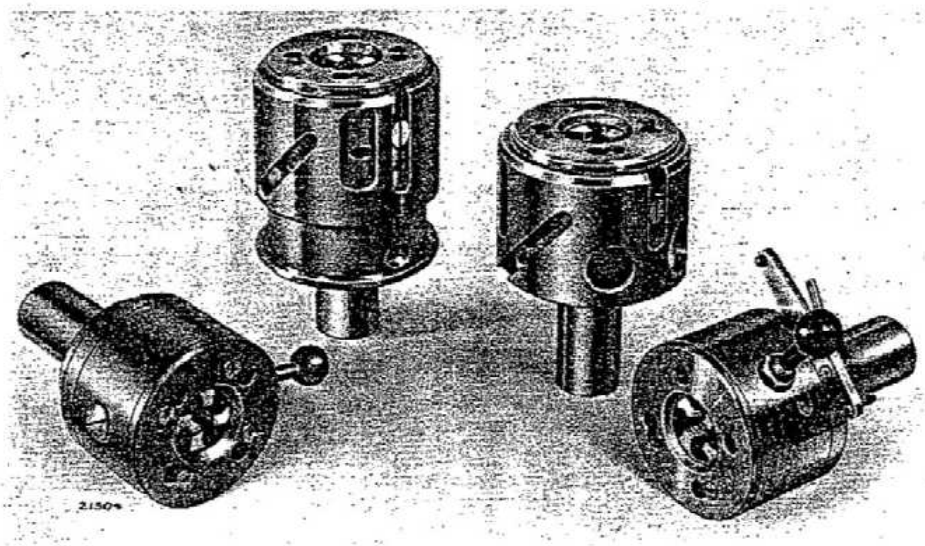


Fig. 7. Types of Style C.H.S. Dieheads. Left to Right, Standard Stationary Type, Rotary Type with Detent Withdraw Sleeve, Standard Rotary Type and Stationary Type with Detent Withdraw Lever

MOUNTING STATIONARY-TYPE COVENTRY DIEHEADS

For many years Coventry Dieheads have been standard items of the tooling for Capstan and Turret Lathes, Single- and Multi-Spindle Automatic Machines.

Accurate mounting of the Diehead concentric with the work is essential, combined with correct workspeed and ample machine power to take the full depth of cut.

Several different methods of mounting Coventry Dieheads on various machines are shown in the following illustrations.

Capstan Lathes

Coventry Dieheads are usually mounted directly in the turret holes of Capstan Lathes, or, if the shank is larger than the turret hole, in a holder bolted to the turret face. If a holder is not convenient the diehead can be supplied with a special shank smaller than standard or fitted with a Flanged Adaptor. See Fig. 10.

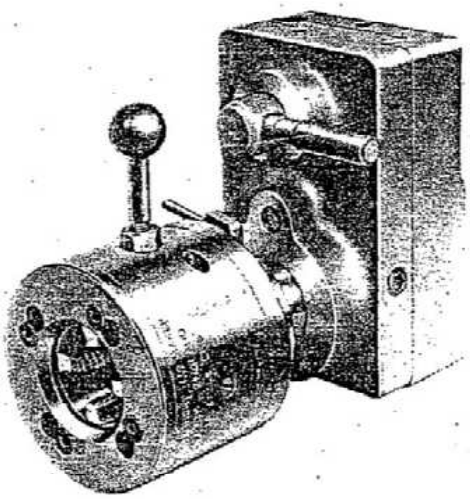


Fig. 8. Hand-operated elevating holder

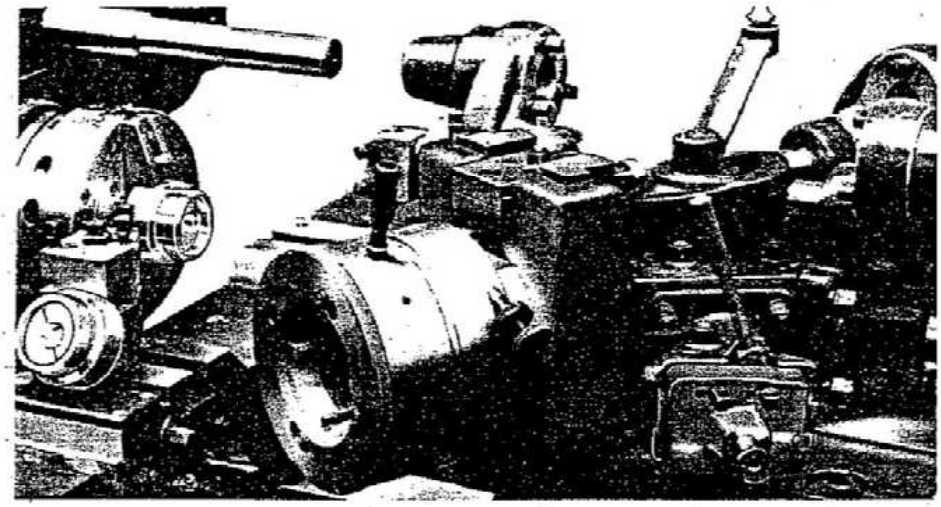


Fig. 9. Automatic cam-operated elevating holder

It should be realised that the fitment of a smaller shank restricts the capacity of the diehead, as the maximum size screw cannot be passed through the smaller shank.

The elevating holders, shown in Figs. 8 and 9, can be used where the swing over the capstan slide prevents the application of a large diehead. See table on page 79.

Automatic cam-operated elevating holders are used where production times are low. The diehead is automatically elevated as it passes over the capstan slide and returned to the working position during further rotation of the capstan.

Combination Turret Lathes

Dieheads are usually held in a Boring-Bar Holder or with a Flanged Adaptor to reach over the cross-slide when working close to the chuck. Where the length of work is sufficient, the diehead may be held in the turret hole, with or without an Adaptor Bush. See table on page 82.

Hexagon Turret Lathes

Sizes of dieheads that can be used on Herbert Hexagon Turret Lathes for bar work are shown on page 82. Whether an Adaptor Bush is required to mount them is also indicated.

Flanged Adaptors

When the standard shank size of a diehead is too large for the turret bore, and it is required to pass the full capacity right through the diehead and a boring bar holder is not available, or it is not desirable to use a boring bar holder because of excessive projection from the turret, a Flanged Adaptor is the only alternative. These are stocked in types to suit most sizes of diehead from $\frac{3}{4}$" and larger which can be used on Herbert Nos. 2D, 2S and 4 Capstan Lathes. On C.H. Dieheads, the shank is removed and replaced by the Flanged Adaptor. On C.H.S. Dieheads, however, it is necessary to have a special short shank to which the Flanged Adaptor is fitted.

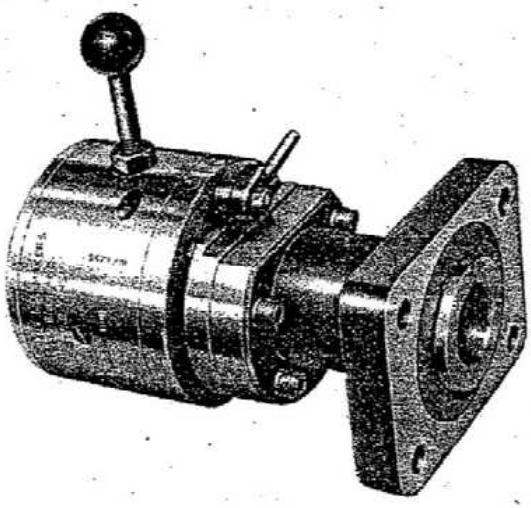


Fig. 10. C.H.S. Diehead with Flanged Adaptor

A Flanged Adaptor is the standard method of mounting the $4\frac{1}{2}$" size diehead and is frequently used in place of the shank on 3" and 2" dieheads. Special Adaptors can be manufactured to suit the turret faces of various makes of British and American Turret Lathes. Particulars of the turret face will be required.

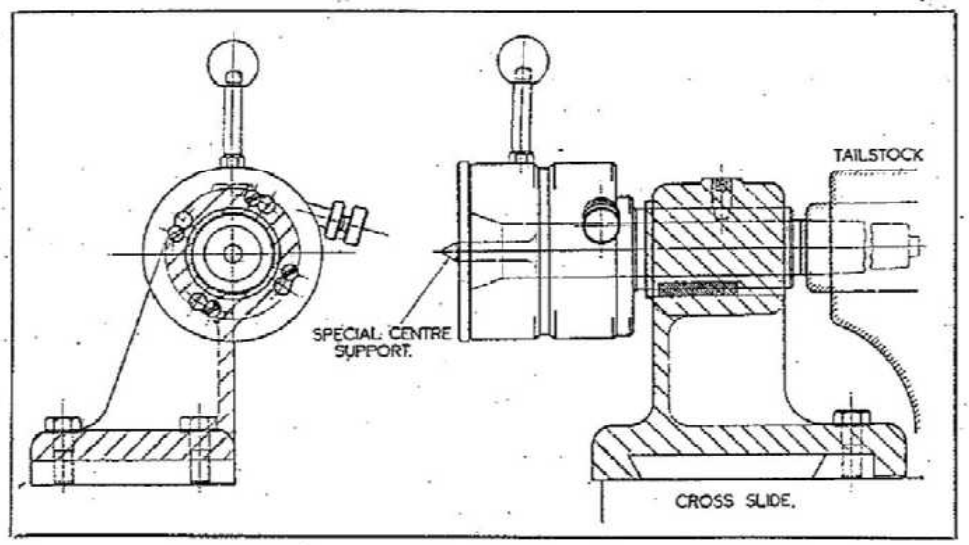


Fig. 11. Coventry Diehead mounted on lathe saddle with special tailstock centre

Centre Lathes

The usual method of fitting a diehead with a taper shank and mounting it in the tailstock spindle is not satisfactory, owing to the difficulty of arresting the forward travel of the diehead to open it at the end of the thread.

A superior method is to mount the diehead in a bracket on the saddle vees as shown in Fig. 11. The saddle provides the necessary traversing arrangement of the diehead to follow the thread being cut.

To open the diehead, a simple form of dead stop can be provided by inserting a piece of steel of suitable length between the headstock and the saddle. This arrests the forward motion of the saddle allowing the diehead to travel forward and open in the usual manner. This form of stop is not suitable if the lead screw is used to control the diehead. In this case we recommend the Detent Withdraw Lever, as shown in Fig. 46.

Medium length screws are cut by holding one end in the lathe chuck on the headstock centre, the other end being supported on the long centre shown, which is a sliding fit in the shank of the diehead.

The bracket should be finish bored in position to ensure correct alignment.

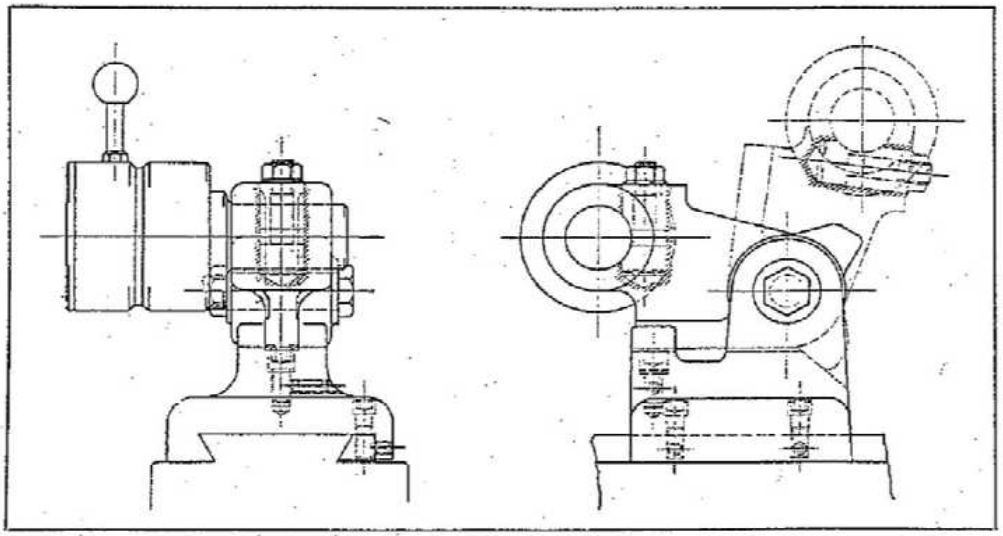


Fig. 12. Details of hinged bracket

If turning or parting-off operations are necessary in addition to threading, a hinged or fold type of bracket should be used. (See Fig. 12). This allows the diehead to be swung clear of the toolpost, allowing drilling or reaming operations from the tailstock

This arrangement on a centre lathe having a hollow spindle fitted with a universal jaw chuck is a good substitute for a capstan or turret lathe where only small quantities have to be machined.

Another arrangement which provides for the traverse and stopping of the diehead is shown in Fig. 13.

The main casting is bored to suit the tailstock barrel and is clamped in position by a pad bolt or similar method. A long, special shank, free to slide longitudinally in the bore of the casting carries the diehead. The long lever is connected to the shank by a hexagon-head pin which also acts as a key, preventing rotation of the diehead. Screwed rods and locknuts provide the stop for arresting the travel of the diehead and allowing the diehead to open in the usual manner. The saddle is free for turning and cutting-off operations.

Fig. 14 shows a diehead and bracket arranged for machining long threads. The bush shown supports the long screw in front of the diehead. One end of the screw is held in the lathe chuck, the rear end being supported by a long centre which passes through the diehead as shown. The diehead is controlled by the leadscrew of the lathe.

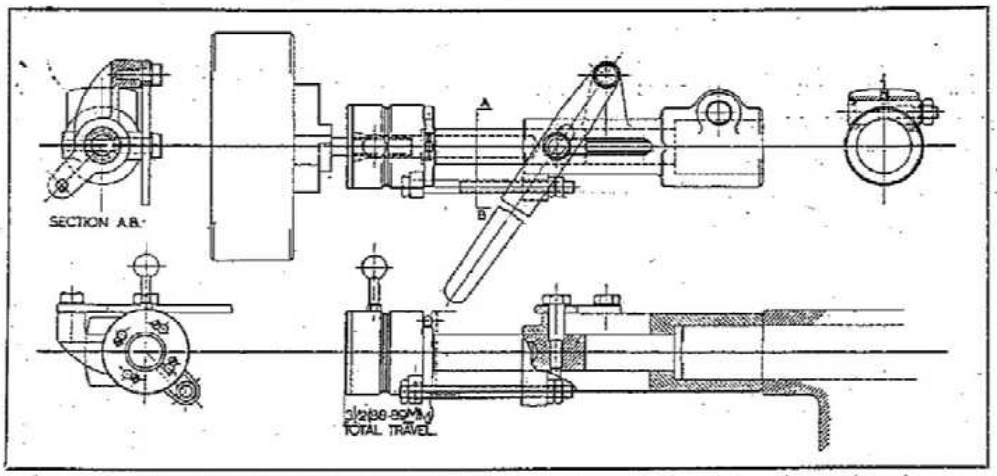


Fig. 13. Details of the sleeve for mounting a diehead on the tailstock

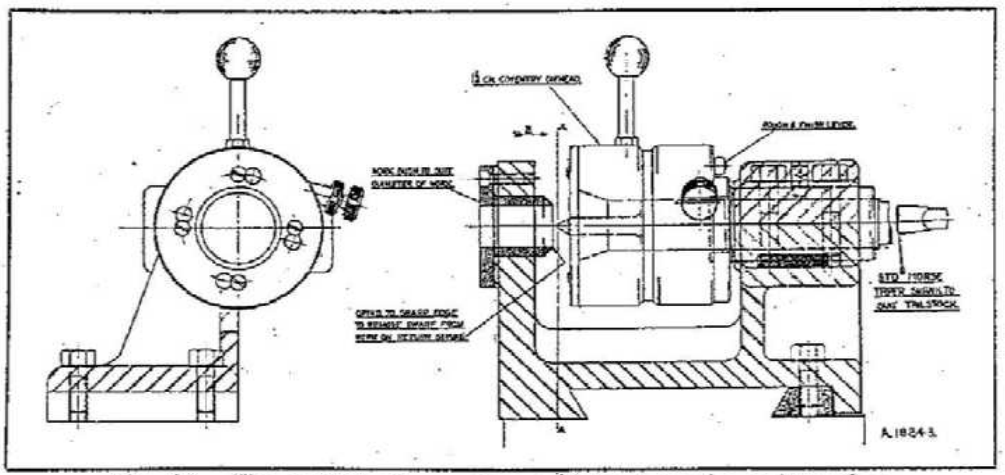


Fig. 14. The method of mounting a diehead on the saddle of an engine lathe for cutting long threads

We cannot undertake to supply the brackets shown in Figs. 11 to 14.

Dies used in a leadscrew-controlled Diehead should have the $2\frac{1}{2}°$ top face angle removed, that is, the cutting face should be parallel with the back of the die to eliminate the self-guiding action. Dies modified in this manner can only be reground on the throat.

When taking two or more cuts with a diehead, the bulk of material must be removed at the first cut. For this reason, four threads per inch is the coarsest we recommend. If a coarser lead is required, it can often be obtained by means of a comparatively fine pitch and multiple start of thread.

Automatic Screw Machines

On Single-Spindle Automatic Screw Machines, the diehead should have a spring holder. Style X.T.2 and Stationary Type C.H.S. (except those with Detent Pin Withdrawing Attachment) have spring holders, and Style C.H. can be converted if required. Wherever possible, the slide carrying the diehead should be actuated by a cam to give a feed slightly less than the pitch of the screw being cut.

When used on Automatics, Styles C.H. and C.H.S. Dieheads have the detent pin handle replaced by a collar to avoid the possibility of the handle being thrown over to the roughing cut position by the indexing action of the machine.

A list of the sizes of dieheads, and diameters of shanks of spring holders which are generally kept in stock is given on page 83.

Cleveland Automatic Machines

On Model A Machines the use of a spring holder is advisable to ensure a good start, especially when cutting coarse threads.

Dieheads are opened in the normal manner, by arresting the travel of the turret, and closed again as the turret revolves, by a bracket attached to the turret cap.

Coventry Dieheads can be fitted in the slide of Model B machines. As this slide has no rotating motion, it is necessary to close the diehead by external means. The usual method is by attaching a suitable lever to the threaded stock stop rod. As this rod revolves to bring the stock into position, the lever contacts the closing handle on the diehead, rotating the front portion sufficiently to close the diehead.

Brown and Sharpe-Type Single-Spindle Automatics

This heading includes B.S.A., C.V.A. and Index machines, all of which are specially catered for by the Style X.T.2 Diehead. The design of this diehead includes an external tripping mechanism which eliminates the possibility of the diehead opening due to the rapid indexing of the turret. See Fig. 15.

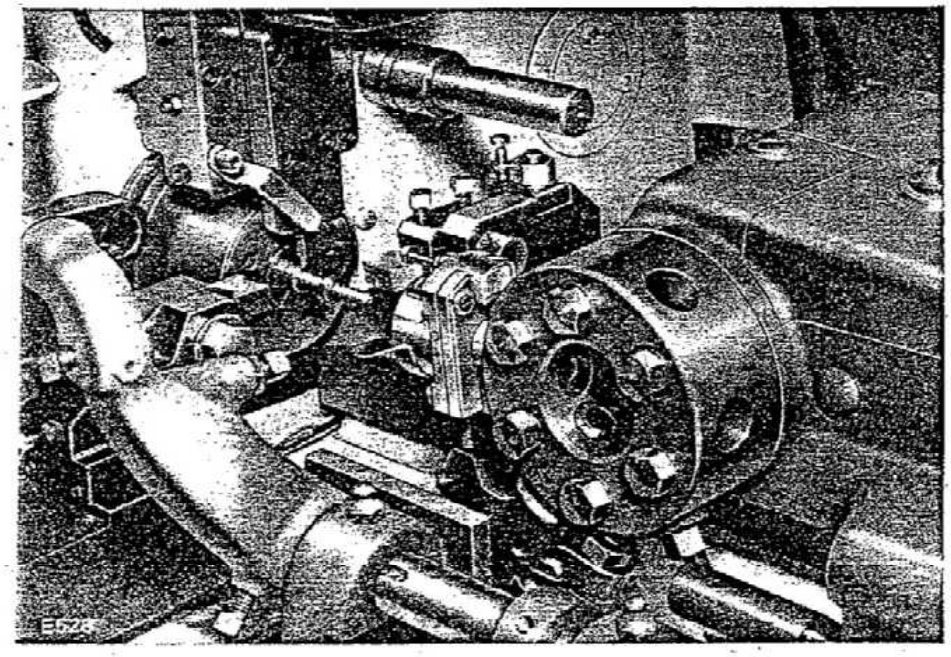


Fig. 15. Style X.T. Diehead on a B.S.A. Single-Spindle Automatic Screw Machine

MOUNTING ROTATING TYPE COVENTRY DIEHEADS

These are for use on rotating spindles and made in two types:—

1. *With closing sleeves and standard Soft shanks.*

These dieheads are used on drilling machines and automatics.

The diehead is opened by arresting the spindle travel, allowing the front of the diehead to pull off and open in the same manner as the stationary diehead. Closing is effected by pushing the closing sleeve forward, by means of the closing bracket or yoke, the distance "E" which is indicated in the charts on pages 73 and 75.

Morse taper or special shanks can be supplied. Overall dimensions are given on pages 73, 74 and 75.

2. *With detent pin withdraw sleeve for opening the diehead.*

These dieheads are suitable for use on multi-spindle automatics, threading machines and drilling machines. The front of the diehead does not pull off when this method of opening is used, suiting this type to applications where the spindle has to be fed by hand or automatically during the operation. Opening is effected by moving the detent withdraw sleeve backwards by means of the opening and closing yoke, or bracket. Closing is performed as described above. This type of diehead is ideal for threading components which are *loosely held*, where the drive can be taken by a keyway, hexagonal, or square part, or some projection on the sample.

Threads as short as three pitches can be cut.

When using this arrangement it is unnecessary to arrest the travel of the spindle to open the diehead. Therefore, feed or cam pressure can be applied up to the instant of opening.

See page 76 for overall dimensions.

Brown & Ward $\frac{5}{8}$" Automatics

The diehead is held in the turret (Fig. 17) and rotated at a suitable speed in the same direction as the work and is fed forward by means of a cam. At the end of the cam stroke, the front of the diehead continues to travel forward until the diehead is pulled off the detent pin when it immediately opens.

When the diehead is returned to the central position, a pin with roller, connected to the diehead closing yoke and operating against the cam, pushes the diehead closing sleeve and closes the diehead.

Petermann Automatic Screw Machines

The diehead is mounted on a rotating spindle by means of a threaded adaptor, which replaces the standard shank and is balanced to run at high speeds. See Fig. 20.

As the work revolves clockwise, the diehead is arranged to revolve at a higher speed in the same direction.

The movement of the spindle is arrested by an adjustable stop which opens the diehead.

Closing is effected by a special sleeve on the diehead which has two spiral slots engaging the closing pins.

Bechler Automatics

The diehead is mounted on a rotating spindle on the threading attachment. It is attached to the spindle by a threaded adaptor which replaces the standard shank and is balanced to run at high speeds.

As the work revolves clockwise, the diehead is arranged at a higher speed in the same direction.

An adjustable stop arrests the motion of the spindle which opens the diehead.

Closing is effected by use of a special sleeve. See Fig. 18.

See illustrations overleaf regarding Brown & Ward and Bechler machines.

Multi-Spindle Automatics

On these machines, the diehead is usually carried on a special threading and tapping spindle which revolves continuously in the same direction as the work. This spindle revolves either slower or faster, depending upon whether the work spindles rotate in a clockwise or anti-clockwise direction. Threading speed is the difference in speed between the two spindles. Taking the four-spindle Gridley as an example, the method of operation is as follows.

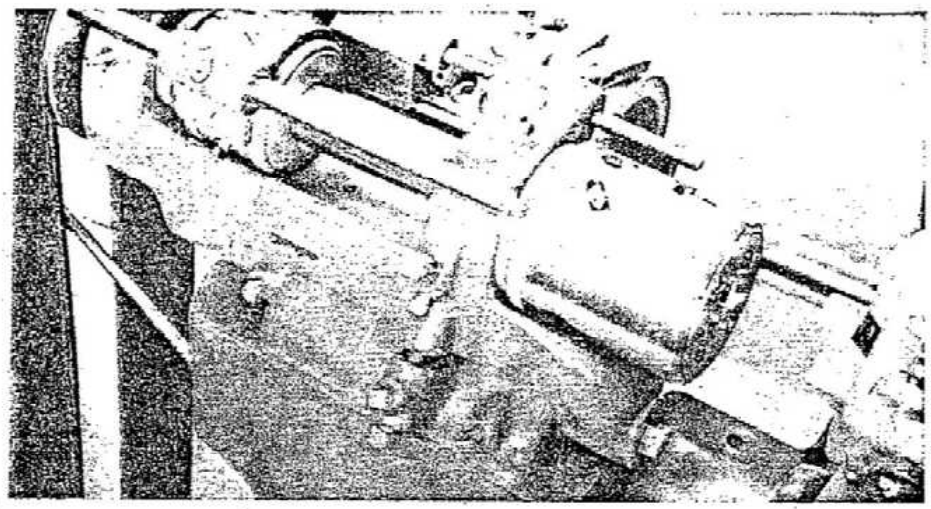


Fig. 16. Coventry Rotating Diehead on a Tornos Swiss-type Automatic

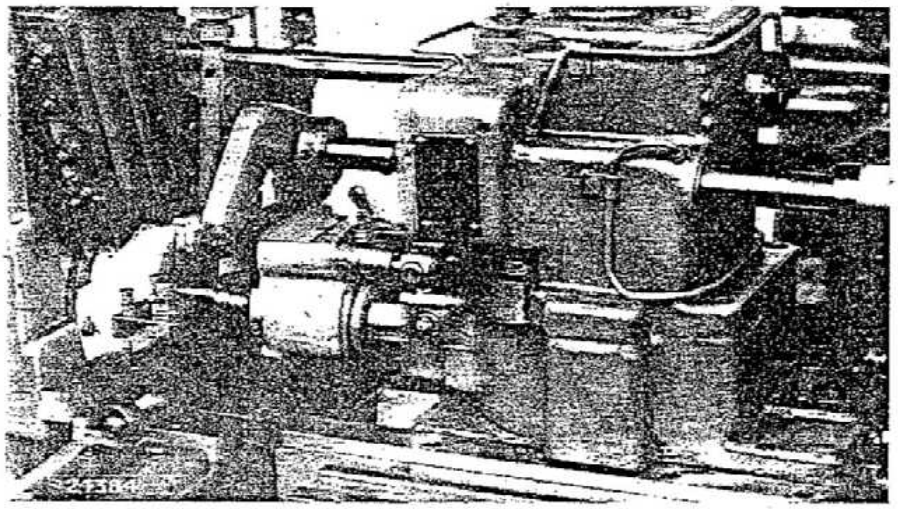


Fig. 17. Cam-operated closing arrangement for a rotating diehead on a Brown & Ward ⅝" Automatic Screw Machine

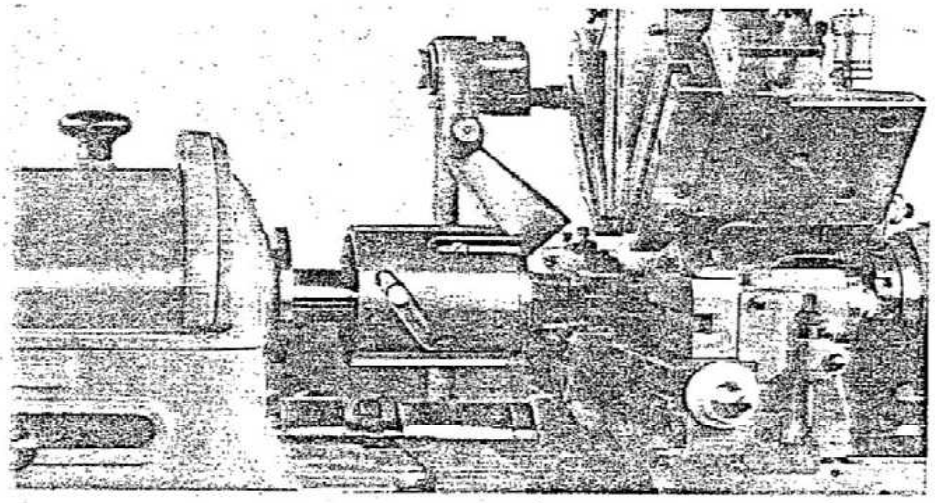


Fig. 18. A Coventry Rotating Diehead fitted to a Bechler Model B, Sliding Headstock Automatic

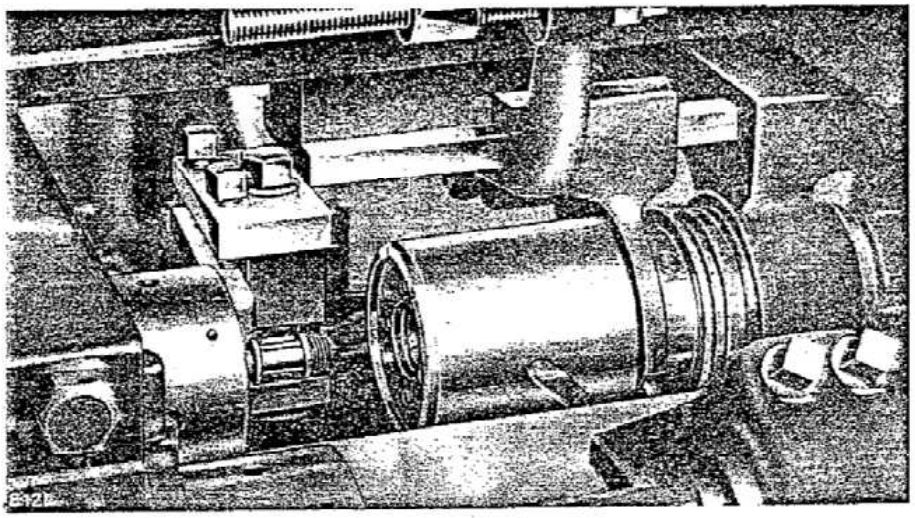
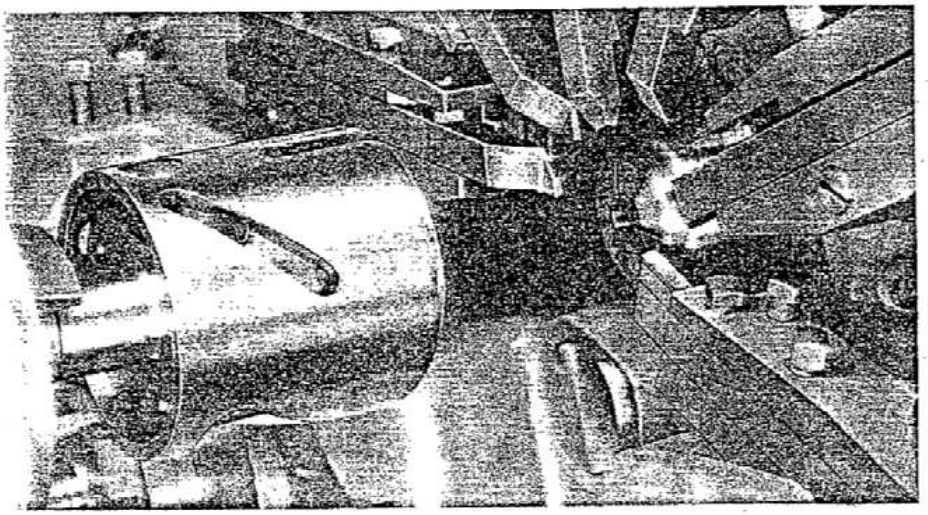


Fig. 19. Coventry Rotating Diehead on types F. & G. Gridley 4-spindle Automatics

Fig. 20. ½" Style C.H.S. Coventry Rotating Diehead fitted to a Petermann Automatic Screwing Machine



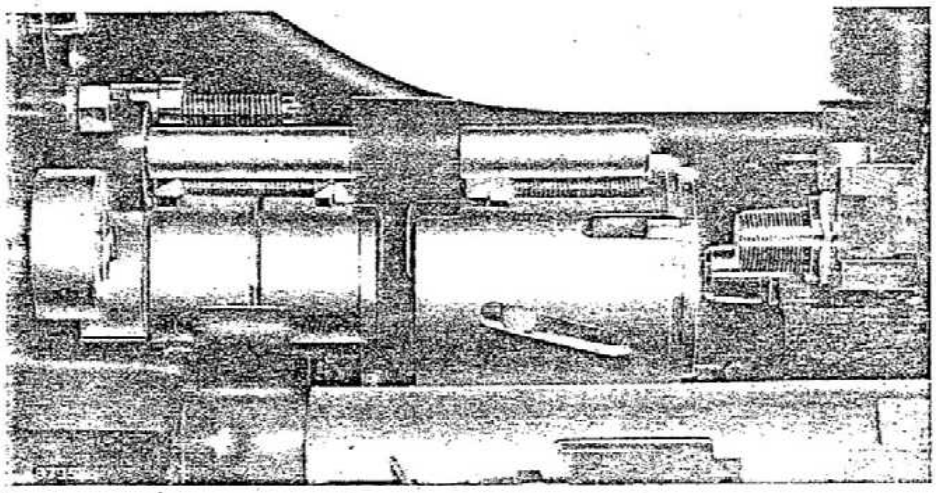


Fig. 21. Coventry Diehead arranged for taper threading on a New Britain 4-Spindle Automatic Chucking Machine

Alfred Herbert Ltd., Coventry, England

At the appropriate time, the diehead is brought forward, by means of a cam, to contact the work. When the dies secure a hold on the work, the diehead and spindle are carried forward by the guiding action of the non-cutting portion of the die. Simultaneously, the bracket or yoke shown is carried forward with the diehead until the arm encounters the adjustable locknuts. This stops the travel of the bracket which is in contact with the Detent Pin Withdraw Sleeve of the diehead. The threading action continues to carry the diehead forward, but the Detent Withdraw Sleeve, being held back by the bracket, gradually withdraws the Detent Pin until the diehead is free to open. Due to the action of the opening springs, the diehead is partly rotated causing the dies to be withdrawn from the work thus stopping the travel of the diehead. The partial rotation of the front part of the diehead combined with the action of the spiral slots causes the diehead closing sleeve to travel backwards. The diehead, still rotating, can dwell in this position until the return cam functions. This withdraws the diehead from the work, carrying the closing bracket along with it until the arm strikes the locknuts. The diehead spindle, actuated by the cam, continues to move backwards. As the closing sleeve is held by the fork on the bracket, the spiral slots cause a partial rotation of the closing sleeve which is transmitted to the front portion of the diehead and completes the closing operation as shown.

Most multi-spindle automatics use a similar system, but closing brackets must be designed individually.

Rotating Taper Threading Diehead

This type of diehead is for use on automatic machines having a reverse to the threading spindle. Dieheads are not opened at the end of the cut but are reversed off the work. The closing sleeve shown in Fig. 21 is prevented from moving laterally by means of a yoke.

Two pins in the diehead body engage angular slots in the sleeve and actuate the opening mechanism during the forward threading motion of the diehead, thus providing the desired taper.

Different tapers necessitate the use of different closing sleeves.

A list of Multi-Spindle Automatics to which Coventry Dieheads can be fitted is shown on page 84.

Drilling Machines

For some classes of threading operations, drilling machines are more suitable than capstan lathes or threading machines.

Fig. 22 depicts the standard arrangement as applied to Herbert Drilling Machines using a ½" Diehead.

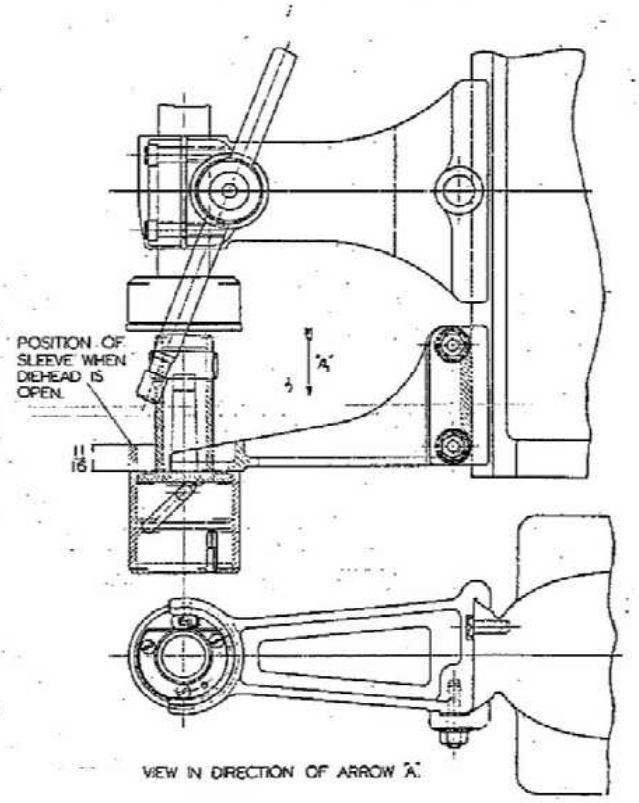


Fig. 22. Arrangement for closing the diehead when the work is held in a chuck vice or fixture. A ½" Diehead is shown

A rotating type of diehead is used, enabling the diehead to be opened and closed without stopping the spindle. Operation is as follows:—

The diehead is fed on to the work from the position shown, to approximately 1/10" from the end of the threading operation. Diehead travel is then halted by means of a stop collar on the drilling spindle which projects beyond the top of the drill column. This allows the front of the diehead to pull off the detent pin and open in the usual manner.

During the opening cycle the diehead sleeve moves backwards 11/16". On the return stroke of the spindle,

the diehead closing sleeve encounters the fixed bracket shown and moves forward the $\frac{11}{16}$" required to close the diehead.

Different types of closing brackets are required for other makes of machines.

Components may be held in a vice, chuck or special fixture.

Fig. 23 shows the style of Coventry Diehead used when the component is held loosely in a fixture or on a pin where a hexagon or square part, or a keyway, in a sample is used to take the drive. The diagram shows the diehead at the commencement of the opening motion. Operation is as follows:—

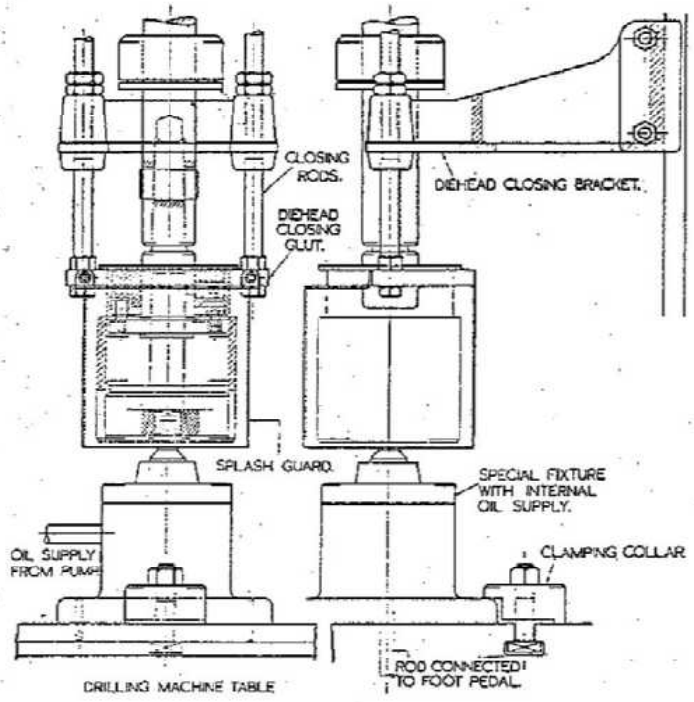


Fig. 23. Arrangement for fitting a Coventry Diehead to a Herbert Drilling Machine when components are held loosely

Closing rod locknuts are set to make contact with the closing bracket at approximately 1/10" before the end of the threading operation, that is, the amount of the engagement of the diehead detent pin.

When the travel of the closing glut is stopped by the locknuts through the closing rods, the diehead, due to the action of the dies, continues to travel forward, the diehead opening collar which is connected to the detent is withdrawn allowing the diehead to open. During the opening movement, the diehead closing sleeve moves backwards until it contacts the underside of the closing glut.

The machine spindle is now returned to the top position, which action brings the hexagon collars on the closing rods into contact with the closing bracket and

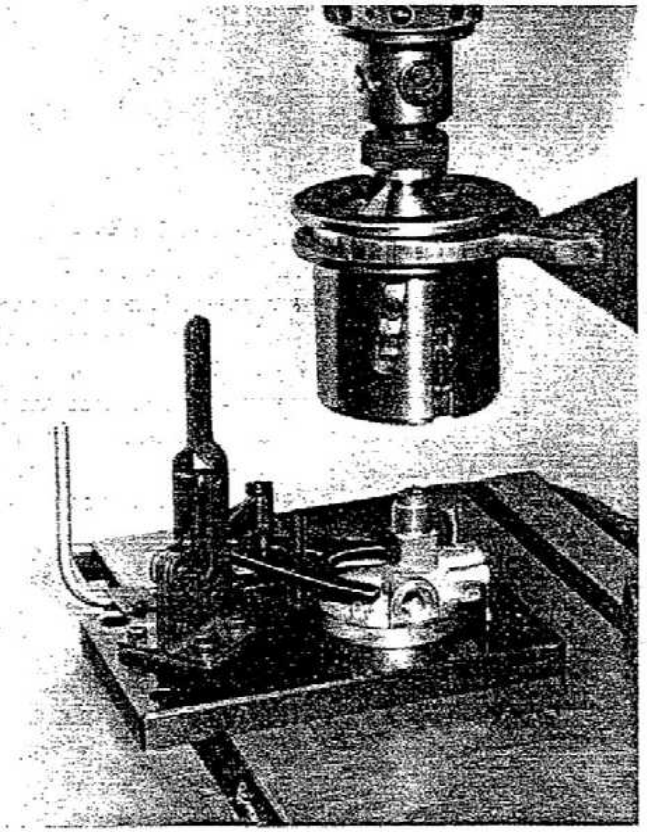


Fig. 24. A Coventry ¾" Rotating Taper-Threading diehead on a drilling machine cutting a ⅜" — 18 N.P.T.F. Dryseal thread

arrests the backward travel of the closing glut. Backward travel of the spindle continues, but the diehead closing sleeve, being in contact with the closing glut, is pushed forward into the position shown.

Three springs and spring pins return the opening collar and detent pin to the closed position. A new cycle of operation can now commence.

OPERATING INSTRUCTIONS

Care of Diehead

Dieheads and dies should be carefully inspected before use, whether new or not, to ensure that they are in good condition, free from burrs or dents, particularly on the die seats, and free of chips, dirt or gummy oil. Coventry Dieheads and Dies will produce high-quality work continuously only if they are kept clean and properly lubricated with thin oil.

If the opening and closing mechanism does not function easily, immerse the diehead in clean paraffin and operate the moving parts. After shaking the paraffin out, lubricate with a thin oil of non-gumming qualities.

Closing the Diehead

Mount the diehead in the machine with the closing handle in a convenient position, preferably at the top. The diehead is then closed by pushing the ball handle until the detent pin springs into the slot at the back of the scroll. If only one cut is necessary, the detent pin handle behind the body can be in either the roughing or finishing position, the diameter then being adjusted by the tangent adjusting screw or screws *.

*Style C.H.S. and X.T. dieheads are provided with two horizontally-opposed adjusting screws.

Opening of Diehead

Stationary and Rotating types are opened by arresting the travel of the head, which allows the front part to draw forward and release the dies. Dieheads with Detent Withdraw Levers or Detent Withdraw Sleeves and Style X.T.2 Dieheads are tripped externally.

Opening the Diehead by Hand

The $\frac{1}{4}$" and $\frac{5}{16}$" sizes of the Style C.H. dieheads can only be opened manually by gripping the front portion and pulling the scroll clear of the detent pin.

On all other dieheads, hand opening is achieved by withdrawing the detent pin from the scroll. See Figs. 1 and 2. First push the closing handle to relieve the pressure of the opening springs, then pull out the detent pin handle, at which the diehead will open instantly.

Changing the Dies

When changing dies, first close the diehead to remove pressure from the dies. Slacken off the front-plate screws approximately two threads, turn the front plate in an anti-clockwise direction and it will then lift off. (NOTE:— For $\frac{1}{4}$" and $\frac{5}{16}$" dieheads the screws must be removed.)

Choose the type of die as recommended on page 26.

Each individual die has its sequence No., 1, 2, 3 or 4, on the front edge, and these should be inserted in the diehead in numerical order in a clockwise direction. It is immaterial which slot is taken to begin the sequence. These instructions apply to both R.H. and L.H. dies. See Fig. 25.

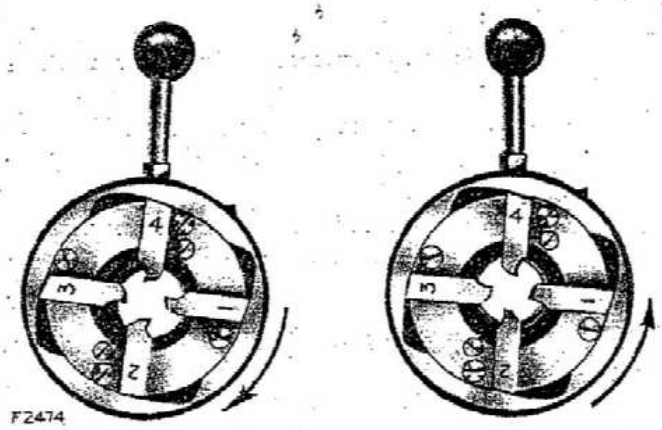


Fig. 25. The correct order for inserting dies. Arrows indicate the direction of work rotation

Illustration, Fig. 26, shows a set of dies with the sequence number on the front edge. The type of die, pitch of thread and the gauge number are on one side, and on the reverse side the registered trade mark, with the addition in the case of special dies of an S.D. number. When ordering replacement dies it will help to avoid errors if these particulars are quoted.

Setting the Dies to Correct Diameter

First put the detent pin handle in the finishing (or minus) position, then set by the tangent adjusting screw (or screws) until the indicator line is opposite the zero line on the graduated scale. When turning

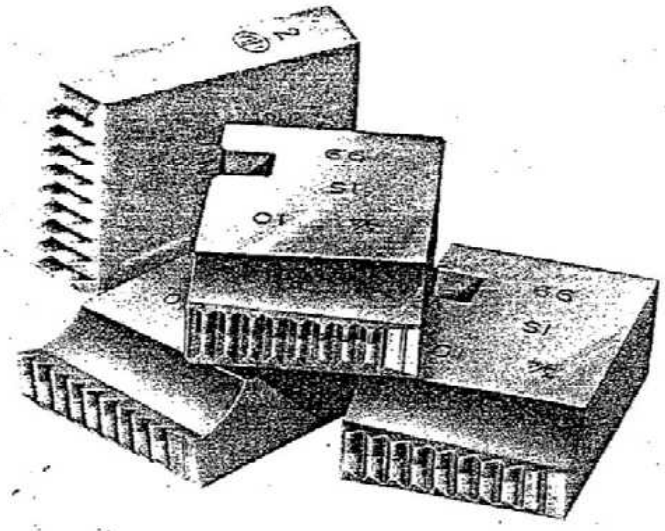


Fig. 26. A standard set of B.S.W. dies

the tangent adjusting screws, always relieve the pressure of the opening springs by pushing on the handle. This makes the adjustment more sensitive. Nominally the dies should cut correct diameter when the indicator line is at zero and the handle in the finishing position. It is better to commence with the indicator set one division on the large side, make a sample, test with a gauge and then use the tangent adjusting screw for final setting. Do not attempt to take a cut as small as ·001" when setting, as the dies will not bite on such a cut and the next sample would almost certainly be undersize.

Speed of Work

The speed depends upon the following factors:—

1. The material to be threaded;
2. The finish and accuracy required;
3. Pitch and form of thread;

and while it is impossible to lay down any definite rule, the following table will serve as a useful guide.

Tough steel	5 to 8 ft. per min.
General mild steel work	10 to 20 ft. per min.
Free-cutting bolt steel ...	25 to 50 ft. per min.
Cast-iron	8 to 12 ft. per min.
Brass and copper	Speeds as for turning.

Direction of Work Rotation

When right-hand threads are to be cut, work should run in the forward direction, and in the reverse direction for left-hand threads. See Fig. 25.

Cutting Lubricant

Always keep the dies well supplied with lubricant when cutting. A good quality cutting oil will maintain the cutting edge, thus prolonging the life of the dies. For speed and finish, a good soluble oil or cutting compound can be used, and is recommended for cutting speeds higher than 15 feet per minute.

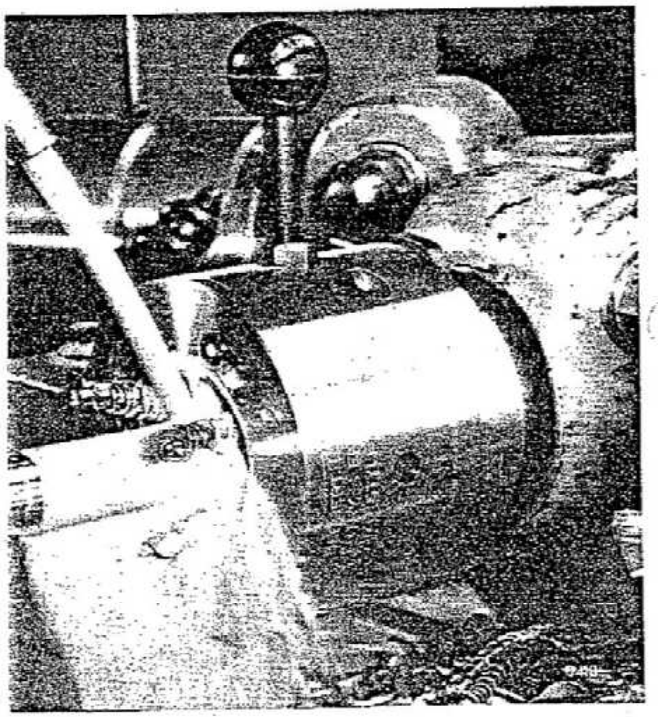


Fig. 27. An ample flow of cutting lubricant should be used when cutting threads

Where it can be arranged, it is very desirable to have an ample supply of oil delivered through the back of the diehead shank and flowing out at the mouth. This washes the chips out and keeps all the working parts free from sediment. Such an internal oil supply can usually be fitted on automatics and turret lathes. It is also desirable that the oil be freed from solid matter either by filtration or the use of settling tanks.

Cutting the Thread

Coventry Dieheads can be used successfully by semi-skilled labour, but the best results can be obtained only after a fair amount of practice to develop a delicate sense of touch.

Dies should not be forced on the work, as this may result in damage to cutting edges. A gentle pressure should be applied until the dies "bite". The pressure should be maintained as the dies travel along the work, not to force the dies, but only to neutralise any drag imposed by the weight of the turret or saddle on which the diehead is mounted.

Work to be threaded should be as nearly as possible the correct diameter or slightly oversize. Best results are obtained when dies remove ·001″ from the full diameter.

In black bolt work, stampings should not be more than ·015″ oversize.

Roughing and Finishing

On all stationary dieheads, except $\frac{1}{4}$″ and $\frac{5}{16}$″ C.H. and all X.T. models, the detent pin handle provides the facility for taking two cuts without disturbing the adjusting screw. It is secured to the detent pin which holds the scrolls in the closed position. This detent pin has two flats at different distances from its axis. The flats engage the hard steel tooth in the back of the scroll and hold it in either the roughing (or plus) or finishing (or minus) position according to the setting of the handle.

When two cuts are necessary, the first cut should be taken with the detent pin handle in the roughing position. Then, before taking the second cut, turn the detent pin handle to the finishing position. On coarse threads necessitating several cuts, the adjusting screw should be used.

Whenever the diehead is in use, the detent pin handle must be positively in either the roughing or finishing position, and not in any intermediate position.

NOTE 1. This does not apply to the 3″ and 4½″ dieheads, which have three-position Detent Pins.

NOTE 2. The handle should not be moved from one position to the other when the diehead is closed, without relieving the pressure of the opening spring by pushing on the closing handle, as this causes excessive wear on the detent pin.

3″ and 4½″ Style C.H. Dieheads have three-position detent pins, which enable three cuts to be taken without altering the adjustment of the diehead. Both of these dieheads are fitted with two adjusting screws, one of which has a graduated collar for making diameter adjustments, the other being a dead stop which is locked in position by a knurled head screw. This enables the diehead setting to be maintained once the correct diameter has been determined.

To engage the thread accurately when taking the second or third cut, arrange the dies in the diehead so that the one with the first full tooth nearest to the front of the die is clearly visible. It is then a simple matter to slip this die into the thread on the work as it rotates.

CUTTING TAPER THREADS

Using a Standard Diehead

Tapers of up to approximately 8° included angle and of limited length can be cut with taper dies in a standard diehead. Maximum length of the taper is the width of the die, minus the length of the throat angle.

Solid Adjustable Dieheads can be used for cutting taper threads on brass, but not on steel.

All such dies used for taper-threading have to cut along their whole length, so that the guiding action is lost (see Fig. 49). This method is satisfactory for such thread tapers as B.S.P. threads (taper) and A.N. Standard Pipe Taper Threads.

A taper die for use in a standard diehead has its top face ground to a certain angle dependent upon the taper to be cut, that is, the 2½° face angle of the standard die is removed. The die therefore cuts along its entire width. This type of die must not be ground on the top face, but only on the throat angle. Dies cutting along their width leave a series of four lines at the point at which dies cease cutting, but except for close-limit work these are not detrimental.

In view of the limited length of taper described, and the fact that these dies may not be reground, we do advise customers, wherever possible, to use a Taper Threading Diehead in conjunction with standard taper dies. See section below.

Using a Junior Taper-threading Diehead

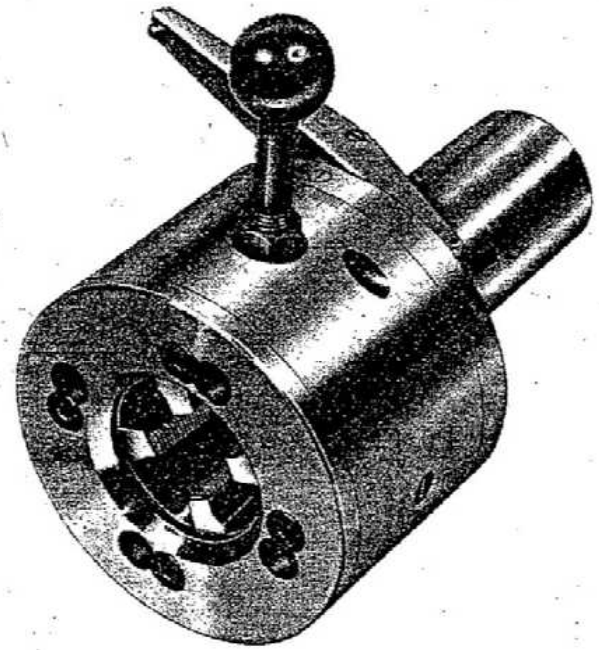


Fig. 28. Junior Taper-threading Diehead

This diehead is a special adaptation of the Standard Style C.H.S. Diehead. Any pipe thread, with a taper not exceeding 1 in 16 and of a length not in excess of those specified in standard taper thread tables, can be accurately and efficiently produced.

The principle of the diehead is that it is equipped with a tapered detent pin and tooth, actuated by a detent withdrawing lever. The detent pin is withdrawn as the diehead advances along the component, increasing the actual diameter of the thread being cut. The taper is produced by the ratio of the diehead opening to its linear advancement. This ensures that only the leading portion of the dies are cutting and that the remainder acts as a pitch controlling guide. Die life is prolonged as regrinding can be carried out on both throat and top face throughout the life of the die.

This method of taper-threading also eliminates the four axial lines which are left along the length of the thread when using taper dies in a standard diehead.

To set-up the diehead, it is only necessary to ensure that the abutment for the Detent-Pin Withdrawing Lever is in the correct position to open the diehead at the end of the forward stroke. Component size is then controlled by the usual adjusting screws on the diehead.

When ordering dies for the Junior Taper-threading Diehead, it is important to state the diehead type, as the dies used in the standard Coventry Diehead are not suitable. The dies required, however, are the same as those used in the standard Coventry Taper-threading Diehead.

NOTE. For overall dimensions of Junior Taper-threading Diehead see page 77.

Using a Standard Taper-threading Diehead

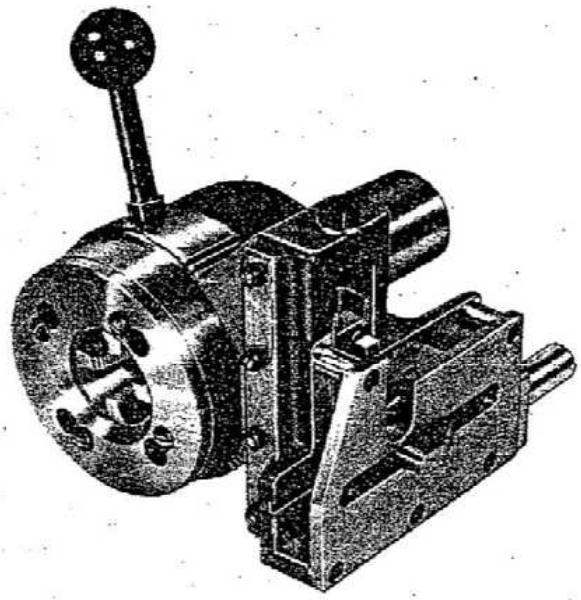


Fig. 29. Standard Taper-threading Diehead

Longer tapers than those mentioned above can be cut by using a standard Taper-threading Diehead, as illustrated in Fig. 29. Dies used with this diehead have the guiding action of standard dies.

Construction is such that the dies open out as they travel along, thus forming the taper.

The taper is governed by a former, which is forced outwards by a spring and held stationary by a stop or fixed abutment on the machine, operating against the projection which works in the elongated slot as the diehead travels forward.

The former has an inclined slot which engages a corresponding projection on an adjustable angle plate clamped to a vertical sliding rack. This rotates the diehead scroll by engaging a gear segment attached to it. The outward movement of the dies is this positively controlled by the former as the diehead travels forward.

The abutment on the machine is set to arrest the motion of the former bar just before the dies begin to cut. The diehead, travelling forward, carries the vertical angle plate along, its projection sliding in the slot of the former. This produces a taper by transmitting sufficient movement through the rack and gear on the outer scroll to allow the diehead sufficient opening movement to produce the taper being cut. The former is set so that at the end of the cut the right-hand edge of the angle plate arrives at the left-hand edge of the former. This allows the angle plate to drop out of the slot in the former, and the diehead, through the action of the opening springs, opens automatically.

One former and adjustable plate serve for all diameters having the same taper, but a different former and plate are required for each different taper.

The diehead is intended to be mounted on the turret of the machine and it is necessary for the user to provide the abutment referred to above.

This method of cutting taper threads affords several advantages. Finished work is quite round and smooth, without the four ridges left by taper dies where the dies cease cutting, thus producing a better-fitting screw. The danger of causing severe strains by running work too far into the dies does not exist, as it does when taper dies are used in the standard diehead.

Adjustment of the Standard Taper-threading Diehead

See Fig. 30. A certain amount of adjustment on the diameter of the thread can be obtained by releasing screw "E" then moving screw "J" upwards to obtain smaller diameters, or downwards for larger diameters.

If sufficient adjustment cannot be obtained by means of screw "J", it will be necessary to alter the position of the teeth on the diehead in relation to the angle plate rack. This operation is performed as follows:—

Remove the sheet-metal chipguard and the diehead front plate. Withdraw the cheese-head closing-spring

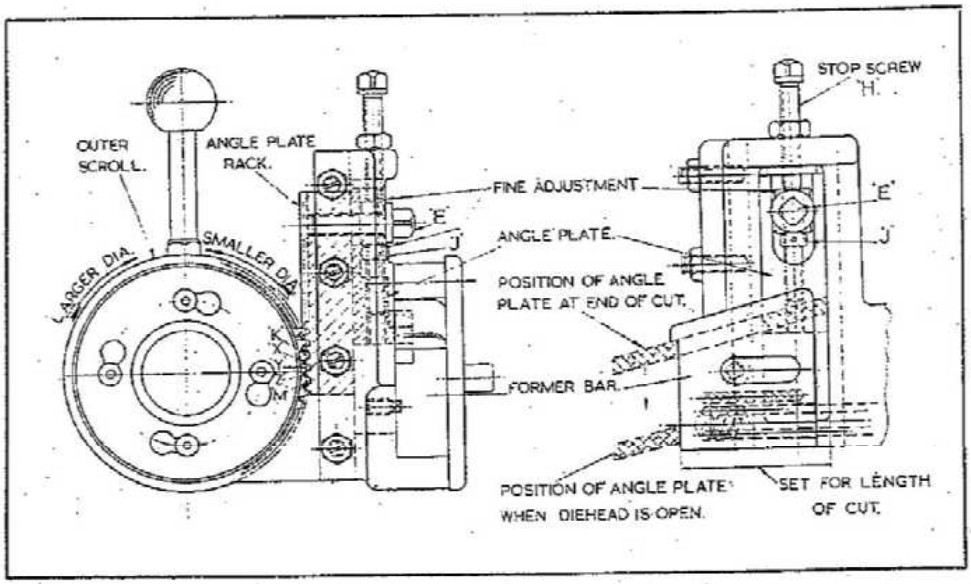


Fig. 30. Adjustment diagram of Taper-threading Diehead

screws and closing springs which can be seen in the front of the diehead body. (See page 48, operation 2.)

The outer scroll of the diehead can now be drawn forward sufficiently to disengage the gear teeth from those of the angle plate rack. If it is desired to thread a smaller diameter taper, the outer scroll should be moved in an anti-clockwise direction one tooth space on the angle plate rack. If a larger diameter taper is required, the outer scroll should be moved in a clockwise direction one tooth space on the angle plate rack.

Replace the closing springs, screws and front plate. Final size adjustment can be obtained by means of screw "J" as explained above. When the requisite diameter has been obtained set stop screw "H" to limit the closing movement and replace the chip guard.

If required, the Taper-Threading Diehead can be used for screwing parallel threads, by fitting it with a short parallel former and adjustable plate, which act as detents to hold the diehead closed. We only recommend this method for occasional jobs if a standard diehead is not available.

To cut taper threads with a diehead which is required to revolve, an arrangement as shown on the New Britain Automatic in Fig. 21 can be supplied.

A Taper-Threading Attachment for the $\frac{1}{2}$" X.T.2 Diehead

This item can be supplied for use on Brown and Sharpe type single-spindle automatics. It is very easy to fit and the diehead can be converted back to parallel threading when necessary.

DIEHEAD OPENED BY INTERNAL STOP

When threading components on which the thread length has to be controlled in relation to the end of the job or to a shoulder, and components which are held loosely in a socket for the threading operation, the normal "pull-off" method of opening the diehead by simply arresting its travel is not satisfactory, and an internal stop is necessary.

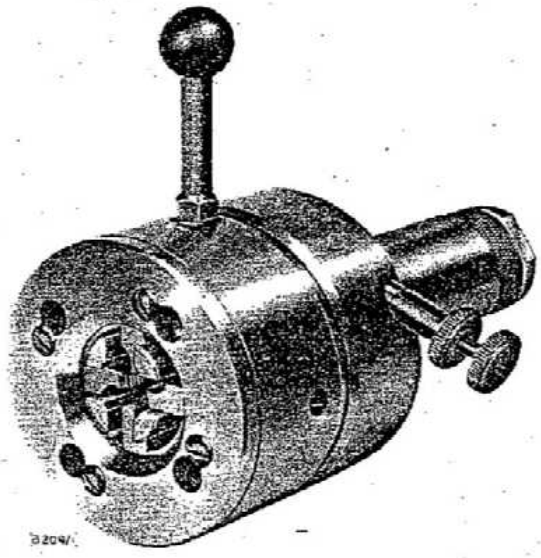


Fig. 31. Style C.H. diehead fitted with pronged internal stop. Style C.H.S. dieheads can be fitted with a similar attachment

The internal stop, which is adjustable endwise, is fixed in the shank so that, when it encounters the component, the back portion of the diehead is arrested whilst the front portion continues to travel forward and open the dies.

When the stop can function against the end of the component, it need only consist of a piece of plain rod of suitable diameter. If contact has to be made with a shoulder at the end of the thread, the stop must be of the tubular, pronged type, as shown in Fig. 31. This type of stop is adjusted so that the prongs project sufficiently in front of the dies to allow them to pull forward and open without striking the shoulder.

This type of stop has to be specially made and it is necessary for us to have detail drawings of the components to be produced to enable us to submit quotations.

NOTE. When fitted with a pronged internal stop, the capacities of Coventry Dieheads are reduced as follows:—

Size of Diehead	$\frac{1}{2}$"	$\frac{3}{4}$"	1"	$1\frac{1}{4}$"	$1\frac{1}{2}$"	2"	3"
Reduced Capacity ...	$\frac{5}{16}$"	$\frac{1}{2}$"	$\frac{5}{8}$"	$\frac{7}{8}$"	$1\frac{1}{8}$"	$1\frac{1}{2}$"	$2\frac{1}{4}$"

HERBERT SOLID ADJUSTABLE DIEHEADS

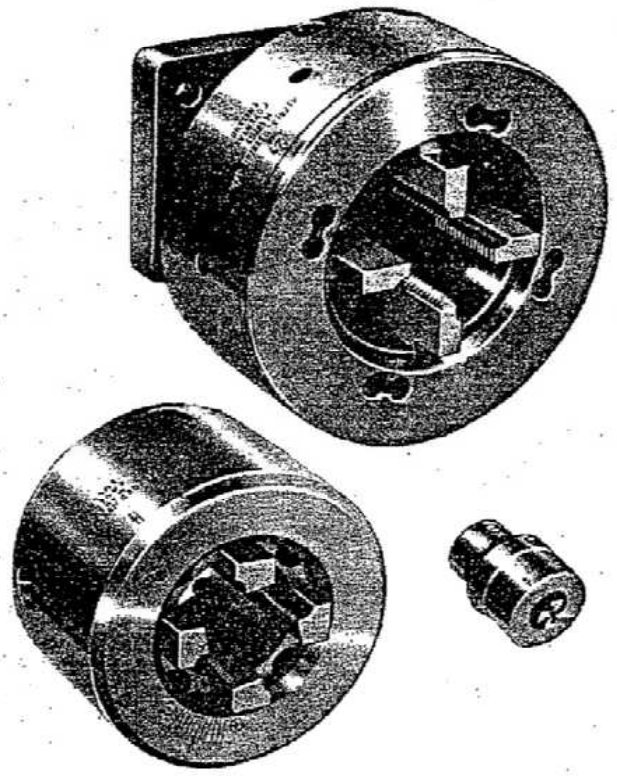


Fig. 32. A group of Herbert Solid Adjustable Dieheads

These dieheads are designed specifically for use on high-speed automatic screw machines and drilling machines having a reverse to the spindle, and in all cases where considerations of size and weight preclude the use of self-opening dieheads. Accurate threads can be cut at a high rate of production, and results are equal to those produced by Coventry Self-opening Dieheads.

Herbert Solid Adjustable Dieheads are made in eight sizes, from $\frac{1}{4}$" to 2" standard and $2\frac{1}{2}$" Fine Thread. The $\frac{1}{4}$" size is for use on machines such as Petermann and Index No. 0 Automatics. Capacities are given on page 72, however, no thread larger than the nominal size of the diehead can be cut.

The $\frac{1}{2}$" diehead can be adapted to machines of the Brown and Sharpe-type, Index Automatics and to various types of multi-spindle automatics and drilling machines. When used on Brown and Sharpe-type Automatics a two-way sliding holder must be fitted.

Shanks, Adaptors or Spring Holders

These can be supplied as extras to individual requirements.

Dies

Solid Adjustable Dieheads use dies which are similar to, but not interchangeable with, those fitted in the Coventry Self-opening Dieheads, and have the correct cutting angles and clearances to suit the material being cut. Results are far superior to those obtained with button dies.

Grinding the Dies

Dies can not be ground successfully by hand, the grinding fixtures must be used. The method of grinding is fully explained later in this book (see pages 32-39) and the following should be noted.

The fixtures used are the same as for the Coventry Self-opening Diehead, with the addition of the packing plate shown in Fig. 55, for all sizes except the $2\frac{1}{2}$" F.T. for which the plate is not necessary.

Changing the Dies

When it is required to replace the dies, proceed as follows:

Slacken the three or four scroll screws, round the periphery of the diehead, sufficiently to clear the body, also undo the two adjusting screws. The outer sleeve will now slide off and the dies can be withdrawn. Before replacing the dies, ensure that the head is perfectly clean and free from dirt, chips or burrs.

It will be seen that there are four eccentric cam faces on the inside of the outer sleeve against which the four dies are located.

Insert the dies 1, 2, 3, 4 in correct numerical order in a clockwise direction, looking at the front of the head. It is immaterial which slot is taken first.

Replace the outer sleeve on the body in such a position that the zero mark on the front of the body is at the extreme 'plus' side of the graduations on the sleeve. With the fingers of the left hand, push the

four dies back against the cam surfaces and with the right lightly tighten up the three or four scroll locking screws just sufficiently to prevent the dies dropping. Now by means of the appropriate adjusting screw, adjust the dies until the zero mark is central. Tighten the scroll locking screws equally, and lock the second adjusting screw.

Note: If available, a finished screw can be used to hold the dies in position. The diehead is now ready for use.

The adjusting screws in the $\frac{1}{4}$" diehead register against a peg, but in all the larger sizes the two screws act on a flat milled on the body.

The front plate screws in the $2\frac{1}{2}$" Fine Thread Solid Adjustable Diehead should be slackened off a little before adjusting the dies and re-tightened securely afterwards.

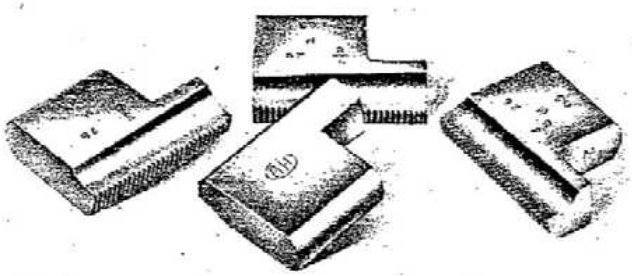


Fig. 33. A set of dies for use in a Herbert Solid Adjustable Diehead

GENUINE COVENTRY STRAIGHT-CUT DIES

All genuine Coventry Dies are marked with our registered trade mark.

Dies are designed so that cutting occurs only on the throat and the first full tooth (Fig. 34). The remaining threads, being above centre height act as a nut, ensuring pitch accuracy. Recommended angles must always be maintained, when regrinding, by use of the correct grinding fixture.

Four standard throat angles of 15°, 20°, 33° and 45° have been adopted for various applications indicated on page 36.

Each die is marked as shown in Fig. 35. Dies which are not of standard Whitworth form also have the thread form marked upon them, e.g., ANC., A.N.F., S.I., etc.

Non-standard or special dies are marked with an SD number. This must always be quoted when re-ordering.

Coventry Dies are supplied in the following grades:

Milled or Ground Thread Dies — for good qual. threading.

Patent Zonic Lapped Dies — for precision threading.

Holozone Dies — for cutting coarse pitch threads.

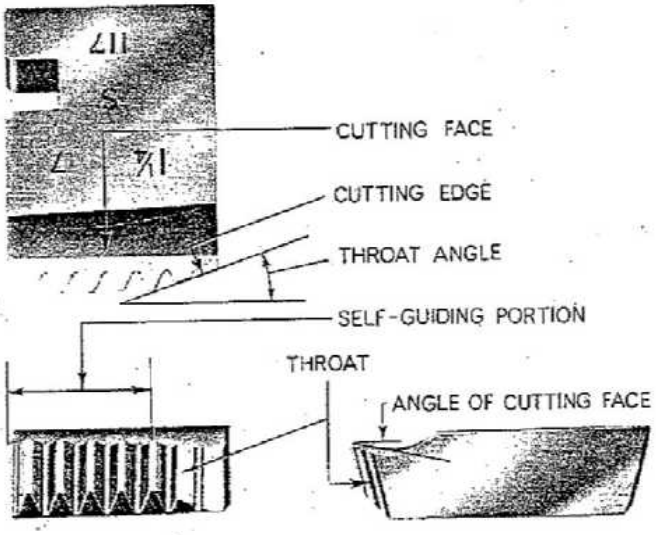


Fig. 34. The combined cutting and self-guiding action of the dies ensures that accurate threads are produced

To suit the wide variety of materials used in modern industry, Coventry Dies are manufactured in 14 different types. *As a general guide only*, we list a few of our recommendations herewith.

Material to be Threaded	Type of Die
Mild Steel, Wrought Iron	S
Malleable Cast Iron	S
Cast Iron, Phosphor Bronze and Gunmetal	M
Brass	B
Plastic Materials	B (High on Face)
Silver Steel, Corrosion- and Acid-resistant Steels	1S5° Zonic
Aluminium	1S Zonic
Copper	'S' (Nitrided)
Acme Threads on Steel	M8° Holozone
High Tensile Steel	A.M. 5°

Type M5° Dies can be regarded as general-purpose dies. They will give reasonably good results on most materials, but superior results will be obtained when the correct type of die for each material is used.

The Type Letter for dies used in Fine Thread Dieheads is identical to that for dies for Standard Dieheads, but is prefixed by the letter "F".

It is in a customers' own interest to state on an order the specification of the material to be threaded. We will then supply the type of die which will give the best results and maximum life.

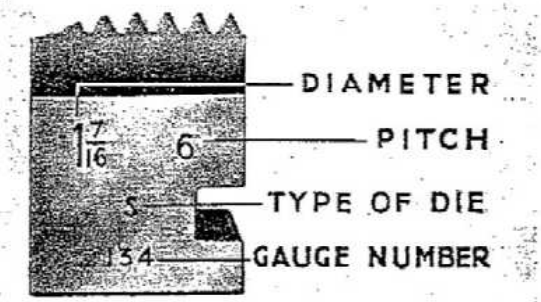


Fig. 35. The markings on a Coventry Die

Holozone Dies (patented)

This type of die, for use in Coventry Dieheads and Herbert Solid Adjustable Dieheads, has been introduced for cutting coarse pitch threads such as Acme, Knuckle, Rope, Buttress and other forms.

Design

Holozone Dies are designed to ensure correct helix angles with approximately true helical relief on the flank angles. Full depth, coarse pitch threads with helix angles up to 12° or more can therefore be produced. A good thread is obtained right from the start.

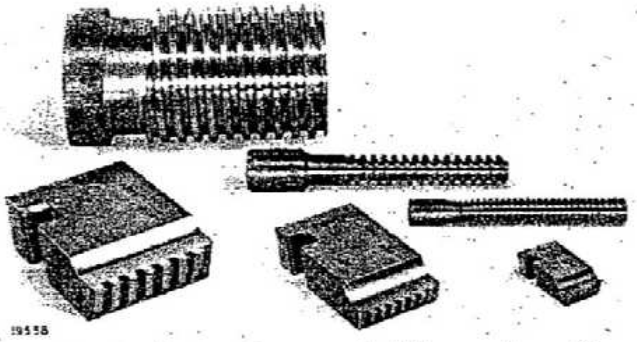


Fig. 36. Acme threads cut with Holozone dies. Shown are 1¾" × 5, ⅜" × 8 and 5/16" × 14 T.P.I. Excellent finish is obtained

Pitch accuracy equals that produced with Zonic Lapped Dies and finish is excellent.

Acme form threads of modified depth are being increasingly employed in the machine-tool and general engineering industries. These are easier to screw and to tap. Core diameters of screws and taps are larger, resulting in reduced tap breakage.

Multi-start threads can also be used to advantage. A 1½" dia. × ½" pitch single start thread would be difficult to produce with a diehead, but if this was changed to 1½" dia. × ¼" pitch × ½" lead, production is greatly simplified. In addition, the thread is more easily cut, tapping is made much easier, the tap is stronger on the core diameter with less torsional stress, and sometimes less taps are required, saving cost and reducing production time. In some cases, the actual bearing area on the thread flanks is increased.

Grinding

Holozone dies are sharpened by grinding the throat angle only, in the grinding Fixture for Coventry Dies. The top face must never be ground.

Coventry Dies for threading high-tensile and aircraft steels, various types of alloys, fibre, etc.

The difficult machining properties of the modern High-Tensile Alloy steels, combined with the accuracy

and high finish demanded by the aircraft industry, have been catered for by the development of a type of "Coventry" die designated by the prefixion of the letter "A" to standard markings, viz., AS, AM, AM5°, 1AM, 1AM5°.

All dies in this category can be supplied in either milled, ground thread or lapped types. In the case of ground thread dies not of standard diameter and pitch, the minimum number which can be supplied is six sets.

Dies for Special Thread Forms

We advise that standard thread forms be employed wherever possible, obviating the manufacture of special equipment and gauges and avoiding the making of other than recognised standards.

When supplying dies for non-standard threads, an additional charge is made to cover a part of any special tooling costs. This tooling remains our property, but is available for future orders.

Special thread forms are sometimes unavoidable and Coventry Dies have been produced and used very successfully for many of these. Some of these cases are illustrated on the following pages.

Coventry Dies are also successfully used for threading many materials other than steels and bronzes.

We are always prepared to experiment on a customers' material in order to determine the most efficient form of dies to use and to place our services at the disposal of all who need assistance to solve threading problems.

Our specialists attend customers' works to give advice on all matters concerning Coventry Dieheads and Dies.

Special Threads with Standard Dies

Often a special form can be obtained by grinding away the crest of the thread on the dies.

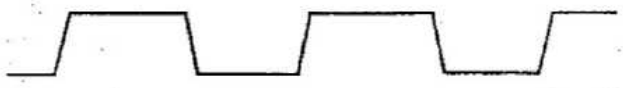


Fig. 37. Shallow Thread of modified Acme form

Modified Knuckle Threads

As there are no recognised British standards for Knuckle Threads, full particulars of the required thread must be stated. The line drawing (Fig. 38) shows a thread form which is used extensively for railway couplings. We possess hobs for cutting several forms of round threads.

Fig. 38. Modified Knuckle Thread

Coach Screw Threads

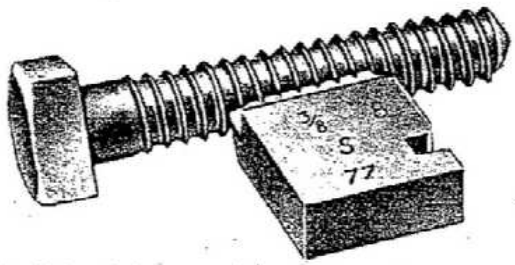


Fig. 39. Coach Screw Thread and Die

This thread form is very efficient for screwing into wood when the hole is drilled to suit the core diameter of the screw. See Fig. 39.

Taper Threads for Porcelain Moulds

Fig. 40. Typical Taper Thread for Porcelain Moulds

Threads of this form are produced very satisfactorily by Coventry Dieheads when arranged for taper threading, as method illustrated on page 20.

Multi-Start Threads

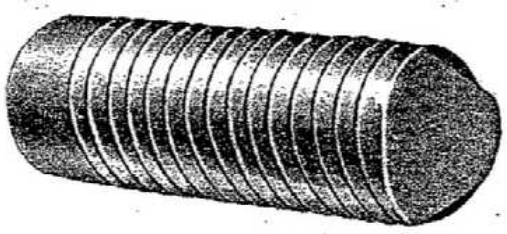


Fig. 41.

The illustration shows a Three-start Whitworth form thread cut in brass.

Standard Acme Threads

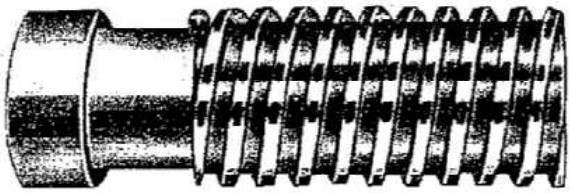


Fig. 42. Acme Form Thread

Standard Acme Threads can be cut, but the coarseness of the pitches limits the capacity of the dieheads. Therefore, we prefer to recommend a suitable size of diehead on receipt of particulars of the work to be threaded.

On brass valve and cock work, shallow threads of the Acme 29° angle are often required, and we can supply dies for this type of thread. The dimensions indicated in Fig. 43 should be stated when ordering, in addition to the ordering particulars listed on page 32.

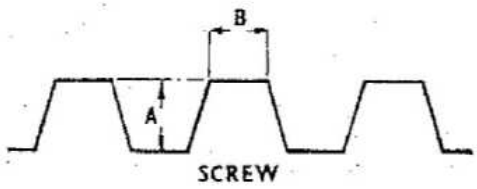


Fig. 43. Dimensions required of Acme threads for brass valve and cock work

We recommend that, wherever possible, dimension "A" on Acme threads should be half or two-thirds standard depth. These shallow threads are equally efficient, easier to screw and tap, and provide a stronger core diameter for both screws and taps.

Square Threads

Square threads are not a practical manufacturing proposition in a diehead. The nearest to the square thread that we can produce is one having 10° included angle. We recommend that the Acme form be used if at all possible.

The square thread is difficult to produce by any method, and square thread taps are prone to breakage owing to interference on the flank of the thread causing jamming.

This obsolete type of thread should never be used on new designs.

Buttress Threads

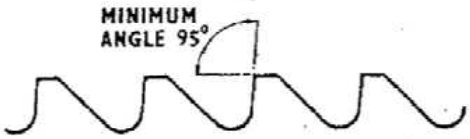


Fig. 44. Buttress Thread

If these do not conform to B.S. 1657-1950, full particulars of diameter, pitch, angle, etc., should be sent with enquiry. Four threads per inch is the coarsest pitch which can be cut. The pressure side of the thread must have a minimum angle of 95° with the axis of the screw. Position of the angular side of the thread relative to the end of the screw should be stated.

Threading Close to a Shoulder

Threading close to a shoulder should be avoided wherever possible. Threads should finish sufficiently far from the shoulder to allow dies having the standard 20° throat angle to be used, with ample clearance between the shoulder and the diehead face when opening occurs at the end of thread.

If the thread must be cut close to the shoulder, it is necessary to cut a recess in front of the shoulder, as shown in Fig. 45. The minimum width of this recess is obtained by the following formula:—
Cotangent of throat angle × (depth of thread + ·010″) ÷ clearance.
Clearance :

= ·010″ for a depth of thread not exceeding ·030″.
= ·015″ „ „ „ „ „ between ·030″ and ·080″.
= ·020″ „ „ „ „ „ greater than ·080″.

To avoid calculation, the table of thread depths on page 30, used in conjunction with the graphs on page 31, will enable the width of recess to be obtained for all threads in general use, using dies with 15°, 20°, 33° or 45° throat angle.

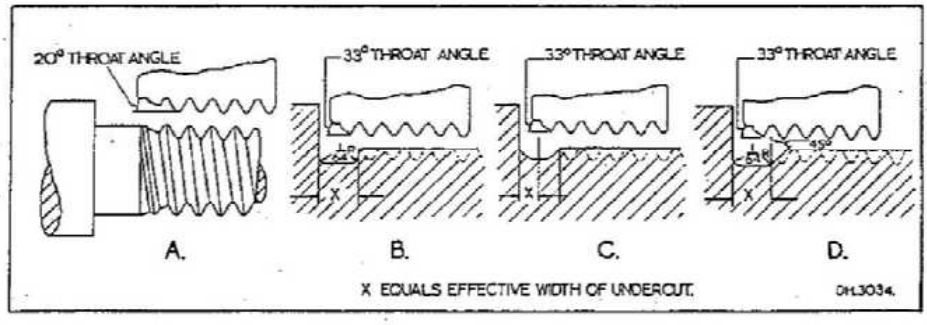


Fig. 45. Ample clearance should be allowed where possible between the end of the thread and the shoulder. For close to shoulder threading, a recess should be provided

The graphs apply to the length of throat on a new die. When regrinding, the length of the throat increases. To maintain the original length, the dies must, therefore, be stepped back (see Fig. 68).

To thread as closely as possible to a shoulder, it is necessary to use dies with 33° or 45° throat angle. A 33° throat angle is the maximum angle which can be used for roughing cuts on steel. Such dies wear rapidly on steel as the pressure on the cutting edge is much heavier than it is for the standard throat angle of 20°. It is therefore advisable to take a second cut.

Short Threads

To prevent damage to very short threads, when the front of the diehead is being pulled forward to open the dies, a Detent Pin Withdrawing Attachment (Fig. 46) can be supplied for Types C.H.S. and C.H. dieheads.

A hinged lever at the back of the diehead engages the detent pin handle.

The lever contacts a pre-positioned stop, and the operating mechanism can actually commence functioning before the dies begin to cut. Screws as short as three threads long can be produced successfully. Style X.T.2 Dieheads incorporate the external tripping feature as standard.

Detent Pin Withdrawing Attachments can be fitted to existing dieheads. On C.H. heads the shank can be locally softened, then drilled and tapped for the lever pivot pin. On C.H.S. Dieheads a new shank is necessary, replacing the standard shank, backplate, closing springs, screws, cushion springs, pins and stop screw.

Projecting Dies

Where a shoulder or projection on the work or chuck jaws interferes with the front plate of the diehead, it is necessary to use projecting dies and a slotted front plate. These items have to be made specially with consequent delay in delivery. Projecting dies require steel of a larger section than standard dies and are more expensive. They should only be used when absolutely necessary.

Long Throat Dies

When threading very tough material or very coarse threads, it is recommended that a long throat with an angle of 15° should be used, as this distributes the cutting over more threads and prolongs die life.

Provision is made in Grinding Fixtures for Coventry Dies for this 15° throat angle to be ground. See Fig. 62.

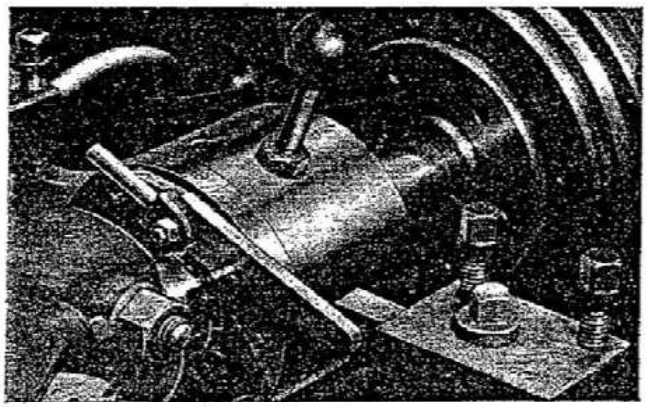


Fig. 46. Detent pin withdrawing attachment for very short threads

STANDARD THREAD DEPTHS IN INCHES

Formula for Depth	Pitch × ·64033	Pitch × ·6495	Pitch × ·61343	Pitch × ·8660	(Pitch ÷ 2) + ·010"	Pitch × ·5327	Pitch × ·7036		Pitch × ·600	
							S.I.		B.A.	
No. of Threads per In.	B.S. Whit. *	American National	Unified Thread	Sharp Vee	Acme	B.S.Cy.	Pitch mm.	Depth Inches	No.	Depth Inches
3	·2134	·2165	·2044	·2887	·1767		7	·1939		
3½	·1830	·1856	·1752	·2474	·1529		6·5	·1800		
4	·1601	·1624	·1534	·2165	·1350	·1332	6·0	·1662		
4½	·1423	·1443	·1363	·1925	·1211	·1184	5·5	·1523		
5	·1281	·1299	·1227	·1732	·1100	·1065	5·0	·1385		
5½	·1164	·1181	·1115	·1575	·1009	·0969	4·5	·1246		
6	·1067	·1083	·1022	·1443	·0933	·0888	4·0	·1108		
7	·0915	·0928	·0876	·1237	·0814	·0761	3·5	·0969		
8	·0800	·0812	·0767	·1083	·0725	·0666	3·0	·0831		
9	·0712	·0722	·0682	·0962	·0655	·0592	2·5	·0692		
10	·0640	·0650	·0613	·0866	·0600	·0533	2·1	·0582		
11	·0582	·0591	·0558	·0787	·0505	·0484	2·0	·0554		
12	·0534	·0541	·0511	·0722	·0467	·0444	1·8	·0499		
13	·0493	·0500	·0472	·0666		·0410	1·75	·0484		
14	·0457	·0464	·0438	·0619	·0407	·0381	1·7	·0471		
15	·0427	·0433	·0409	·0577		·0355	1·66	·0460		
16	·0400	·0406	·0383	·0541	·0362	·0333	1·5	·0415		
17	·0377	·0382	·0355	·0509		·0313	1·25	·0346		
18	·0356	·0361	·0341	·0481		·0296	1·0	·0277	0	·0236
19	·0338	·0343	·0323	·0457		·0280	·90	·0249	1	·0212
20	·0320	·0325	·0307	·0433		·0266	·85	·0235		
21	·0305	·0309	·0292	·0412		·0254	·81	·0224	2	·0191
22	·0291	·0295	·0276	·0394		·0242	·80	·0222		
24	·0267	·0271	·0256	·0361		·0222	·75	·0208		
25	·0256	·0260	·0245	·0346		·0213	·73	·0202	3	·0172
26	·0246	·0250	·0236	·0333		·0205	·70	·0194		
27	·0237	·0241	·0227	·0321		·0197	·66	·0183	4	·0156
28	·0229	·0232	·0219	·0309		·0190	·60	·0166		
30	·0213	·0217	·0204	·0289		·0178	·59	·0163	5	·0139
32	·0200	·0203	·0192	·0271		·0166	·55	·0152		
34	·0188	·0191	·0180	·0255		·0157	·53	·0146	6	·0125
35	·0183	·0186	·0175	·0247		·0152	·50	·0139		
36	·0178	·0180	·0170	·0241		·0148	·48	·0133	7	·0113
37	·0173	·0176	·0166	·0234		·0144	·45	·0125		
38	·0169	·0171	·0161	·0228		·0140	·43	·0119	8	·0101
40	·0160	·0162	·0153	·0216		·0133	·39	·0108	9	·0092
42	·0152	·0155	·0146	·0206		·0127	·35	·0096	10	·0083
48	·0133	·0135	·0128	·0180		·0111	·25	·0069	11	·0073
50	·0128	·0130	·0123	·0173		·0107			12	·0066
56	·0114	·0116	·0109	·0155		·0095			13	·0059
60	·0107	·0108	·0102	·0144		·0089			14	·0050

*Also B.S.F., B.S.P., Std. Brass, Adm. Fine, Conduit and Copper Tube.

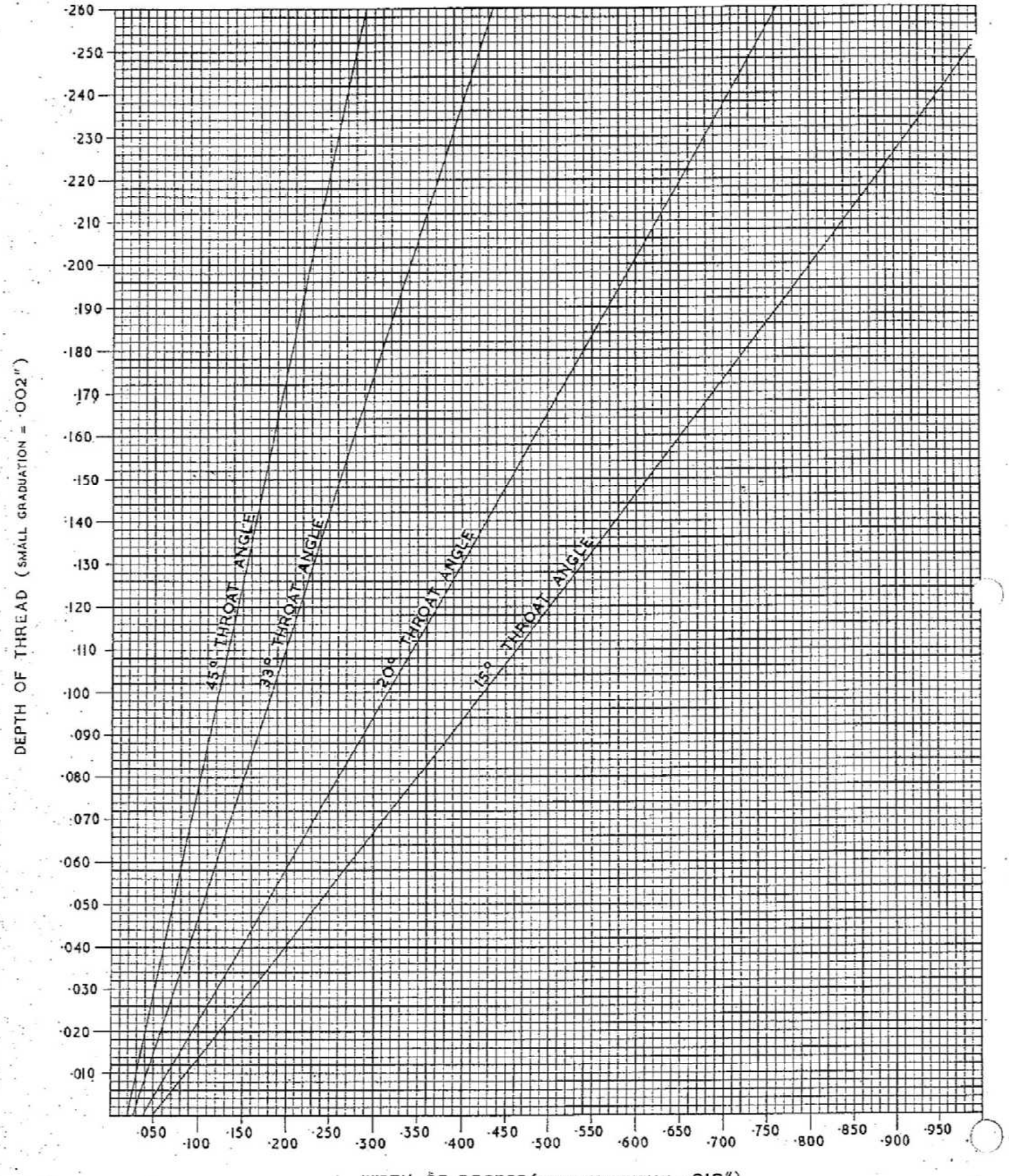


Fig. 47. Graph to show width of recess required for any throat angle and depth of thread

ORDERING COVENTRY DIES

When ordering Coventry Dies, the following information must be stated.

1. Size and style of Diehead.
2. Form of thread (see page 85).
3. Diameter and pitch to be cut.
4. Width of recess, if any, at end of thread (see pages 28 to 31).
5. Material to be threaded. Due to the wide variety of steels in use, full particulars should be given. When a satisfactory type of die has been determined, re-order by quoting the type letter. See Fig. 35.
6. If it is necessary to cut close to a shoulder, short throat dies or projecting dies should be specified. See pages 28 to 31.
7. When dies for taper threads are required, it is necessary to supply the following additional data concerning the work. See Fig. 48.

   Diameter of the small end of the taper—dimension A.

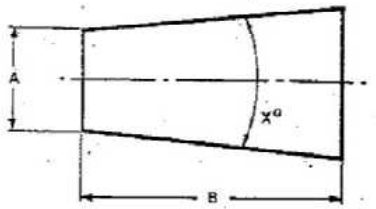


Fig. 48. Details for Taper Threads

Length of the taper—dimension B.

Included angle of the taper—angle X°.

Whether the thread form is at right-angles to the axis or to the taper. It should also be stated whether the dies are to be used in a standard diehead, or in a Taper-threading Diehead.

B.S.P. Dies are supplied to cut the thread at right-angles to the axis, unless specifically otherwise ordered.

American National pipe threads are always at right-angles to the axis.

GRINDING COVENTRY DIES

(For Holozone Dies see special instructions on page 26.)

Dies must be kept sharp. *They cannot be ground properly by hand:* the special fixtures which are supplied must be used, and all dies in a set must be ground on the throat at the same time. The diagrams on page 36 show how the fixture and baseplate are used to obtain the correct angles for various materials.

Before describing the grinding operation it is desirable to understand the cutting action of the dies.

Referring to Fig. 49, the lines AB and A^1 B^1 coincide with the centre line of the work. It will be noticed that the cutting face CD is inclined to the line A^1 B^1, so that the actual cutting is done only by the edge on the throat of the die and the first full tooth; the remaining teeth, being above centre, act as a nut, engaging the previously cut threads and ensuring pitch accuracy.

Dies are sharpened by grinding the throat of the die, as shown in Figs. 58 and 59. A Norton 38A60-K8VG grinding wheel 6" dia × ½" wide × 1¼" bore is recom-

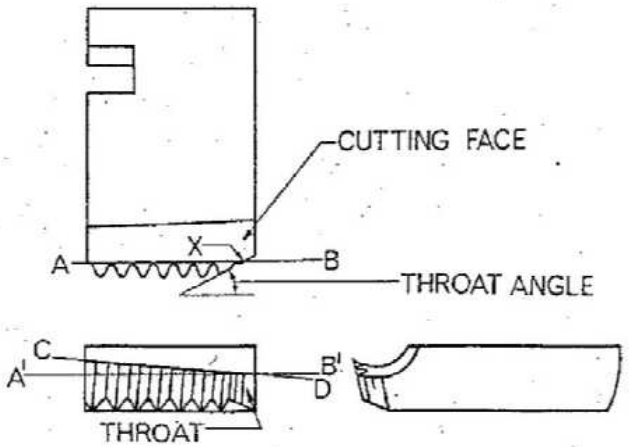


Fig. 49. Diagram to illustrate the cutting and self-guiding action of Coventry Dies

mended. Sharpening can be done several times but ultimately the effect is to raise the height of the edge above centre, along the line AB.

This is depicted more clearly by the diagram Fig. 50. If CD, C^1 D^1, is the throat angle of a new die, the intersection X X^2 with the line AB, A^1 B^1 (drawn tangential to the bottom of the threads), is at correct centre height.

If the throat angle is ground back to the line EF, the point X moves to position X^1 X^3, above the centre height A^1 B^1. It is therefore necessary to grind from the cutting face the amount shown shaded, to bring X^3 into position X^4 on the centre line A^1 B^1.

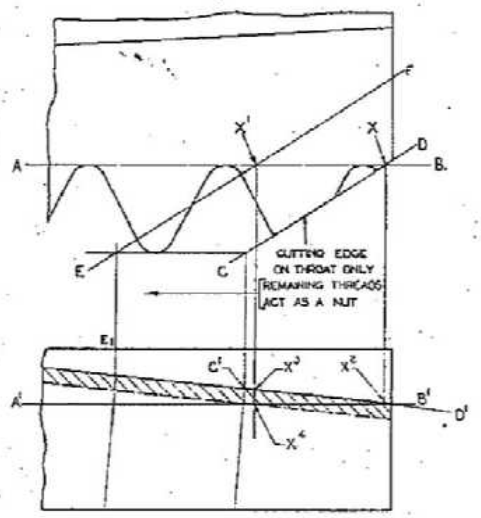


Fig. 50. Diagram to show the effect of grinding the throat and the need for grinding the cutting face

Grinding Fixtures

Two types of grinding fixture for Coventry Dies are in use. The standard type and the new type.

Standard Grinding Fixtures

One fixture, Fig. 52, is required for each size of diehead, to grind Mark S, M, M5 and B dies for right-hand threads; also dies with the prefix letter 'A' and the number '1', such as Type AS, 1AM, etc., and Holozone dies.

For left-hand threads, corresponding left-hand fixtures are required.

The same fixtures are used for the dies of all Coventry Dieheads, and enable all four dies of a set to be ground together on the throat angle, ensuring the correct angle and equal lengths of throat. They also provide for grinding the cutting face. Fig. 56.

Baseplates for use with Standard Grinding Fixtures

The 20° throat angle and the 12° cutting face or top rake are ground in the fixture without the use of the baseplate. See Figs. 58 and 60. The cutting face of Type M dies is actually ground parallel to the bottom of the die, the 12° cutting angle being obtained by the radial location of the die in the diehead. When other angles are required, the baseplate must be used as shown in Fig. 62.

An older type of baseplate is indicated in Fig. 56.

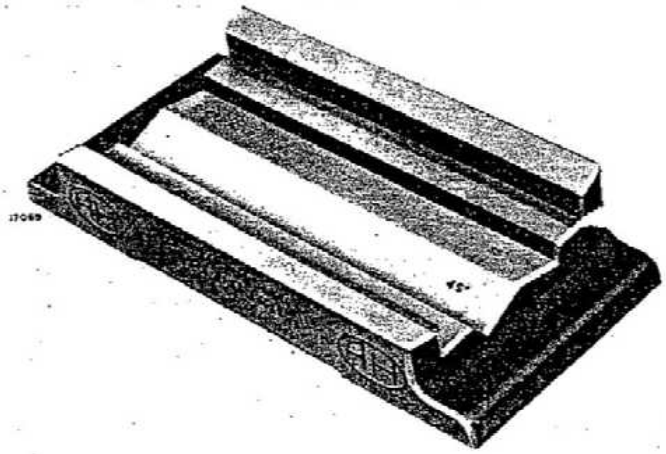


Fig. 51. The baseplate used when grinding 15°, 33° and 45° throat angles and 5° and 13° rake angles

This will enable all throat angles except that of 45° to be ground.

These baseplates are suitable for use with either R.H. or L.H. grinding fixtures.

Grinding the Throat Angle

Dies should be ground carefully so that their temper is not drawn. When the dies become dull they are sharpened by grinding the throat angle. (See Figs. 58 and 59).

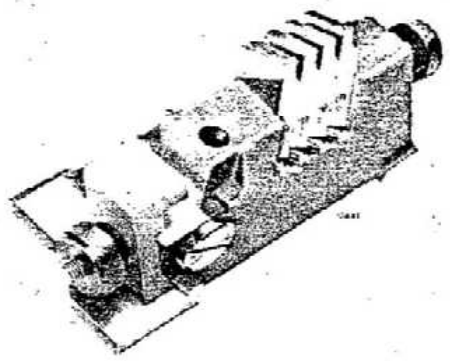


Fig. 52. Dies mounted in fixture for grinding the throat angle

After lightly clamping the dies in the fixing shown in Fig. 52 (the order is immaterial) gently tap the teeth with a copper or lead hammer until the locating rollers have no shake. Locating rollers are not necessary in left-hand fixtures as the dies are located on the bottom of the slot in the fixture. (See Figs. 53 and 54).

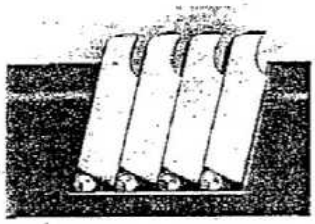


Fig. 53. Locating rollers in fixture for right-hand dies

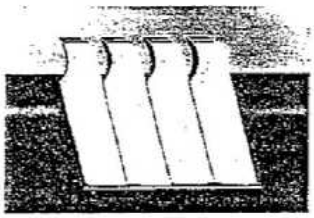


Fig. 54. Fixture for left-hand dies

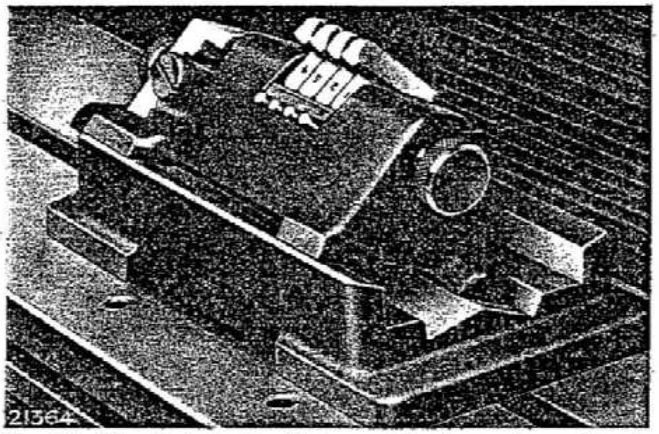


Fig. 55. The die grinding fixture with the packing plate in position for grinding dies for the Herbert Solid Adjustable Diehead.

Grinding the Cutting Face

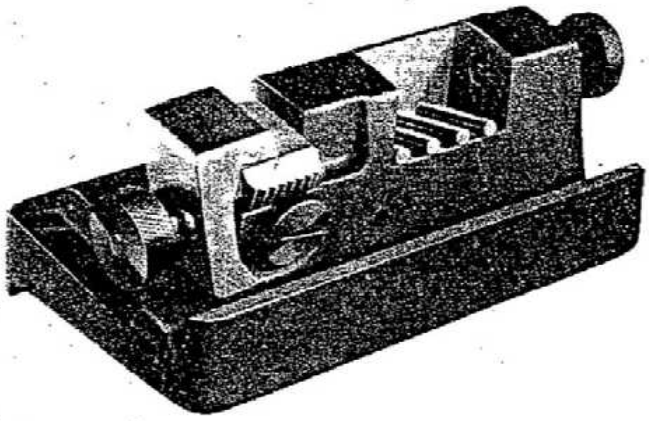


Fig. 56. Die mounted in fixture for grinding cutting face, using old-type baseplate

The fixture should be used with or without a base-plate according to the throat angle required and as given in Figs. 62 and 63.

When the throat angle has been ground a few times it becomes necessary to grind sufficient material from the cutting face to restore the original height.

To grind the cutting face each die is mounted in the fixture as shown in Fig. 56, the base plate being used where necessary. As indicated in Figs. 62 and 63. (See also Figs. 60 and 61).

Holozone dies, or taper dies for use in a standard type diehead, either stationary or rotating types, must not be ground on the cutting face but only on the throat angle.

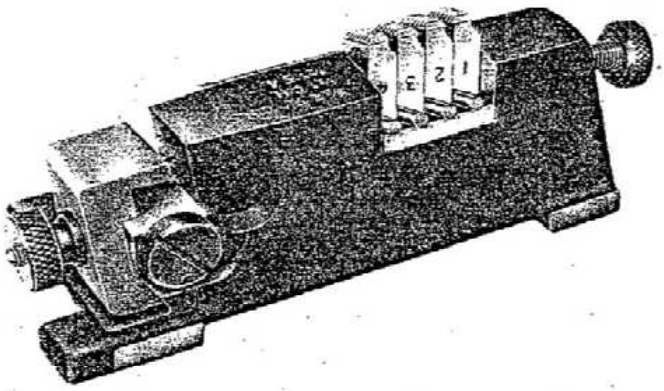


Fig. 57. The ½" Die Grinding Fixture with plate to take ⅜" dies

Fig. 58. Grinding 20° throat angle (Baseplate not required)

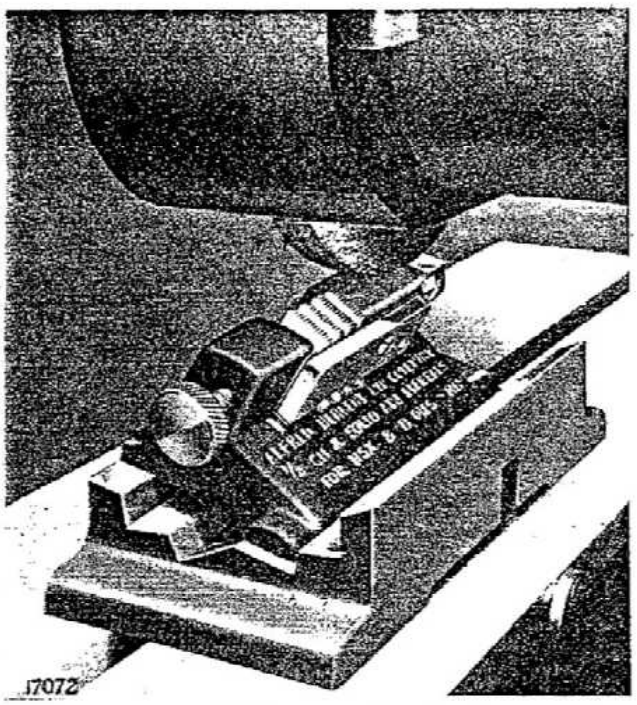


Fig. 59. Grinding 33° throat angle using the appropriate position on baseplate

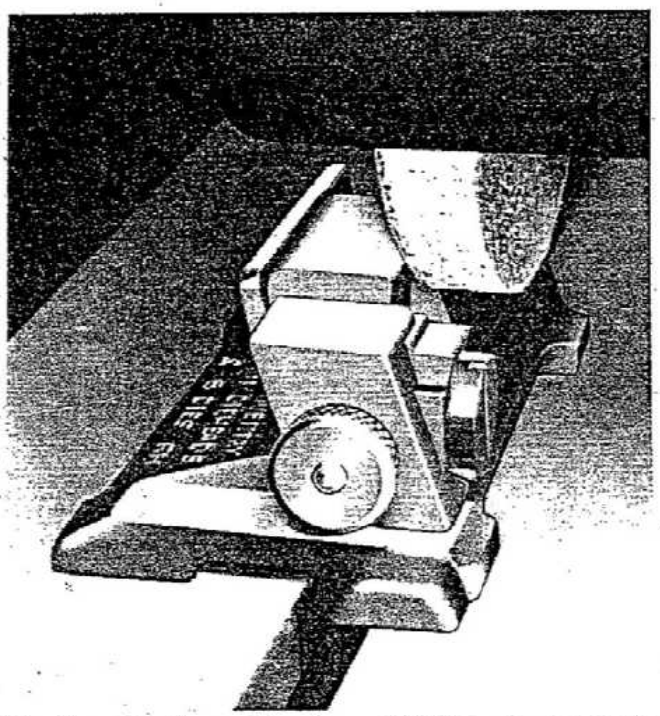


Fig. 60. Grinding cutting face of M Type die to provide 12° top rake when the die is in the diehead. (Baseplate not required)

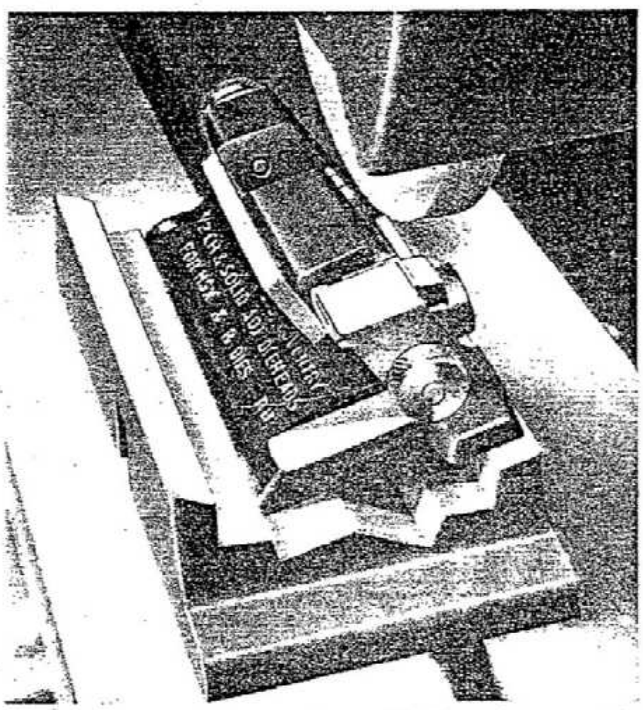


Fig. 61. Grinding cutting face of B Type die to provide 1° negative top rake when the die is in the diehead, using appropriate position on baseplate

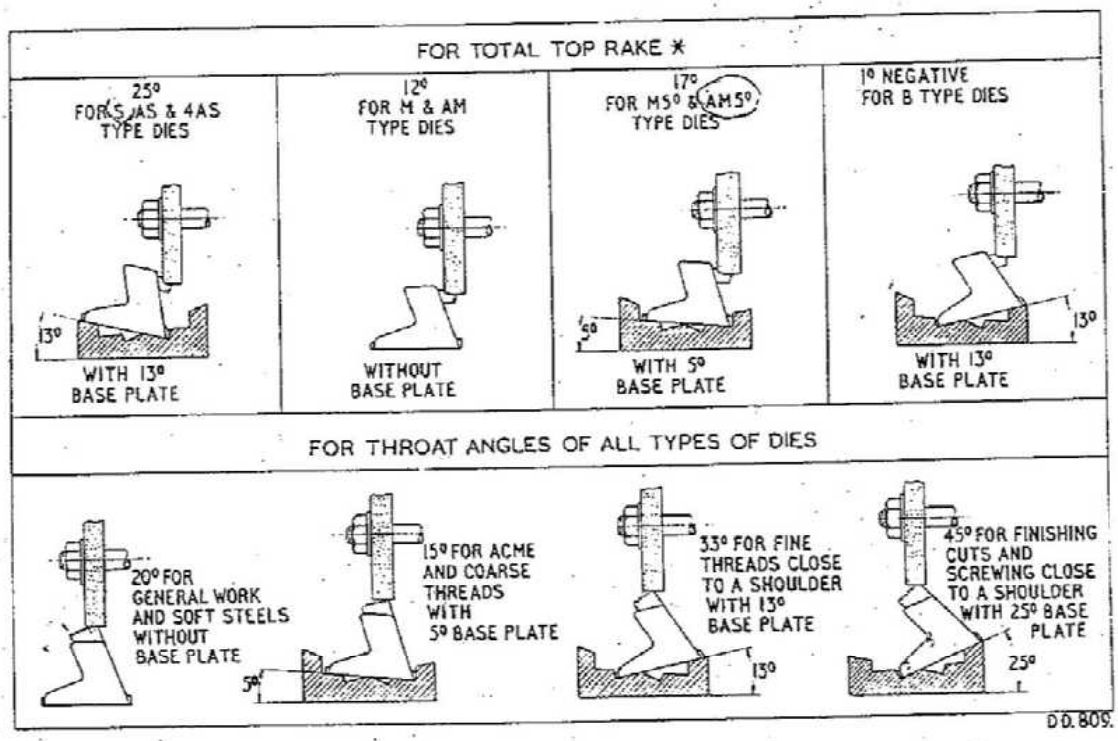


Fig. 62. Table indicating the use of standard fixture and baseplate

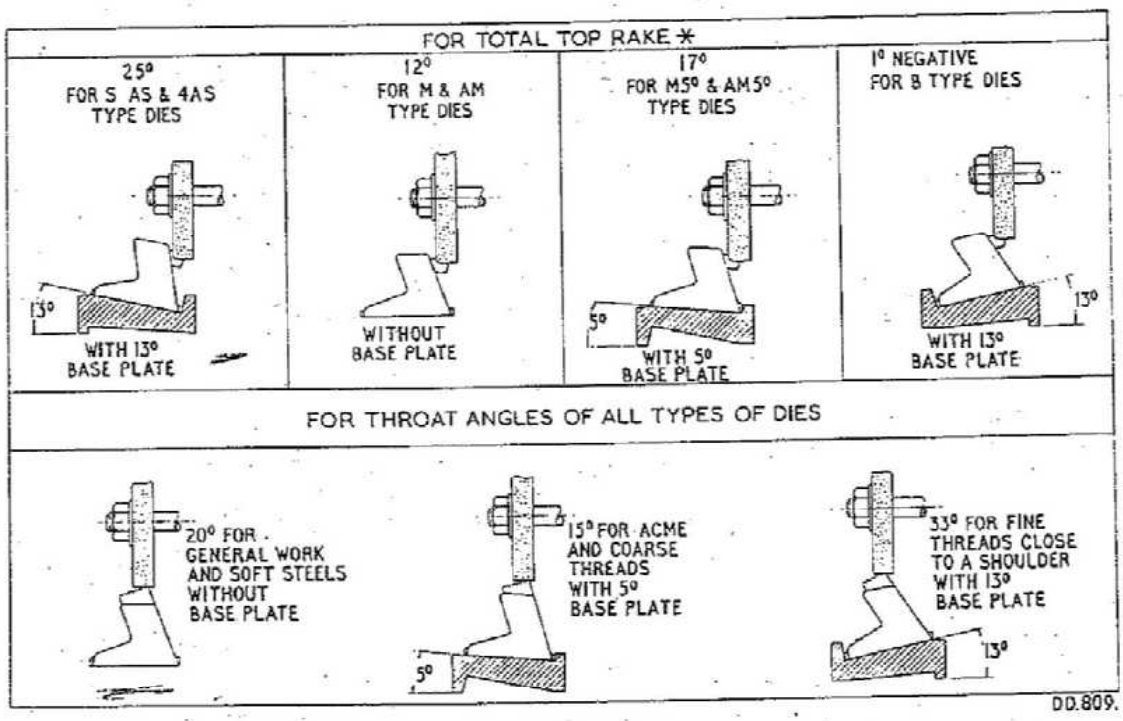


Fig. 63. Table indicating the use of standard fixture and old-type baseplate

**Note:* The total top rake is obtained by the top rake on the die, plus 12° due to the position of the die in the diehead.

New-type Grinding Fixtures

Designed to replace the earlier design of fixtures and baseplates, these fixtures can be used to grind all rake and throat angles on both right- and left-hand dies within their capacity.

Each fixture accommodates all dies for the following sizes of dieheads:

No. 1. Fixture for $\frac{1}{4}$", $\frac{5}{16}$", $\frac{3}{8}$" and $\frac{1}{2}$" dieheads.

No. 2. Fixture for $\frac{3}{4}$", 1" and $2\frac{1}{2}$ – $3\frac{1}{2}$" Fine Thread Dieheads.

No. 3. Fixture for $1\frac{1}{4}$" and $1\frac{1}{2}$" dieheads.

Grinding the Throat Angle

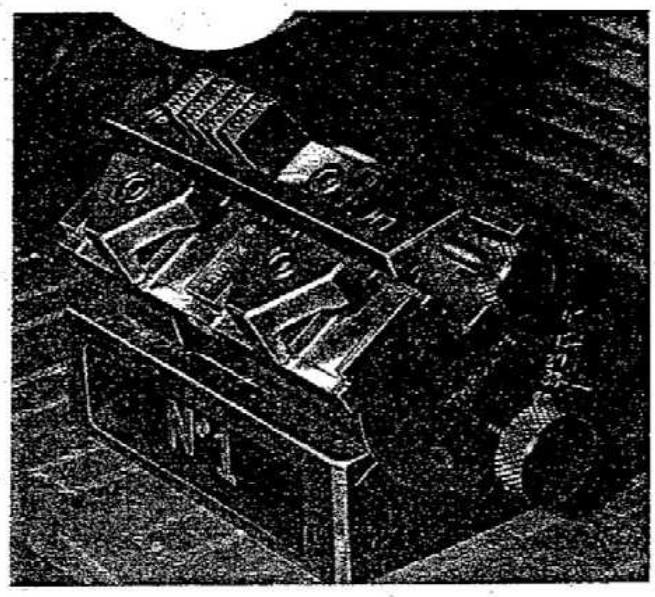


Fig. 64. Grinding a 33° throat angle on a set of right-hand Coventry Dies clamped in the throat-angle locating block in a No. 1 Fixture

Place the dies in the side of the throat-angle locating block marked relevant to the hand of the dies (*i.e.*, left-hand dies near L.H. marking, right-hand near R.H. marking). Ensure that the seating is clear of swarf.

When using the No. 2 Fixture, place the packing strip marked $\frac{3}{4}$" and $2\frac{1}{2}$" F.T. dies in the back of the throat-angle locating block to reduce the width of the slot when grinding $\frac{3}{4}$" dies. Taper wedges, inserted one at either end of the dies, are used in conjunction with this packing strip when grinding dies used in the $2\frac{1}{2}$" Fine Thread Diehead. Ensure that the wedges are positioned correctly, *i.e.*, to reduce the angle in the throat-angle locating block. A separate throat angle locating block is required for dies used in the $3\frac{1}{2}$" Fine Thread Diehead.

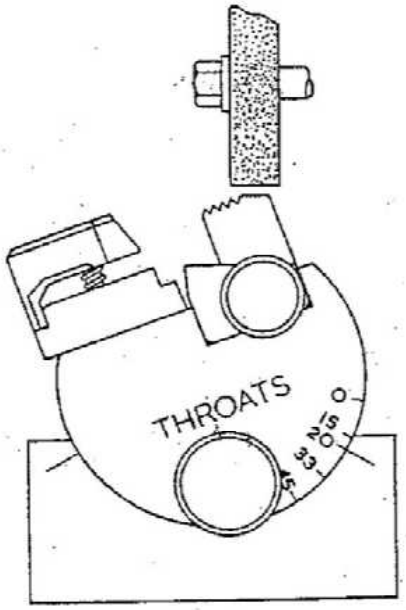


Fig. 65. Grinding the throat angle.

When using the No. 3 Fixture to grind $1\frac{1}{4}$" dies, place the packing strip marked $1\frac{1}{2}$" at the back of the block to reduce the width of the slot.

Clamp the dies firmly in position by means of the thumb-screw which should be inserted in the end of the throat-angle locating block farthest from the dies and should butt against the central retaining block.

When grinding the smaller sizes of dies in the No. 1 Fixture, a packing piece should be placed under the dies, raising the dies and preventing the grinding wheel fouling the fixture.

Slacken the large knurled clamping screws and rotate the trunnion until the required throat-angle graduation coincides with the datum line on the base. See Figs. 64 and 65. Tighten the clamping screws.

Dies should be ground carefully to avoid drawing their temper by overheating.

After grinding the throat angle, a Coventry Die Height Gauge should be used to check the height of the cutting edge. If this height is correct the rake angle need not be ground, if incorrect the rake angle will require grinding.

Grinding the Cutting Face

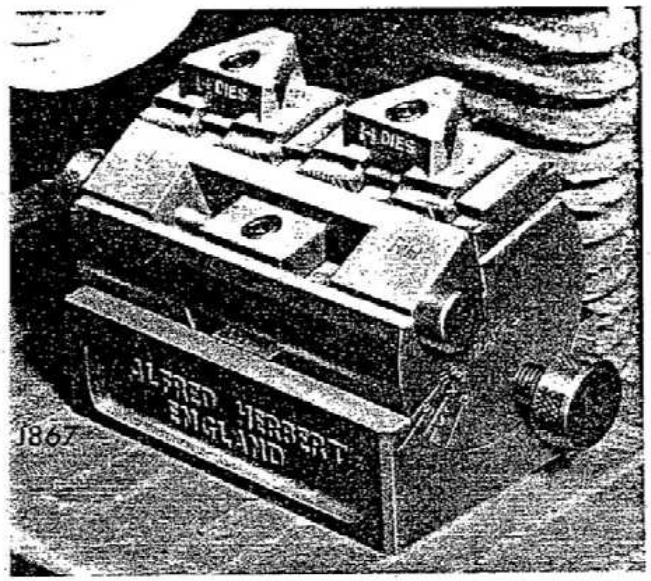


Fig. 66. Grinding the cutting face on a set of S type dies

Clamp the throat-angle locating block centrally on the fixture to provide a datum for positioning the dies. Place the dies in the slots of the appropriate rake-angle locating plate with their teeth contacting the throat-angle locating block. Two plates are supplied, each being marked with the size of dies which it will accommodate. Hold the dies against the block and clamp them firmly.

Ensure that the rake-angle locating plate, which is marked L.H. and R.H. on its edges is positioned correctly in the fixture. The marking on the plate which coincides with the hand of the dies being ground should face outwards from the fixture.

Take care that the correct clamps are used.

Set the trunnion to the requisite die-type letter (engraved on the dies), indicated by the rake-angle graduations engraved on the end face of the trunnion, and securely clamp. See Figs. 66 and 67.

Angles for the fine thread dies are set to the graduations shown on the right-hand side of the trunnion and pre-fixed by the letter F. 3½" Fine Thread Dieheads have six dies per set, and the rake angle has to be ground on four of the dies and then on the two remaining.

Check the height of one of the dies in the Coventry Die Height Gauge. If this is correct, other dies ground at the same time will also be ready for use.

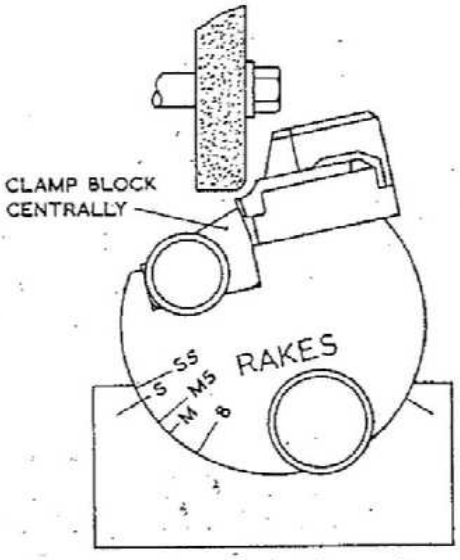


Fig. 67. The setting of S type dies

When grinding the rake angle on projecting dies, the throat-angle locating block should be removed completely. The projecting portion of the dies provides the location.

Stepping Back

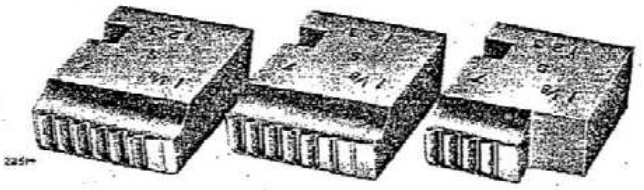


Fig. 68. To avoid a long throat after repeated grinding, dies may be stepped back by grinding as shown on the right

When after repeated grinding the throat has become too long, the front of the dies may be ground away or "stepped back".

Set the dies in the throat-grinding position on the fixture and set the trunnion to zero. This brings the front edge of the dies into the vertical plane and the necessary "stepping back" can be carried out.

Testing the Height of the Cutting Edge

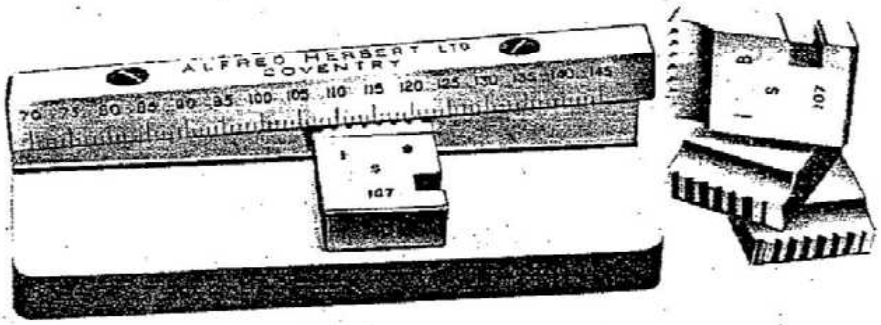


Fig. 69. Height Gauge used for testing the dies after grinding

Height Gauges

These items are for checking the height of the cutting edge of the dies after grinding. Each size of diehead, except the 4½" size, requires one gauge for R.H. dies and another for L.H. dies. The 4½" requires two gauges each for R.H. and L.H. dies.

After grinding the throat angle, the height of the dies must be tested in the gauge illustrated in Fig. 69.

The teeth of the die are placed under the scale and the die is moved along in the taper recess until contact is made with the bottom of the scale. Make sure that the die is kept flat and does not tilt.

Point X, Figs. 50 and 70, which is the intersection of the throat angle and a line AB tangential to the bottom of the teeth should, if the die is correctly ground, coincide with the number on the scale corresponding with the gauge number stamped on the die. (See also Fig. 35.)

In general practice it does not affect the efficiency of the die if this point lies further towards the cutting side of the die.

It is important however that the position of point X is identical on all four dies.

Each die of a set must be tested in this manner.

If the number indicated on the scale is lower than that shown on the die, grind a little more off the throat angles; if higher, grind more off the cutting face.

The limits for the height of the cutting edge to which we work on new dies are from the gauge number given to one division above.

If the die slots in the diehead are worn, this has the effect of lowering the cutting edge and chatter may occur. To remedy this the cutting edge must be raised slightly above the gauge number.

If a ·005" feeler gauge will enter the die slot with the die in position, the body should be replaced.

When the throat has become too long through repeated grinding, the front of the dies may be ground away.

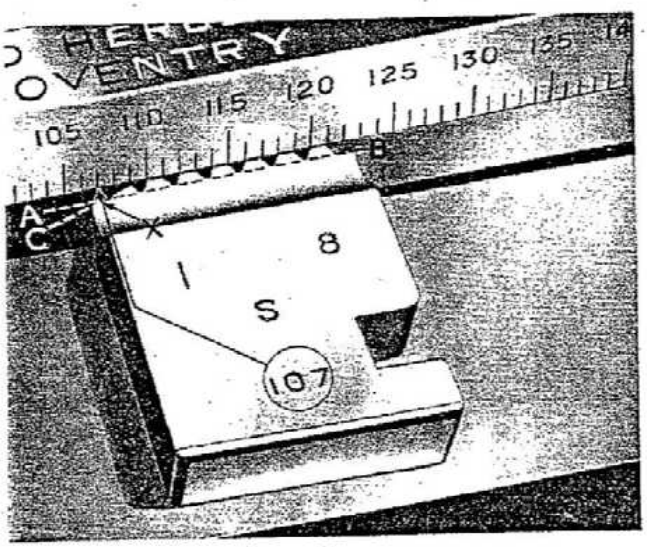


Fig. 70. If dies are correctly ground the point of intersection X should coincide on the gauge with the number stamped on the die

TROUBLES AND REMEDIES

Below we deal with difficulties sometimes experienced by users of Coventry Dieheads.

Dies will not Cut a Thread

First check that the dies are a complete set and are placed in correct numerical order clockwise in the diehead. See Fig. 25.

If the trouble is not rectified by this, return the dies for examination.

Rough Thread Produced

Firstly place the dies in the die grinding fixture and skim up the *throat angle* to ensure that the dies are in perfect balance. See Fig. 52.

Next test the height of the cutting face in the height gauge and correct if necessary. See Fig. 69.

If the trouble still persists, it may be due to the top rake of the dies not being suited to the material and the dies should be returned to us for examination together with samples of the material being worked.

Chattered Threads Produced

First test the dies in the height gauge, as this trouble is usually caused by cutting edges being low.

If the dies are correct, the trouble may lie in the die slots. Insert a feeler gauge at the back of the dies. If this indicates ·003″ to ·005″ play, grind a little more off the throat to raise the cutting edges. If there is more than ·005″ play, the diehead body should be replaced.

Alternatively, chatter may be caused by a lack of stability in the work itself, as when cutting a thread a long way from the chuck face. If Type S dies are being used and the work can not be held nearer to the portion to be threaded, first grind a little more off the throat angle. This increases the height of the top face.

Should this not prove a satisfactory solution, Type M5° may be tried as these dies are not so keen as the Type S and therefore support work more firmly.

Variation in Diameter of Work

If work varies slightly in diameter from one piece to another, it may be due to either high cutting edges, or to wear on the detent pin or tooth giving a different registration each time the diehead is closed.

High cutting edges will cause squeaking and burning of the work when cutting. Test dies in the height gauge and correct any error by grinding.

If wear on the detent pin or tooth is suspected, dismantle the dieheads, as per instructions printed later, and if examination of the detent pin and tooth indicates it, these parts can be easily replaced.

Taper Threads

This is a trouble which is very difficult to diagnose as it may arise from so many causes.

First thoroughly clean the diehead, replace the dies, tighten the front plate securely, and then test the dies for play. If play is excessive, the diehead should be returned for repair.

Taper threads are frequently produced because the front plate is left loose, allowing the dies to tip. This quickly causes wear in the die seats and aggravates the trouble.

Another cause of taper threads is that the die is too high on the cutting face. Check the dies in the height gauge and correct if necessary.

Consistently Bad Threads

If good threads can not be produced when all suggested remedies have been tried, the alignment of the machine on which the diehead is used should be checked.

Errors in alignment can often be counteracted by making the cutting edge of the dies higher than standard. This height must be determined by trial, and must be maintained when dies are re-ground.

Diehead Fails to Open

This can be caused by chips or dirt behind the dies locking them and thus preventing the opening springs from functioning.

Cleaning may cure this.

If this is not the cause, try the pull-off by hand with the diehead closed. If the diehead will not open, it is due to the closing-spring screws being tightened up too far and thus preventing the scroll from coming off the detent pin.

Another reason may be a broken opening spring. Dismantle the diehead as described later, examine the springs and replace if necessary.

Diehead Opens Prematurely or Will Not Remain Closed

First dismantle the front portion and examine the detent pin and tooth. These may have worn or chipped edges.

Alternatively the closing springs may have weakened or broken, or the closing-spring screws may have been damaged.

New parts can be fitted according to instructions.

Clogging with Chips

This trouble may be encountered when the dies are nearly worn out, as then the thread cutting takes place well inside the diehead. It is also much more acute when threading soft clinging materials such as very mild steel and copper.

The tendency to choke may be minimised by using neat oil instead of a cutting compound. Also, if the cutting lubricant can be introduced at the back of the diehead this helps to wash the chips out.

REPLACEMENT PARTS

Ordering instructions and complete lists of replacement parts for all types and sizes of Coventry Dieheads are given in our publication 'Spare Parts List for Coventry Dieheads', copies of which will be sent upon request.

Nearly every part of the Coventry Diehead can be replaced from stock, but there are a few minor components which are fitted and supplied together. Details of these components are as follows:

On Styles C.H.S. and C.H. Dieheads, the detent pin handle is fitted on to the tapered end of the detent pin and held in position by a hexagon nut. When a new detent pin is required it is necessary to supply this complete with a new handle and nut.

When fitting a new internal scroll, customers must locate this in the correct relative position in the external scroll, and then drill the locating holes in the internal scroll from the screw holes in the external scroll. The scroll must then be heated to 820°C and quenched in oil, then tempered at 450°C cooling in oil. The scroll may have distorted making it necessary to re-set or press back to circular form in a vice.

On Styles C.H. and C Dieheads, the external scroll has a small hardened tooth fitted at the back of it, and it is therefore necessary when an external scroll is ordered to supply it complete with hardened tooth fitted in it.

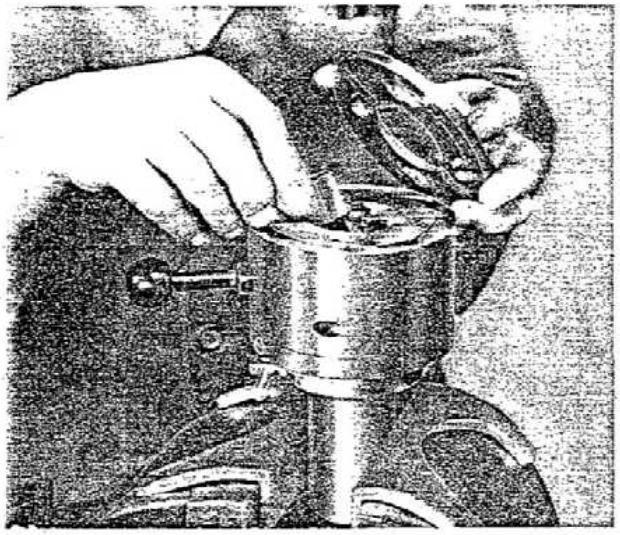
If a new tooth only is required it is supplied in the soft state so that the hole for the retaining pin can be drilled in position. The engaging portion of the tooth must then be water hardened from 760°C.

INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING STYLE C.H.S. COVENTRY DIEHEADS

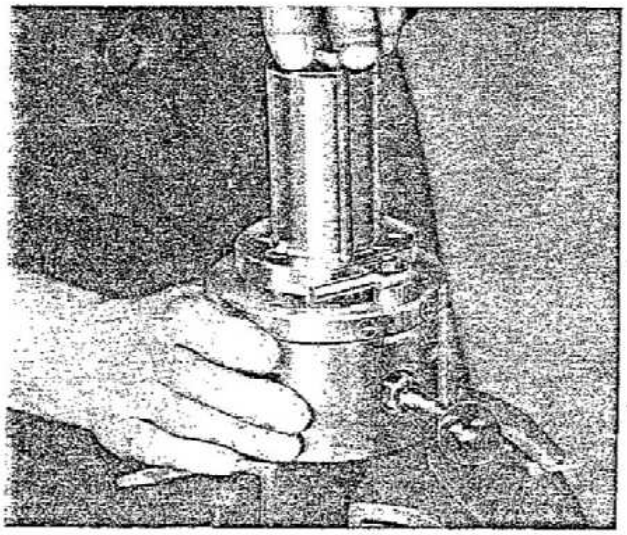
The following instructions apply to Style C.H.S. Dieheads, Sizes $\frac{1}{4}$" to $1\frac{1}{2}$" (for 2" C.H.S. see page 48).

Tools required are a bench vice with soft jaws, a suitable screwdriver, several pieces of brass or copper rod for knocking out pins and bushes, the Allen-type key supplied with the diehead and a pair of pliers.

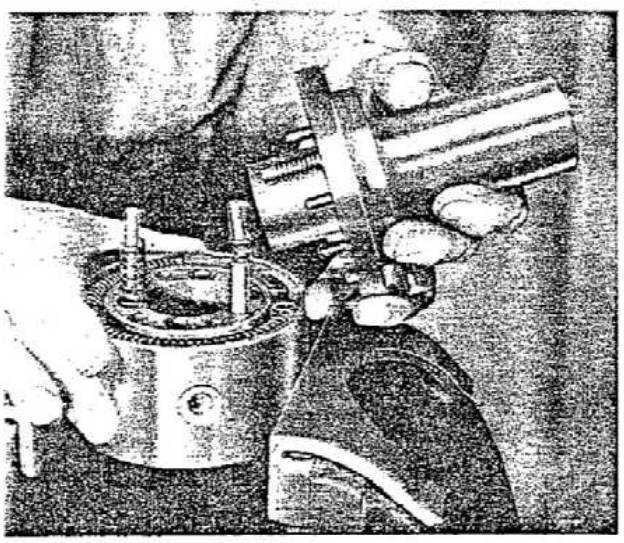
Dismantling Instructions



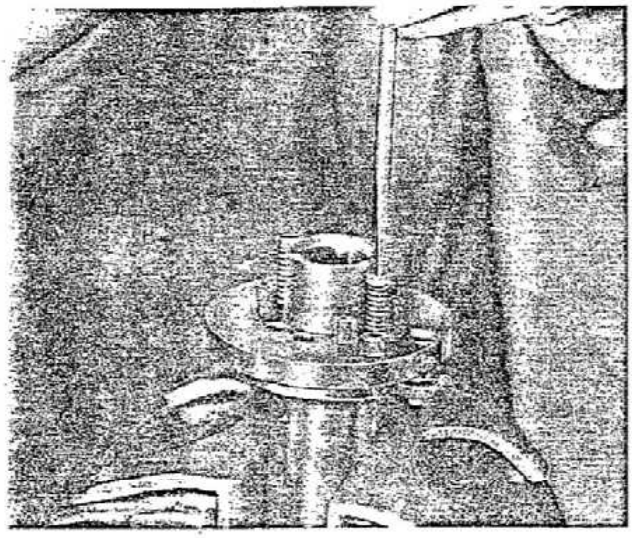
1. Close the diehead to relieve pressure on the dies. Loosen the front plate screws, remove the plate and the four dies. Open the diehead again.



2. Release the four backplate screws. These are reached through clearance holes in the shank flange, using the special long hexagon key.

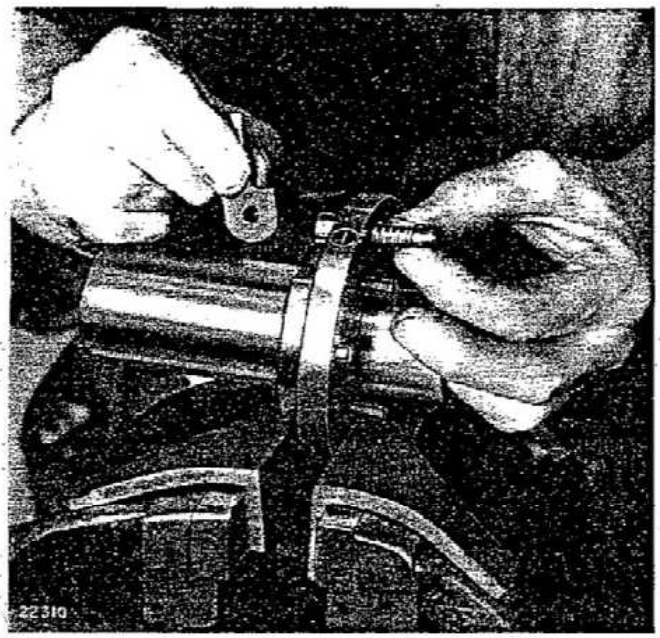


3. The shank complete with backplate can now be removed. The condition of the opening spring and detent tooth can be clearly seen. The body can now be withdrawn from the outer scroll.

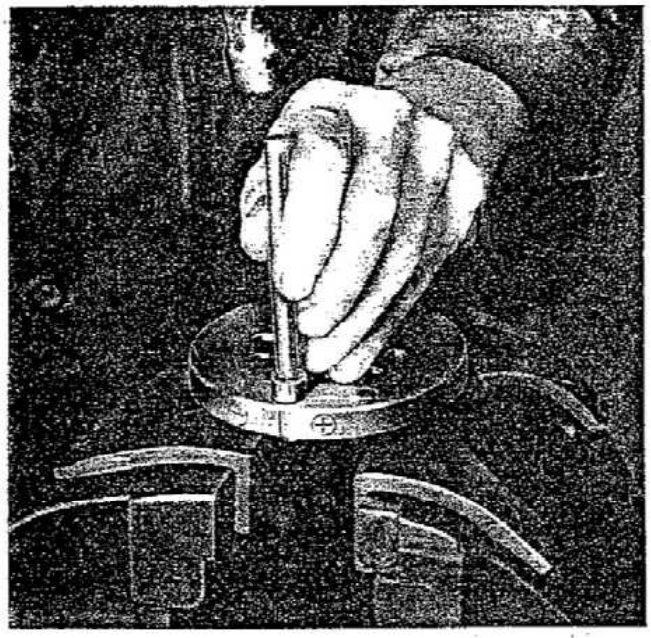


4. Remove the two closing spring screws.

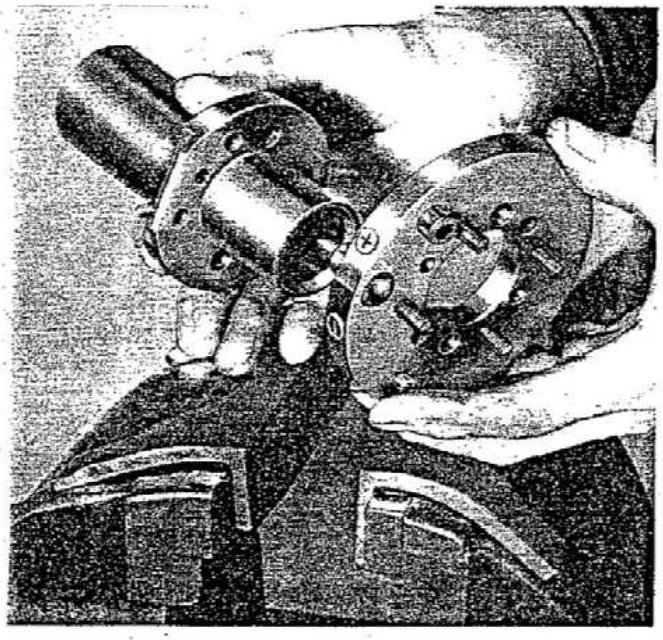
Dismantling Style C.H.S. Dieheads *(contd.)*



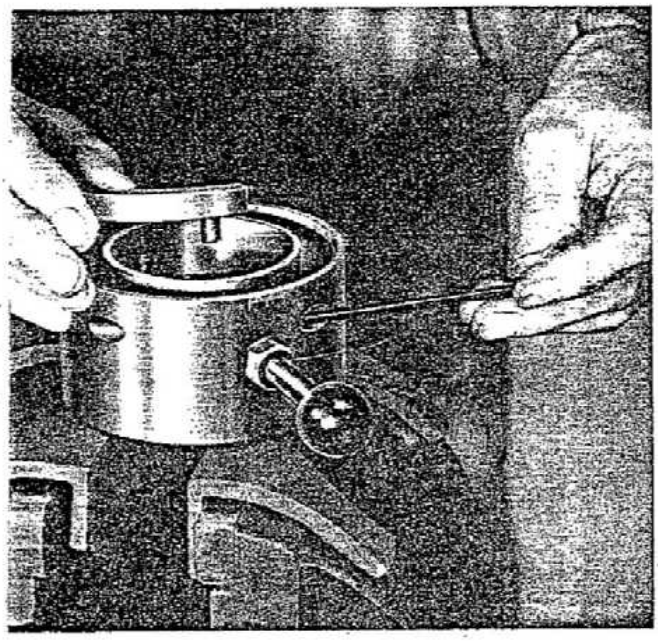
5. Take off the detent-pin nut and handle. Detent pin and spring can now be removed.



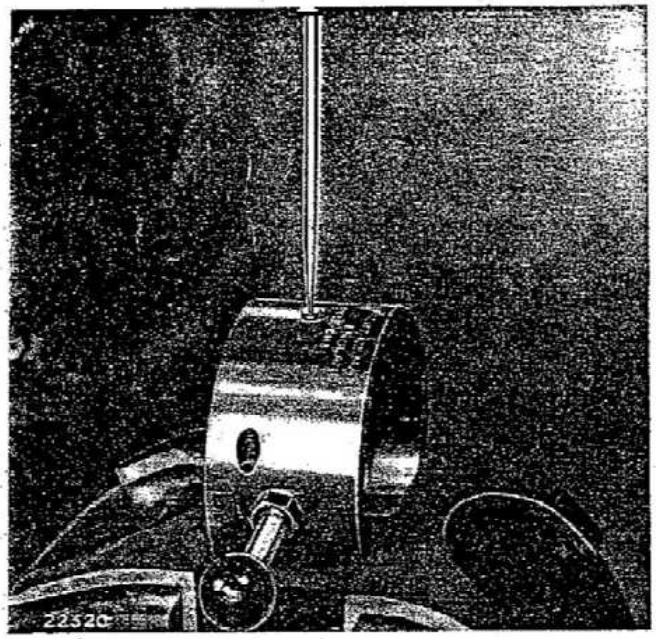
7. Drive out detent pin bush using brass rod.



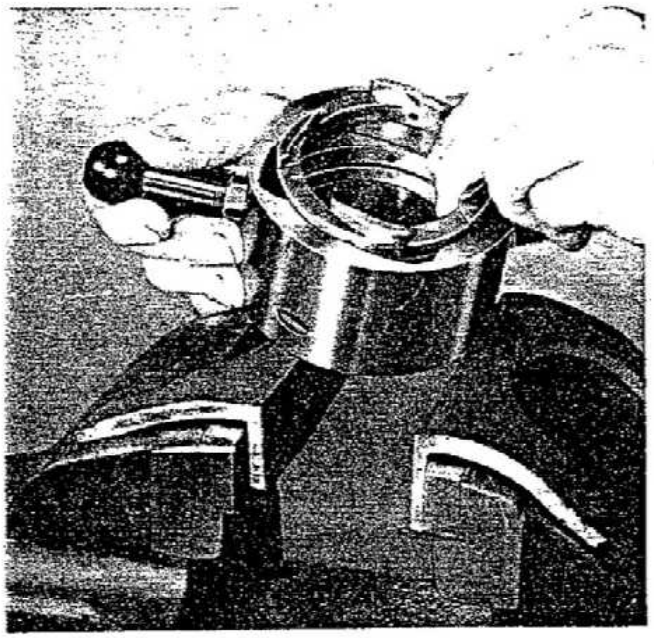
6. Remove the stop screw. The backplate can now be taken off the shank.



8. Take out the opening spring. Release one of the two adjusting screws and the detent pin tooth can be taken out.



9. Remove the two screws which hold together the internal and external scrolls.



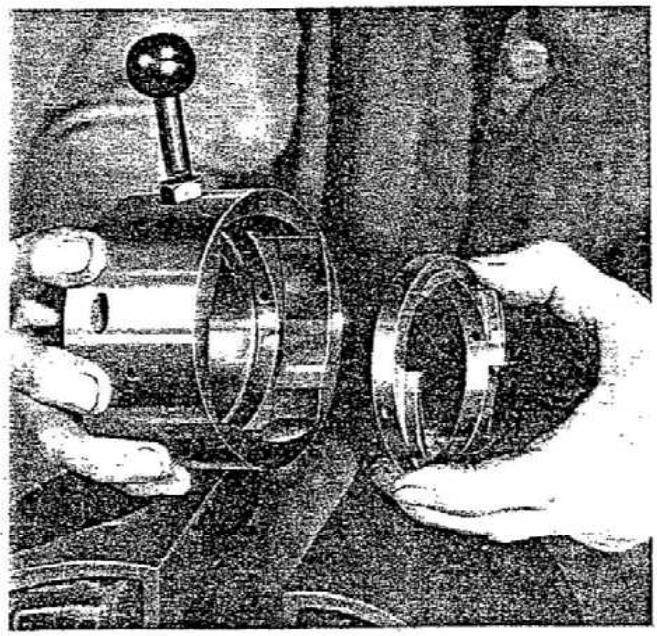
10. Withdraw the inner scroll from the outer scroll.

THE DIEHEAD IS NOW SUFFICIENTLY DISMANTLED FOR ORDINARY PURPOSES

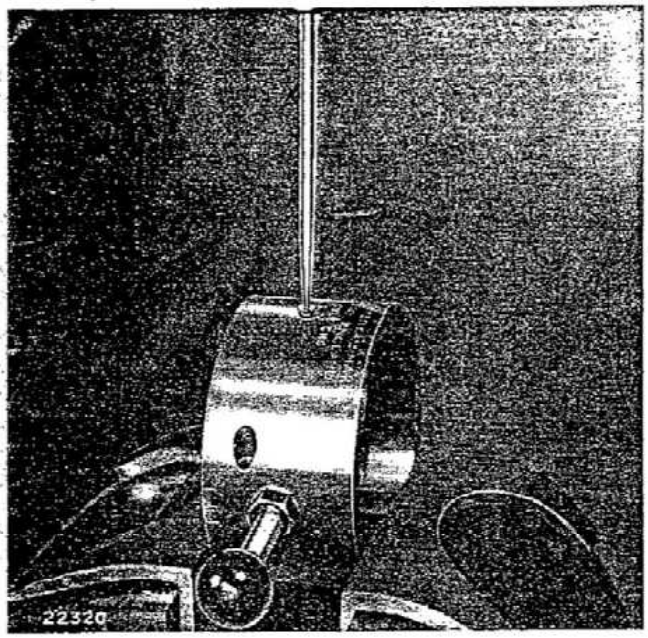
Re-assembling Instructions

Before beginning to re-assemble a diehead, ensure that all components are free from burrs, rust or dirt. All parts should be greased and working parts lubricated with a good quality thin oil.

1. Replace the inner scroll in the outer scroll. The number on the face of the inner scroll should be facing the opening handle when the holes are in alignment.

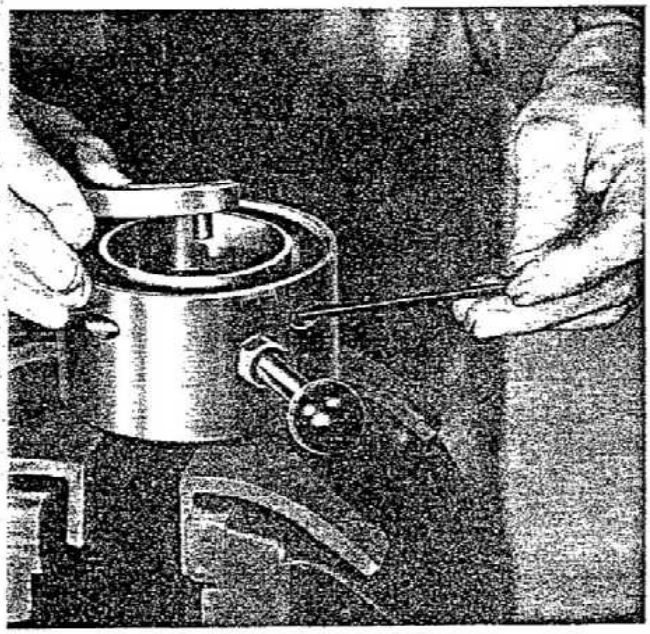


Re-assembling Style C.H.S. Dieheads *(contd.)*

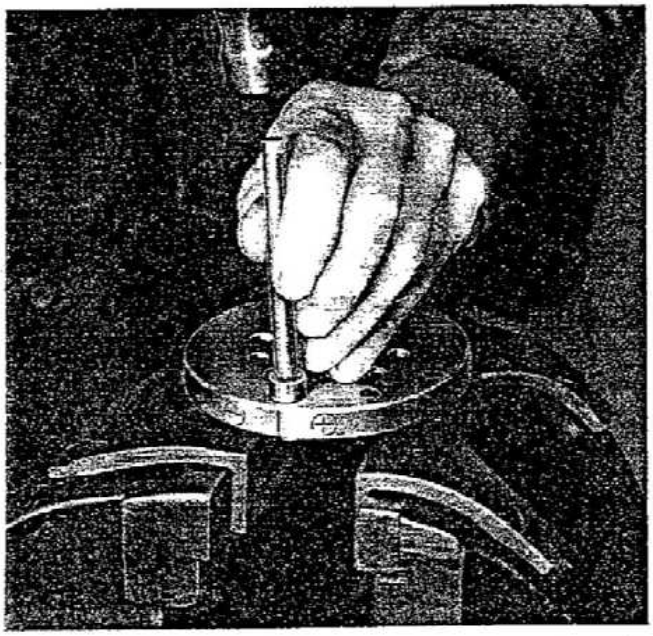


2. Replace the two scroll screws.

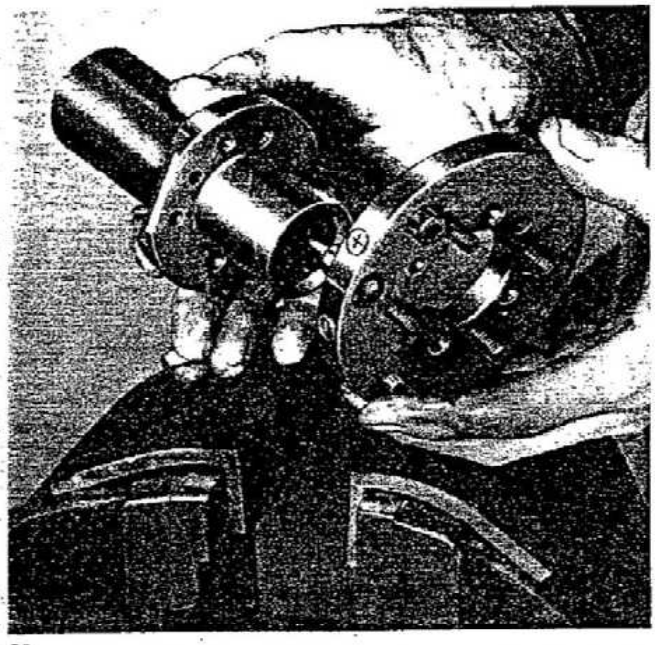
4. Replace the pads in the ends of the opening spring and, using a screwdriver, place the spring in the internal scroll.



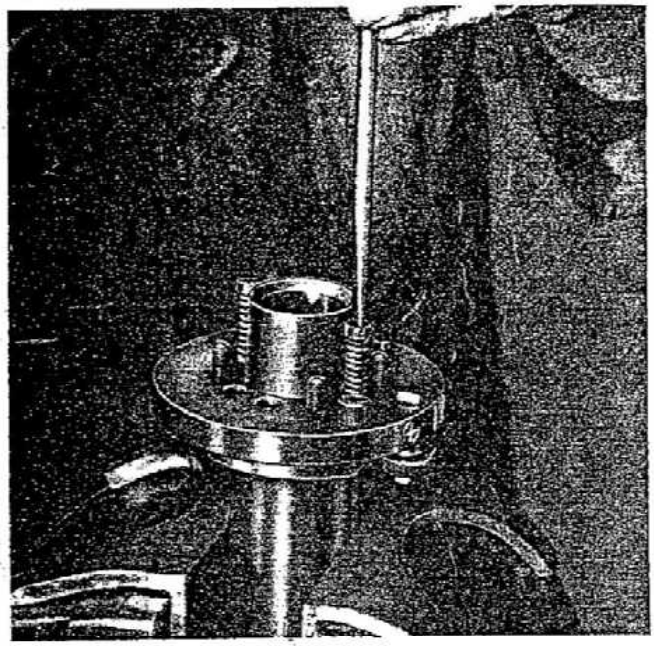
3. Replace the detent pin tooth and lock securely by means of the two adjusting screws.



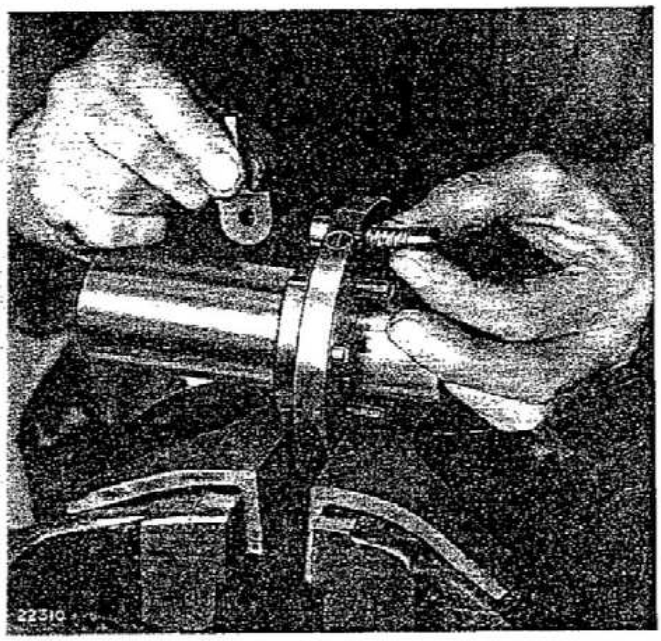
5. With cheese-head screw uppermost, drive the detent pin bush into the back plate using brass rod.



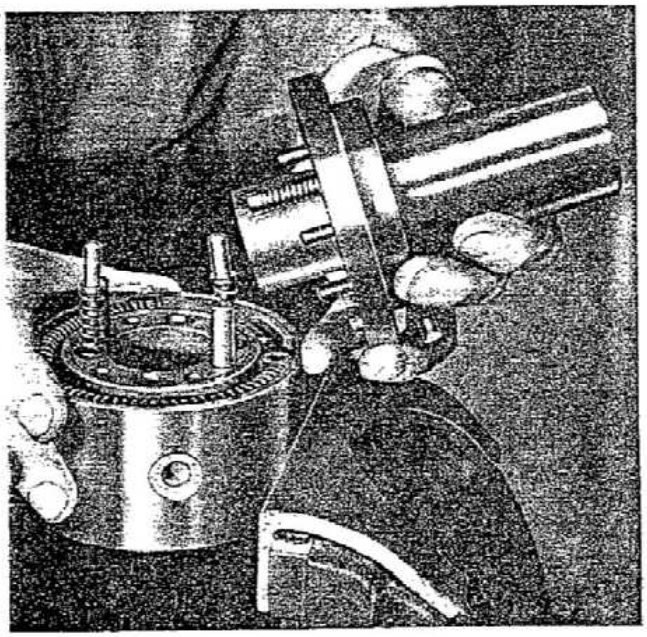
6. Insert the four cheese-head screws in the back-plate and assemble the plate on the shank.



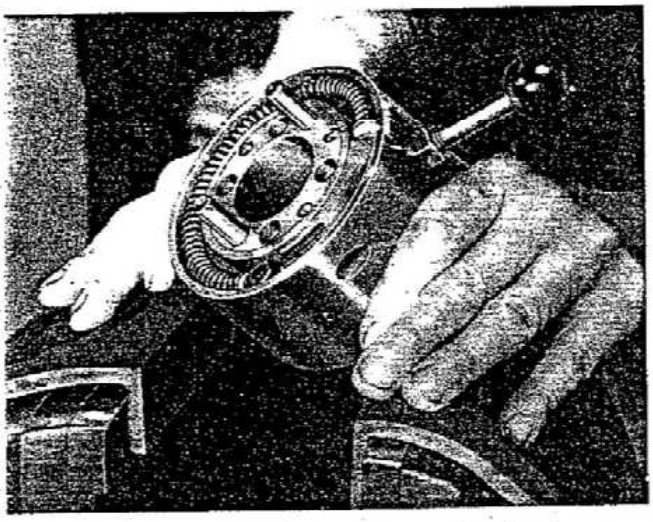
8. Replace the closing spring screws with their springs.



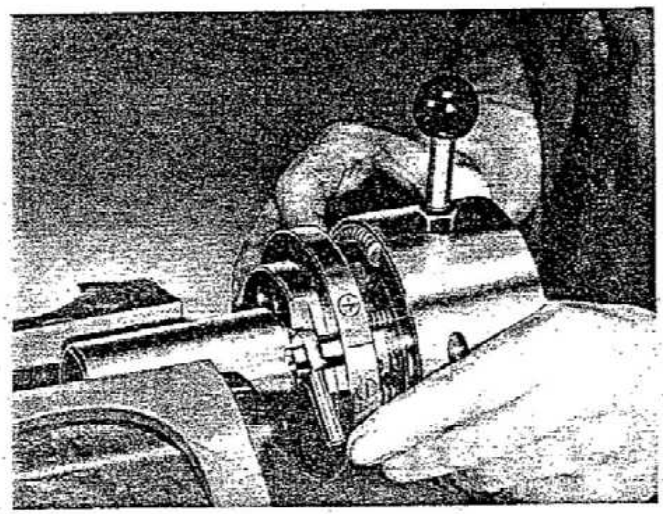
7. Replace detent pin and spring, and secure handle on taper end with nut. NOTE: The small flat on the pin end and the handle must be on the minus sign side. Hold detent pin head with pliers when tightening nut.



9. Replace the body in the outer scroll. NOTE: The number stamped on the body end must face the plain end of the tooth. Replace the two cushion pins and springs.



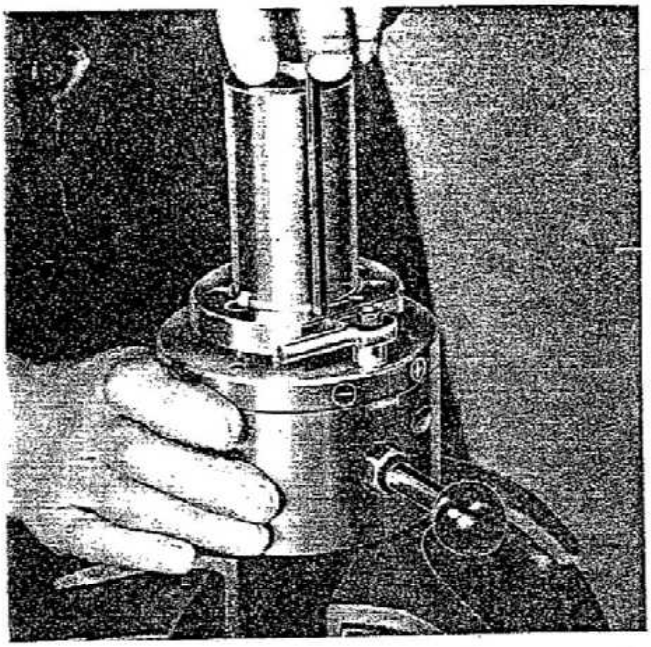
10. Lift the end of the opening spring in the outer scroll halfway above the end of the tooth.



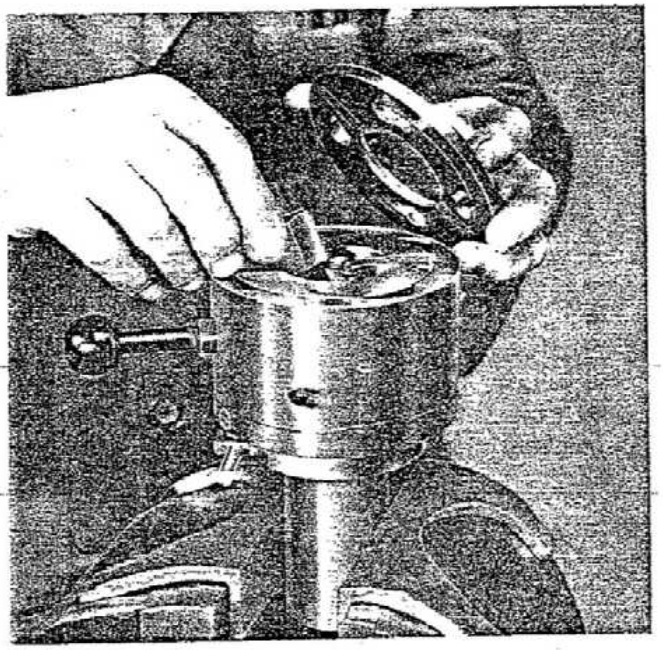
11. Replace the body and outer scroll on to the shank, ensuring that the number stamped on the body is facing the detent pin when the cushion pins and dowels are in position. Partly screw down one of the backplate screws to prevent the body coming off.

Push the body on to the shank as far as it will go, bringing the end of the uplifted spring into contact with the cheese head screw.

Turn the outer scroll in an anti-clockwise direction, compressing the spring until the screw head can be pushed into the space between the spring and the end of the tooth.



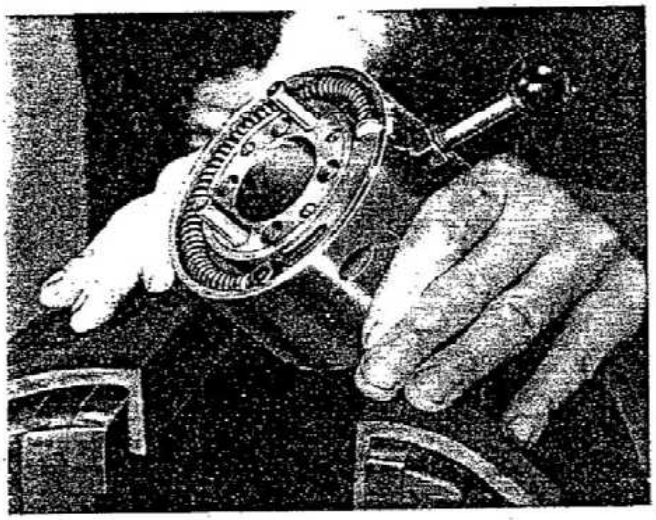
12. Screw down tightly the four backplate screws.



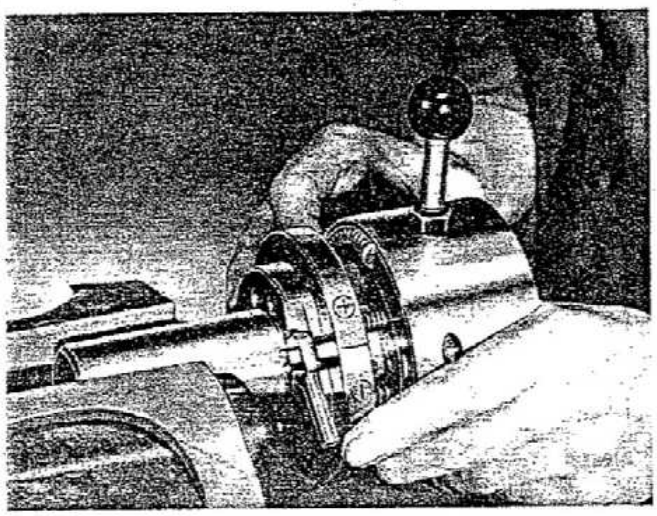
13. Replace the dies and front plate, fixing screws tightly. Put the detent pin handle to the minus position and adjust the diehead to zero.

The Diehead is now ready for use.

Re-assembling Style C.H.S. Dieheads (*contd.*)



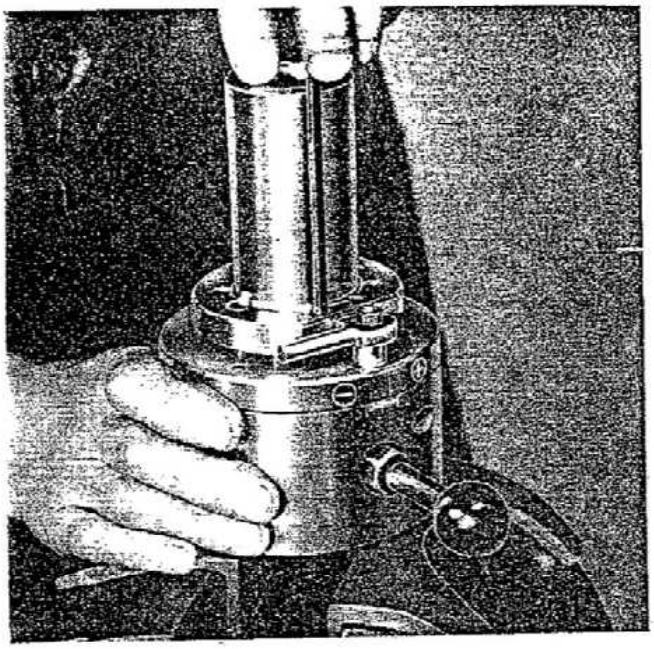
10. Lift the end of the opening spring in the outer scroll halfway above the end of the tooth.



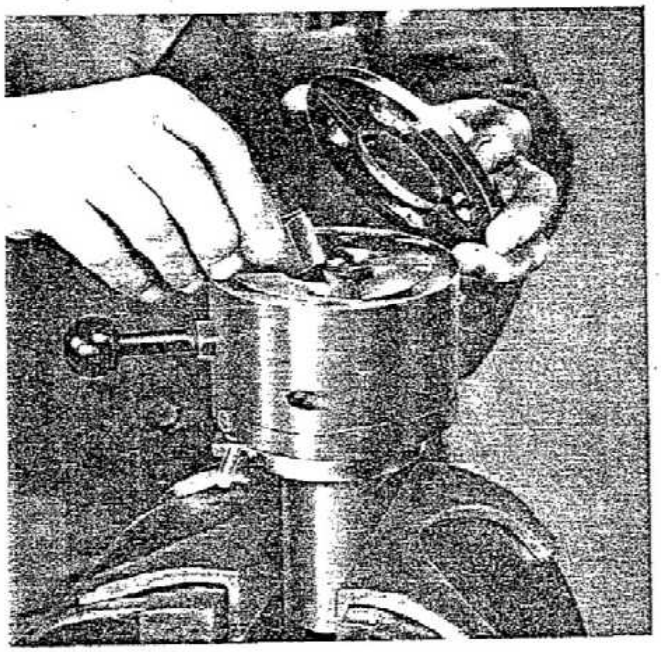
11. Replace the body and outer scroll on to the shank, ensuring that the number stamped on the body is facing the detent pin when the cushion pins and dowels are in position. Partly screw down one of the backplate screws to prevent the body coming off.

Push the body on to the shank as far as it will go, bringing the end of the uplifted spring into contact with the cheese head screw.

Turn the outer scroll in an anti-clockwise direction, compressing the spring until the screw head can be pushed into the space between the spring and the end of the tooth.



12. Screw down tightly the four backplate screws.



13. Replace the dies and front plate, fixing screws tightly. Put the detent pin handle to the minus position and adjust the diehead to zero.

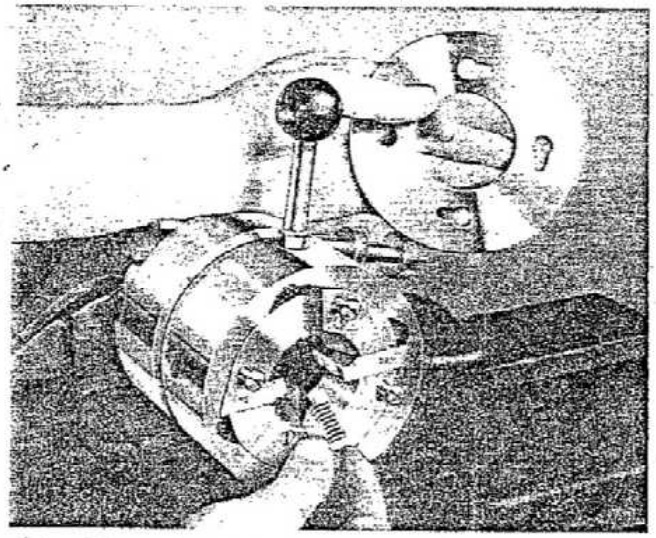
The Diehead is now ready for use.

INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING STYLE C.H. ½"-2" DIEHEADS

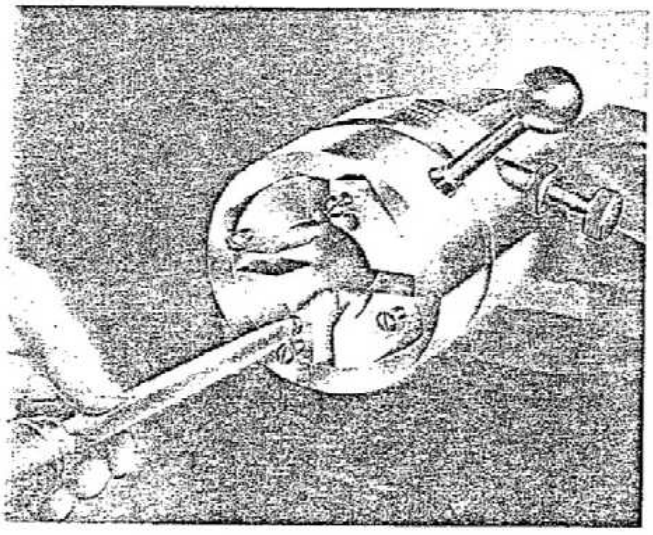
The following instructions apply when dismantling and re-assembling Style C.H. Dieheads sizes ½" to 2" and, with slight but mainly obvious discrepancies, the ½" and ⅝" C.H., 2" C.H.S., 2½" and 3½" Style C Fine Thread Dieheads.

Tools required are a bench vice with soft jaws, two or three suitable screwdrivers, a hammer, several pieces of brass or copper rod for tapping out pins and bushes, and, if possible a pair of 'Circlip' pliers.

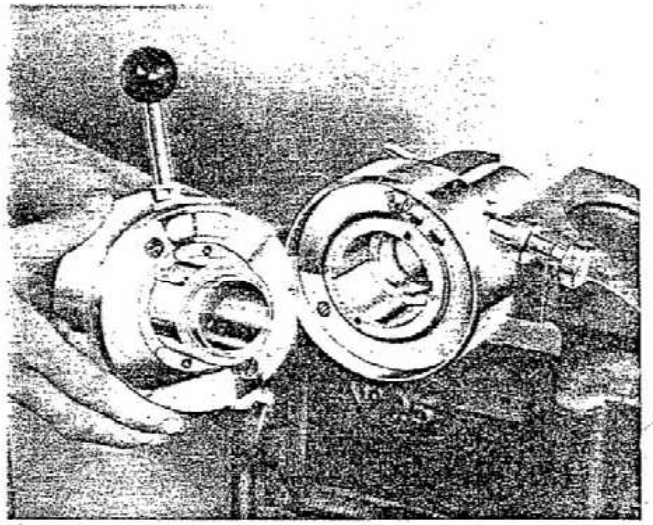
Dismantling Instructions



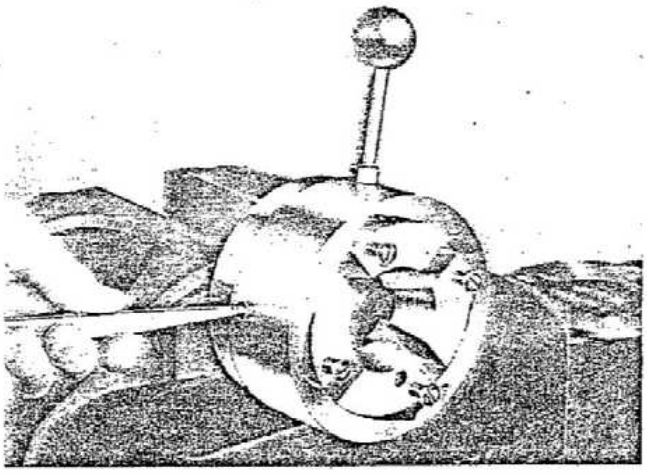
1. Close the diehead to take all pressure off the dies. Remove the front plate and dies.



2. Open the diehead. Remove closing spring screws and springs.

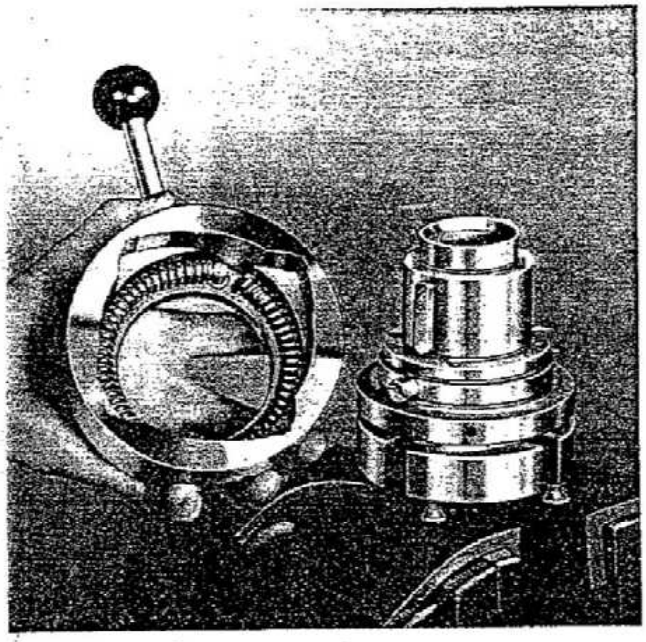


3. Slide body out of adjusting ring support. Detent pin and tooth can now be examined. To remove tooth drive out the pin passing through it.

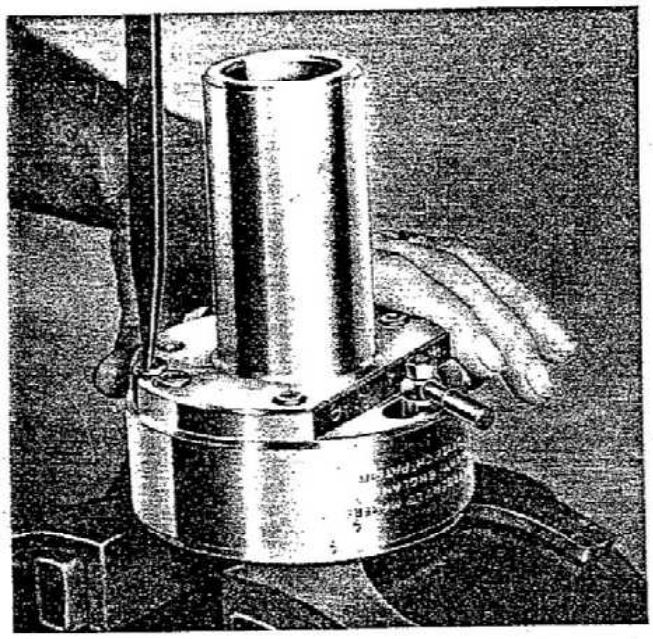


4. Remove the two screws which hold together the external and internal scroll.

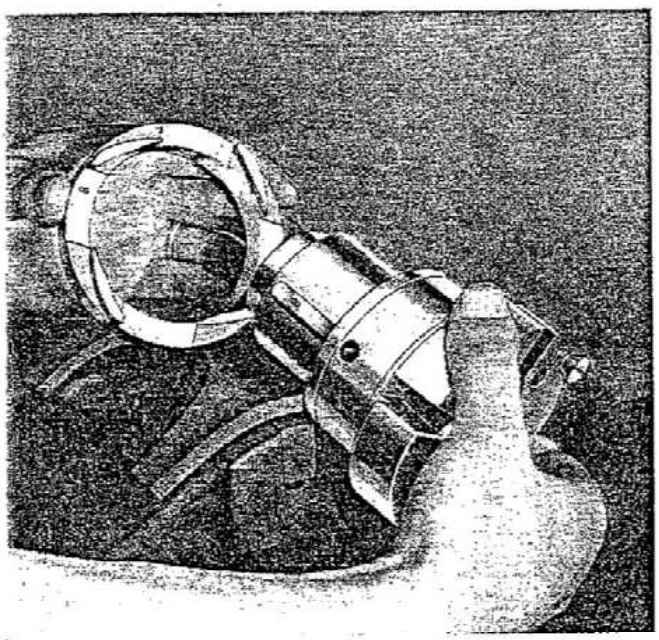
Dismantling Style C.H. $\frac{1}{2}$" to 2" Dieheads (*contd.*)



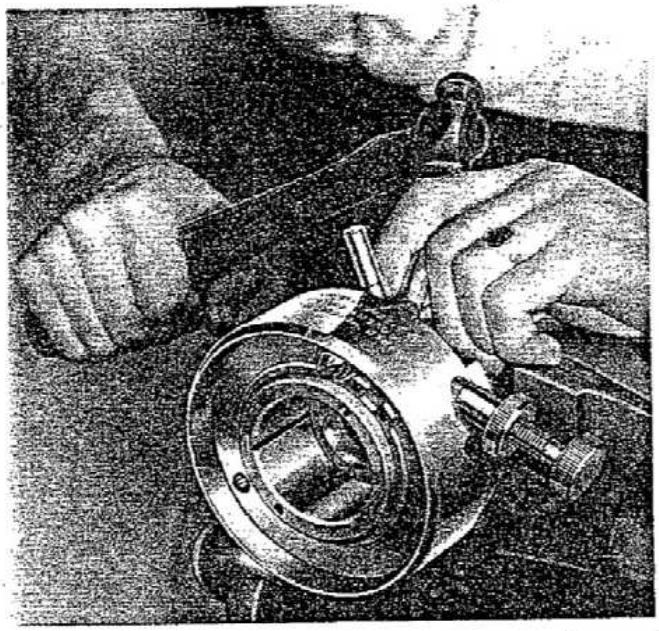
5. Lift the external scroll off the body. Opening springs can now be examined and removed, if necessary.



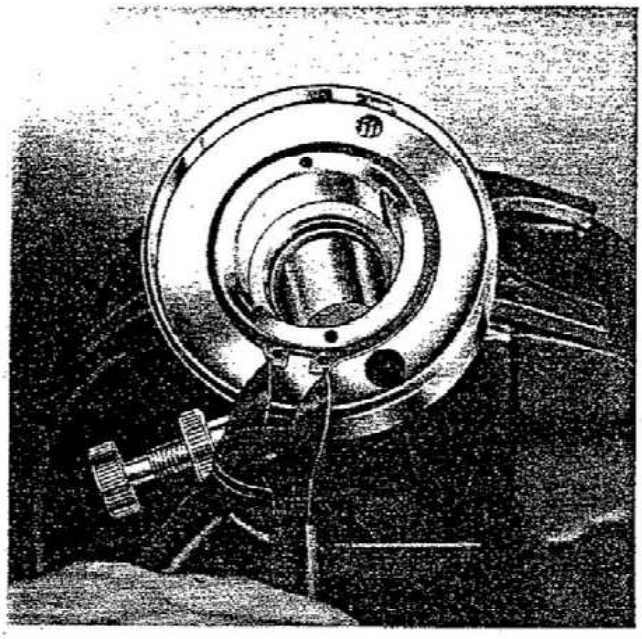
7. Remove the adjusting spring screw from the back of the adjusting ring support through the slot in the flange.



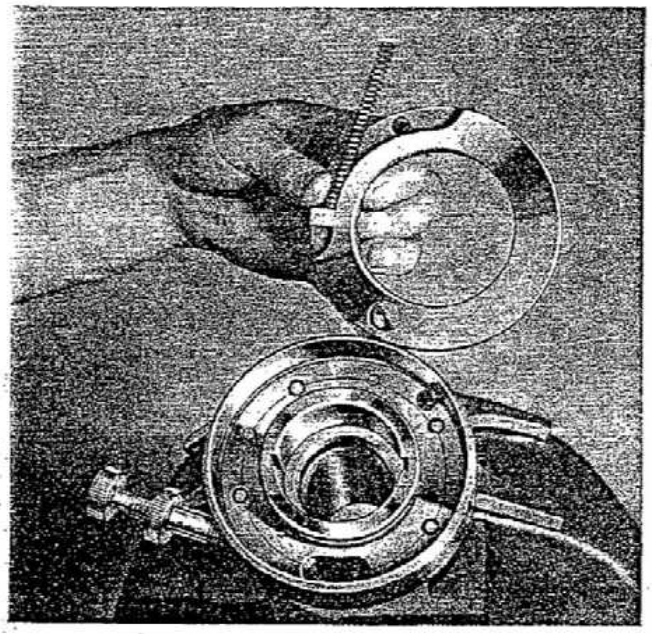
6. Remove the two cheese-head screws projecting from the body and lift off the internal scroll.



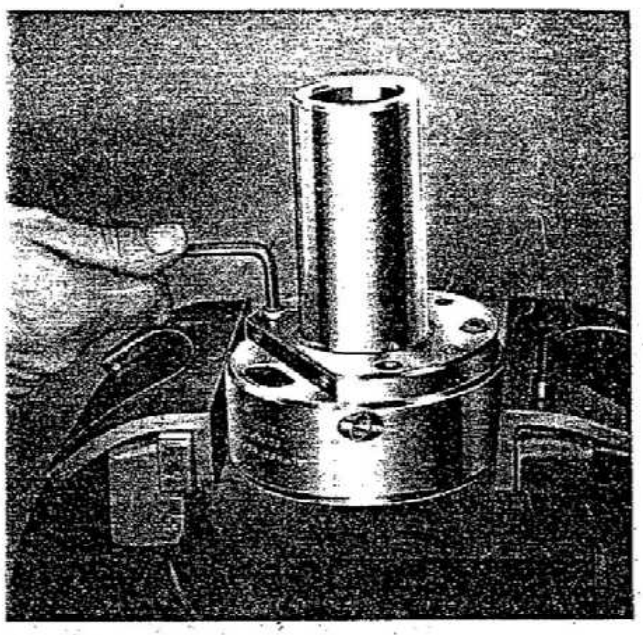
8. Remove the detent pin, nut and handle, and tap out the detent pin with its spring, then the bush.



9. Remove the 'Circlip' ring by expanding it with a special pair of pliers.



10. Remove the adjusting ring with its spring and take out the adjusting screw with its locknut.



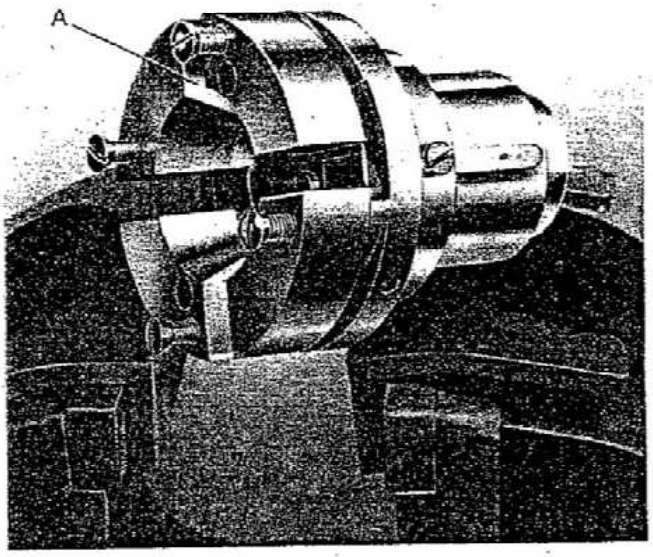
11. Remove the four shank screws and knock out the two taper dowels from the inside. The shank can now come off.

The Diehead is now sufficiently dismantled for ordinary purposes.

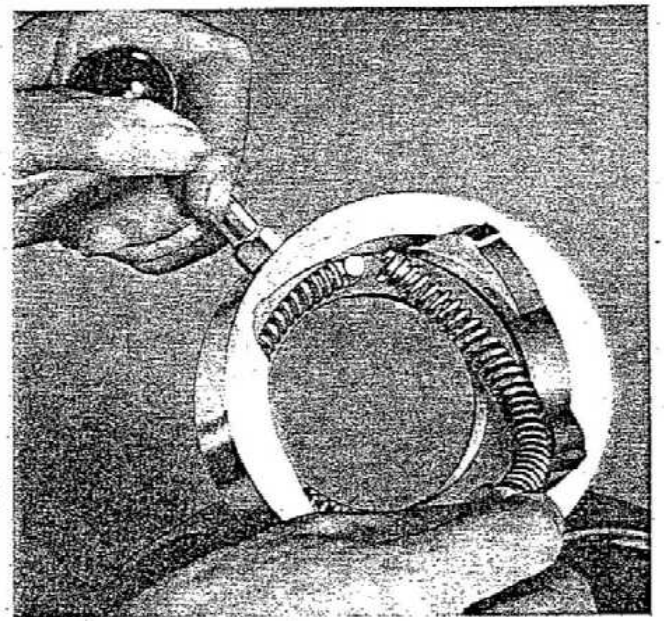
Re-assembling Instructions

Before beginning to re-assemble the diehead, ensure that all parts are free from burrs, rust and dirt. All parts should be greased and working parts lubricated with a good quality thin oil.

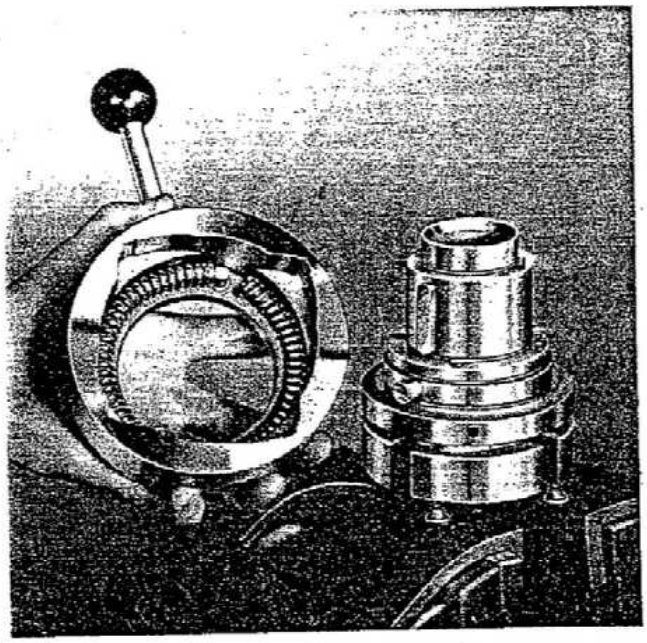
Re-assembling Style C.H. $\frac{1}{2}$" to 2" Dieheads (*contd.*)



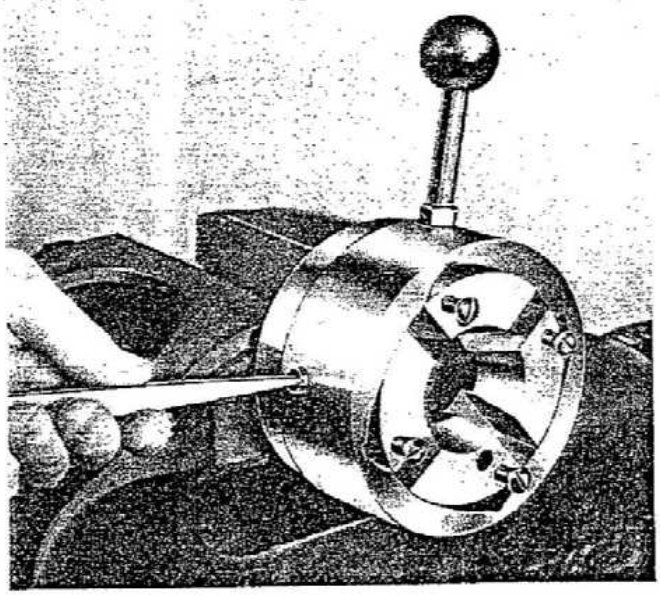
1. Replace the internal scroll on the body and the two cheese-head opening-spring screws. The numbered key on the body should be to the right of slot 'A' where the number on the face of the internal scroll can be seen.



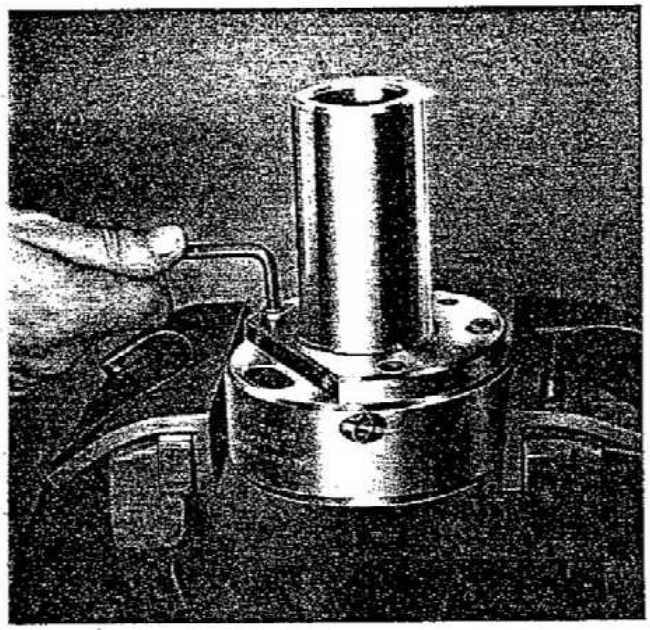
2. Replace the two opening springs with their pads in the external scroll.



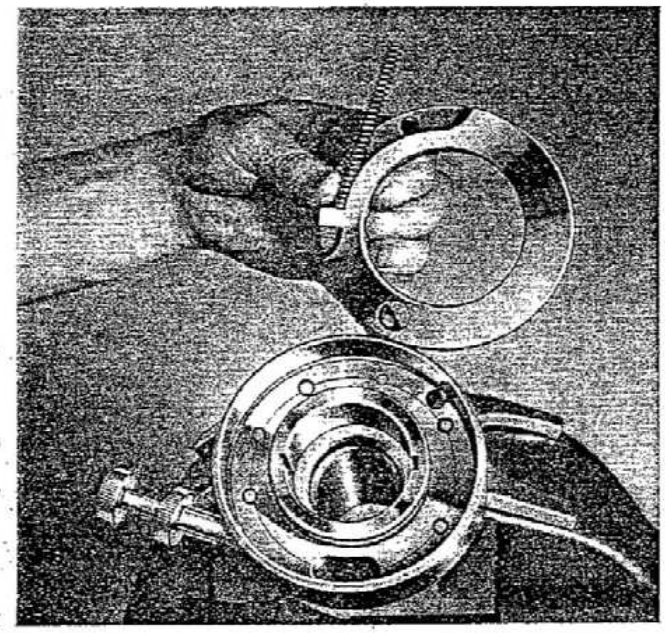
3. Replace the external scroll on the body. The closing handle must be on the same side as the numbered key.



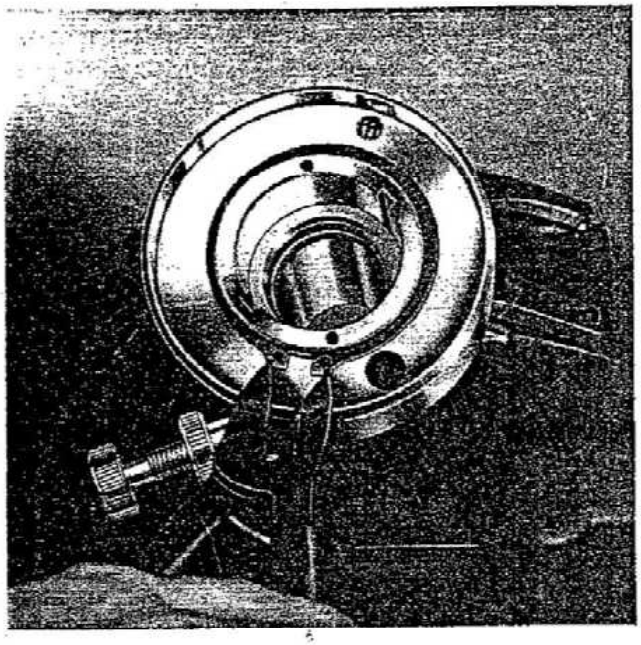
4. Line up the holes in the external scroll with the internal scroll and replace the two scroll screws.



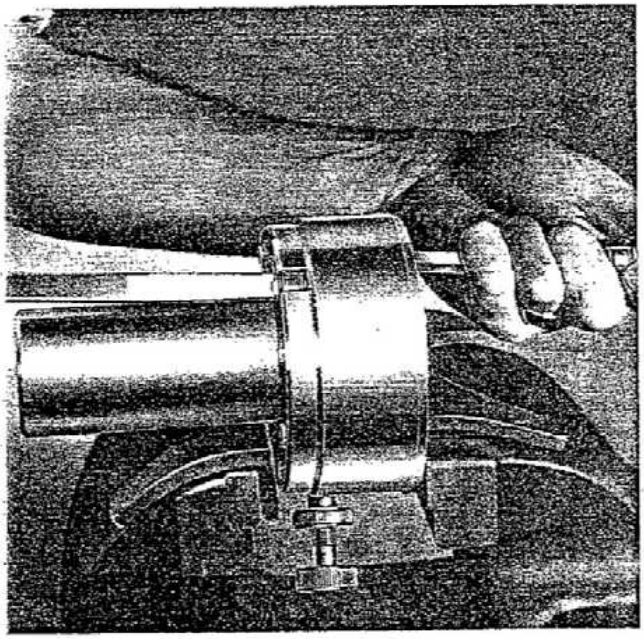
5. Replace the shank on the adjusting ring support, knock in the two taper dowels and replace the four screws. Replace the adjusting screw and its nut.



6. Replace the adjusting ring with its spring into the adjusting ring support, with the detent pin bush hole over the elongated hole.



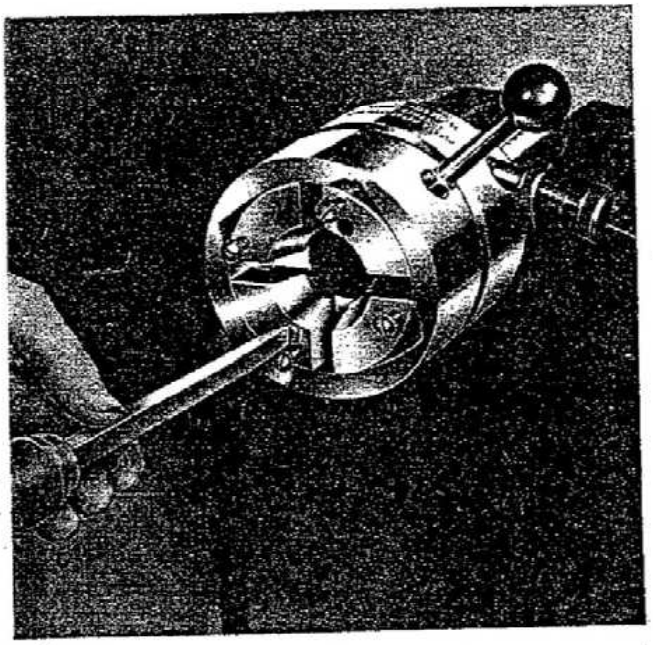
7. Replace the 'Circlip' with special pliers. Note the position of the two lugs in relation to the detent-pin bush hole. Replace the detent-pin in the adjusting ring.



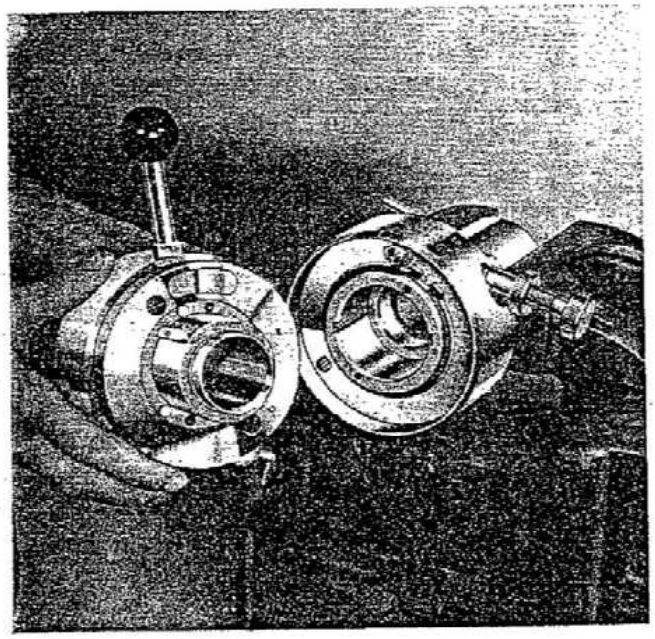
8. Press back the adjusting ring spring with two screwdrivers, coil by coil until clear of the hole, then replace the adjusting ring spring screw through the slot in the flange.

Re-assembling Style C.H. $\frac{1}{2}$" to 2" Dieheads (*contd.*)

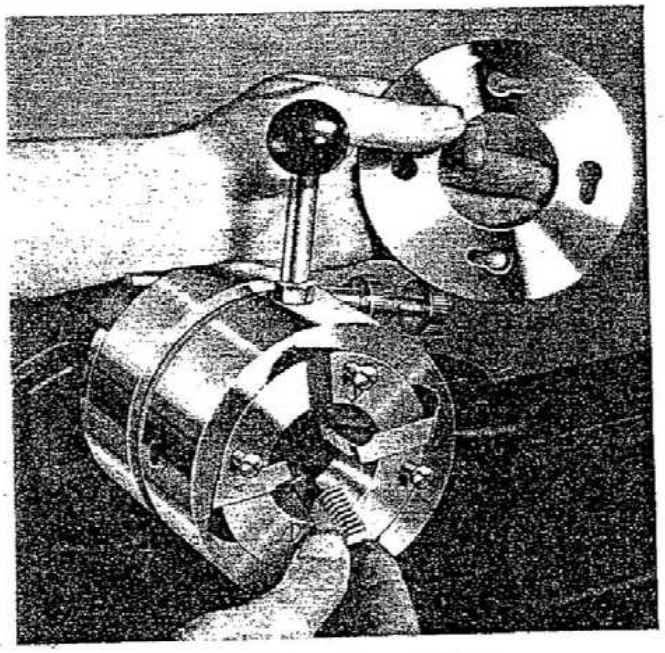
9. Replace the detent pin, handle and nut. Note the relation of the handle to the pin end.



11. Replace the two closing spring screws and springs. Now close the diehead.



10. Replace the body with the external scroll in the adjusting ring support. The numbered key must go in the numbered keyway.



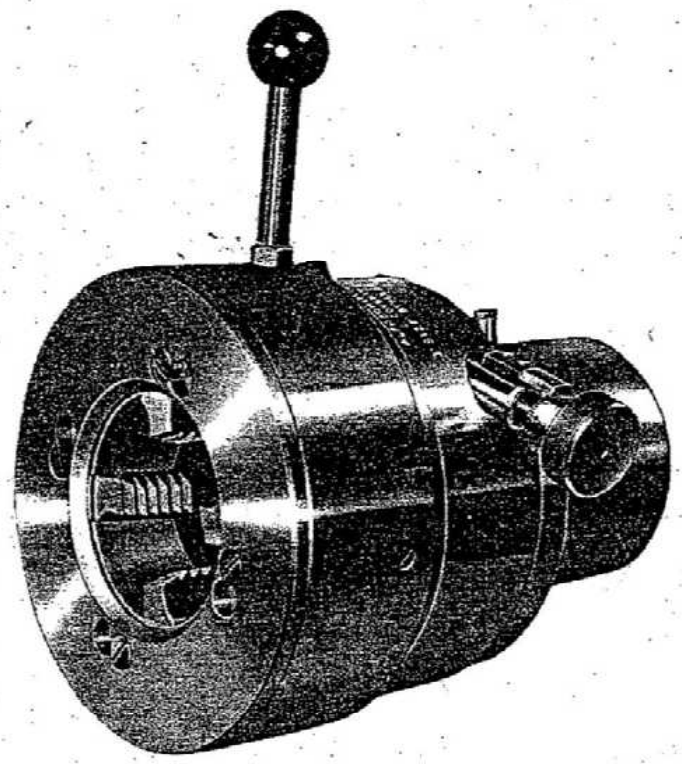
12. Replace the dies and front plate.

The Diehead is now completely re-assembled and ready for use.

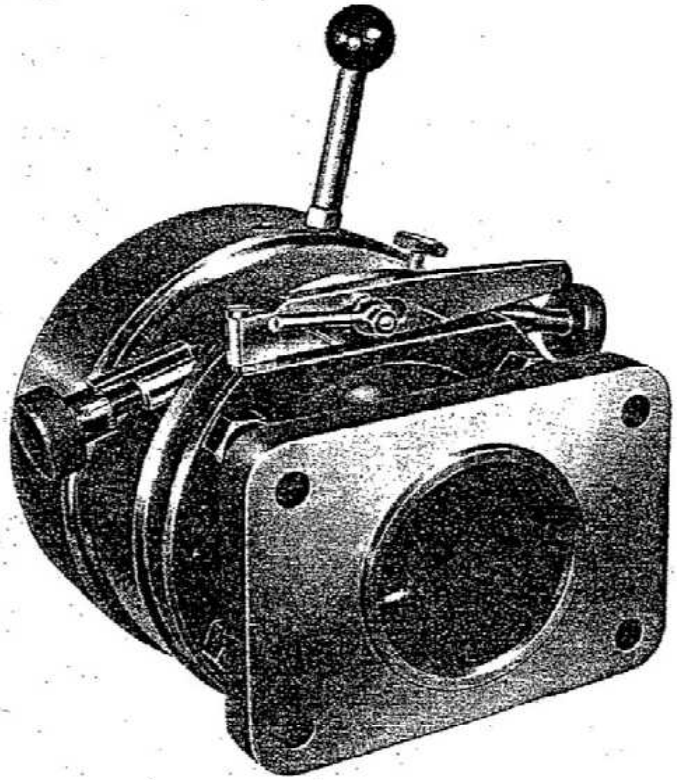
INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING STYLE C.H. 3" AND 4½" DIEHEADS

The following instructions should be followed when dismantling and re-assembling the above dieheads. The main difference between the two dieheads is that the 3" size has a shank fitted and the 4½" size is flange mounted. See the illustrations below.

The tools required, in addition to those supplied with the diehead, are a bench vice with soft jaws, two or three suitable screwdrivers, a hammer, several pieces of brass or copper rod for knocking out pins and bushes, and, if possible a pair of 'Circlip' pliers.

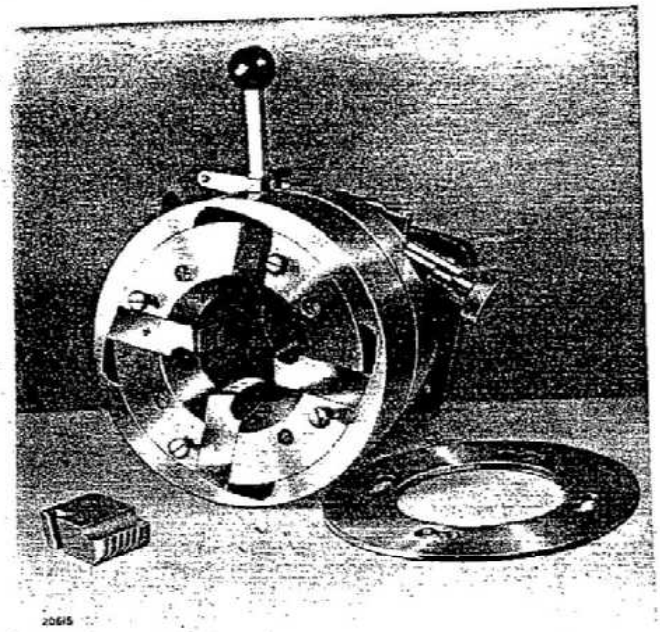


Style C.H. Diehead, size 3"

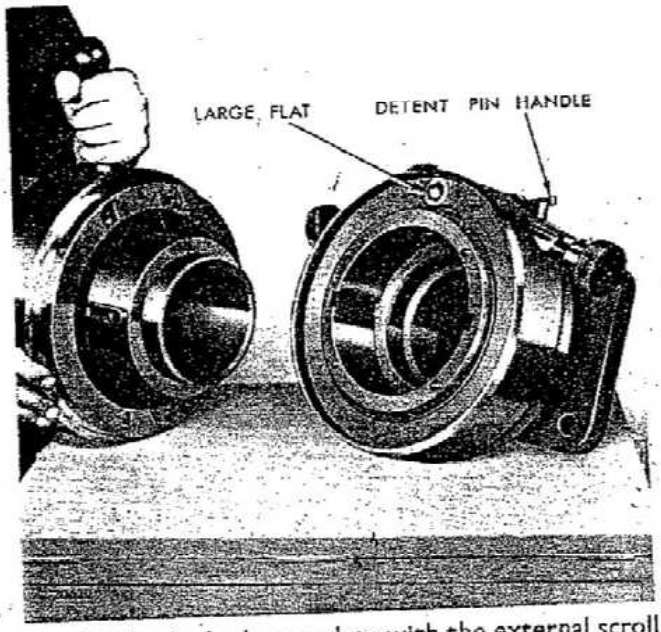


4½" Style C.H. Diehead showing the mounting flange from the rear

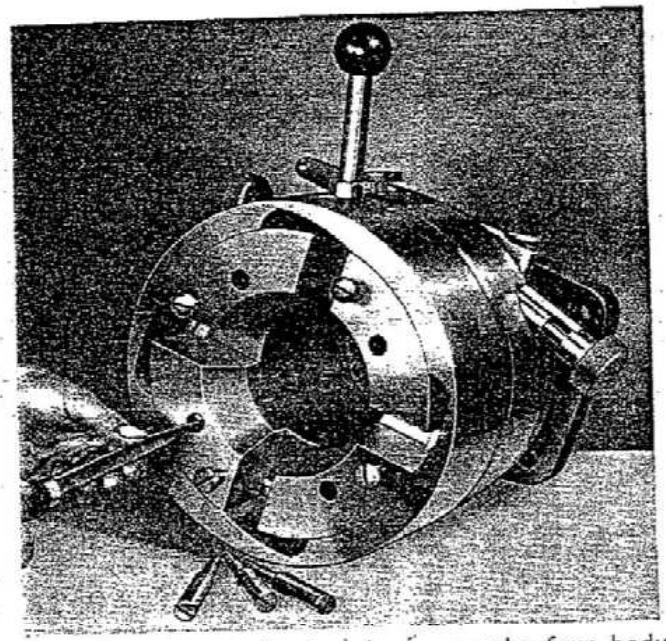
Dismantling Instructions (Style C.H. 3" and 4½" Dieheads)



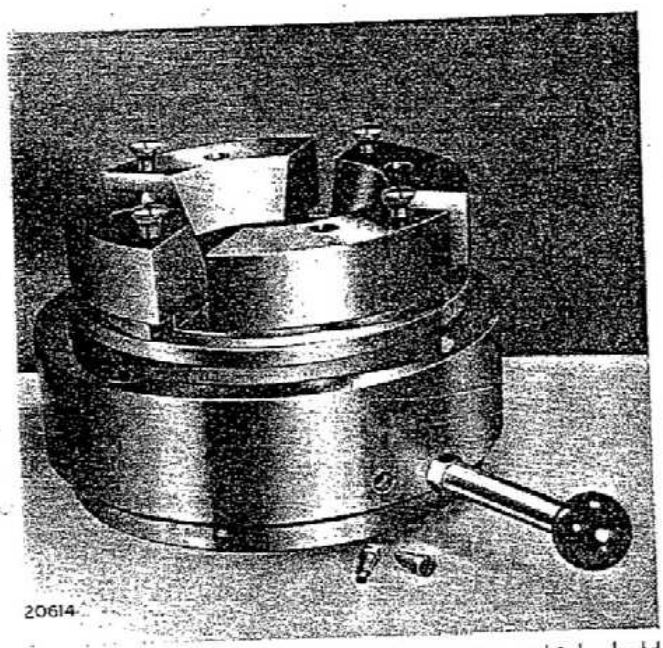
1. Close the diehead to take pressure off the dies. Remove the front plate by slackening the four screws and twisting the plate anti-clockwise. Take out the dies.



3. Slide the body complete with the external scroll out of the adjusting ring support. The condition of the detent pin and tooth can now be examined.

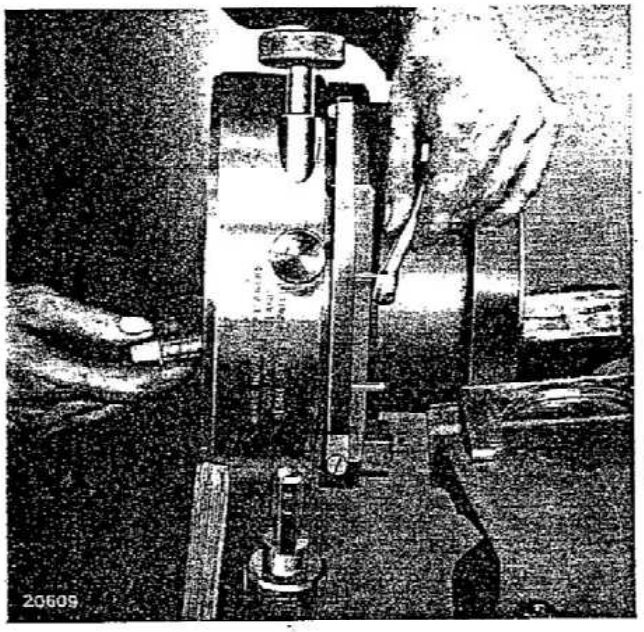


2. Open the diehead and remove the four body retaining screws.

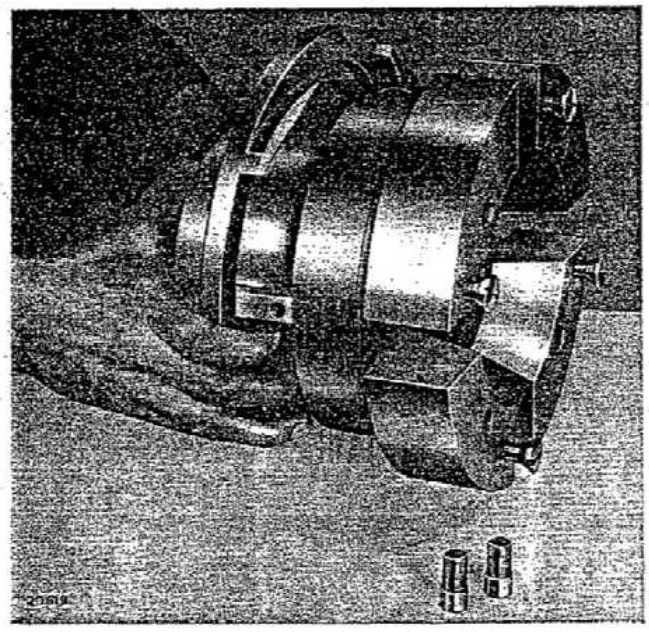


4. Remove the two scroll screws which hold together the external and internal scrolls. Remove the body complete with internal scroll from the external scroll.

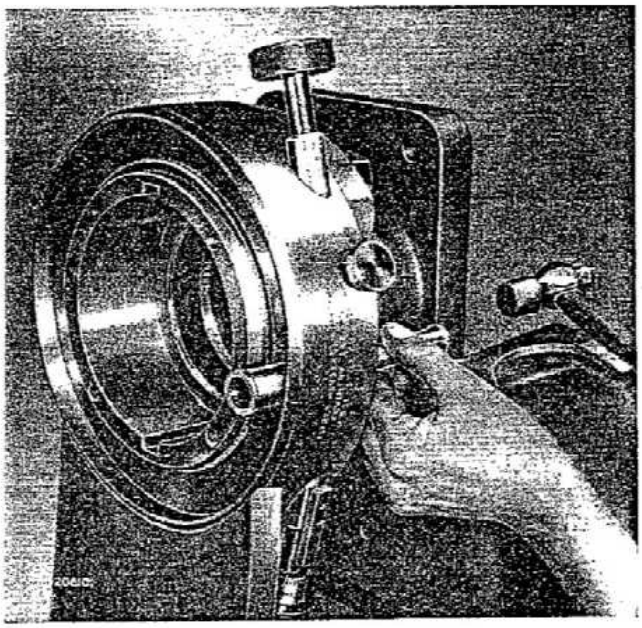
5. The two opening springs can now be examined and removed if necessary.



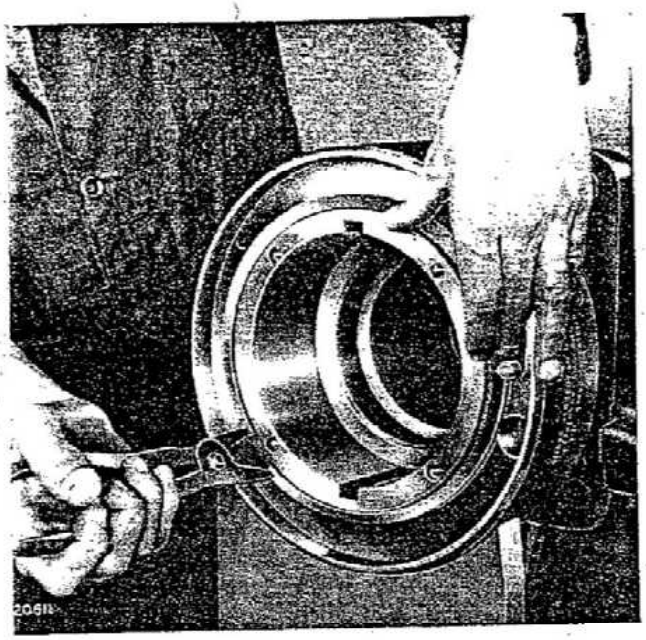
7. Remove the detent pin nut and handle, and withdraw the detent pin with its spring. The hinged detent pin lever can now be removed.



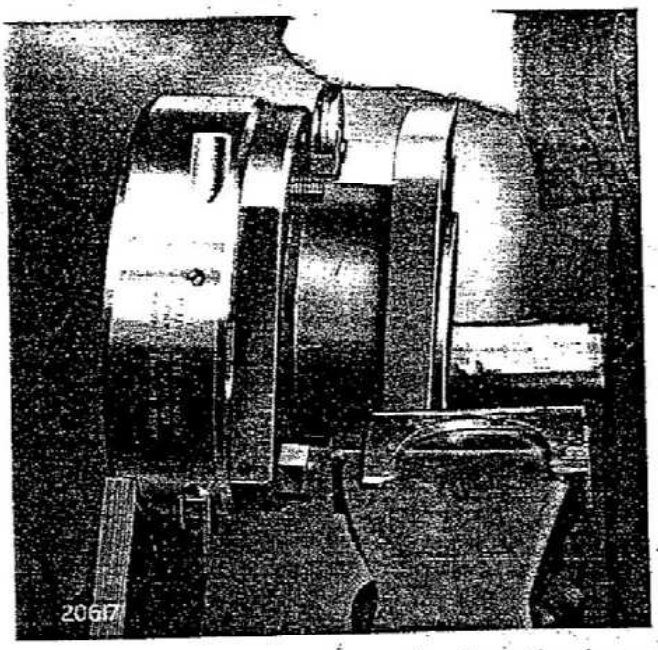
6. Remove the two cheese-head screws projecting from the body and the internal scroll can be drawn off.



8. Remove the knurled-head locking screw and the two long adjusting screws. Take out the adjusting ring spring screw (seen through the slot in the flange). Tap out the detent pin bush using a piece of brass rod.



9. Remove the 'Circlip' ring by expanding it with special pliers. The adjusting ring with its spring can now be withdrawn.



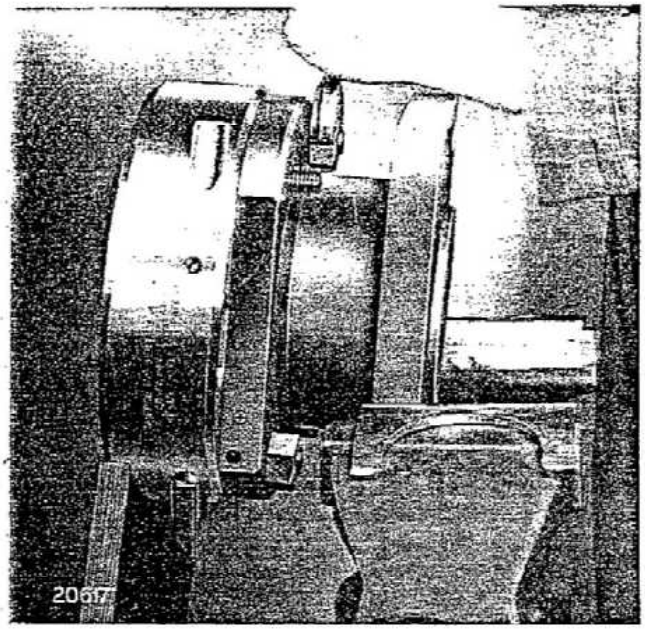
10. Remove the nuts on the flanged adaptor (4½" Diehead) or the Allen-type shank screws (3" Diehead). Drive out the pins from inside the adjusting ring support, using a brass rod. The flanged adaptor or shank can now be removed by driving it from the inside using a brass rod.

The Diehead is now sufficiently dismantled for normal purposes.

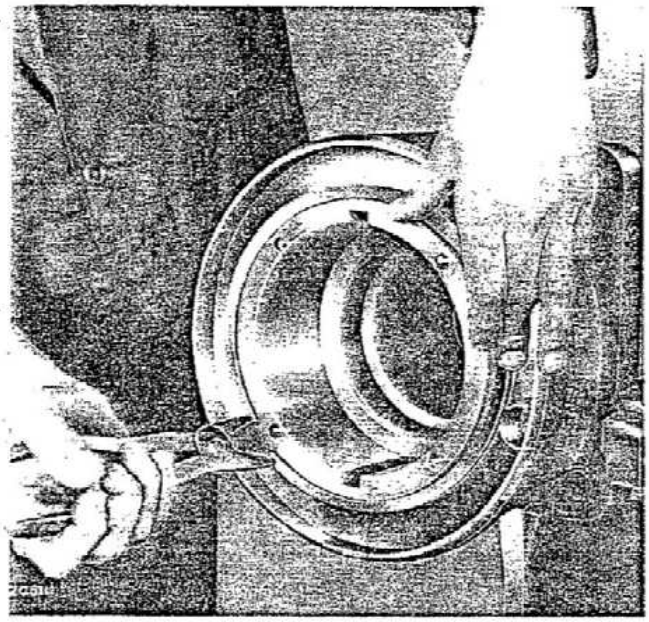
Re-assembling Instructions

Before commencing, ensure that all parts are free from burrs, rust or dirt. All parts should be greased and working parts lubricated with a good quality thin oil.

Re-assembling Style C.H. 3" and 4½" Dieheads

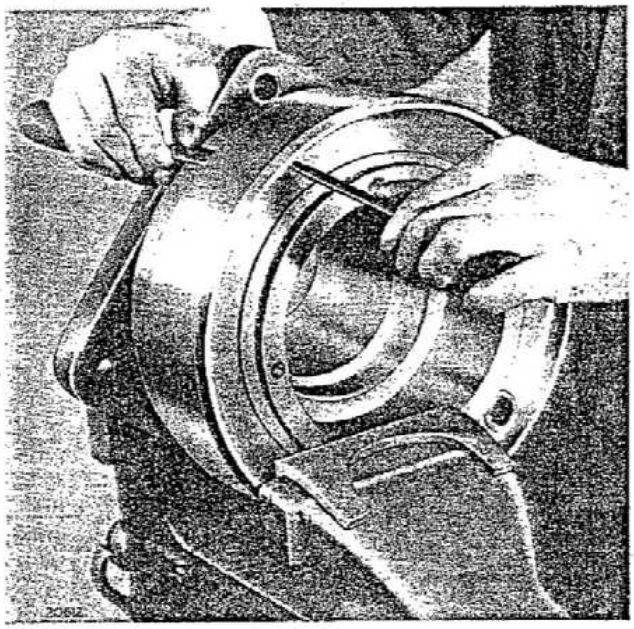


1. Replace the flanged adaptor (4½" Diehead) or shank (3" Diehead) on adjusting ring support. Replace dowel pins (4½" Diehead) or taper pins (3" Diehead).



2. Replace the adjusting ring with its spring in the adjusting ring support and secure with 'Circlip' ring using special pliers.

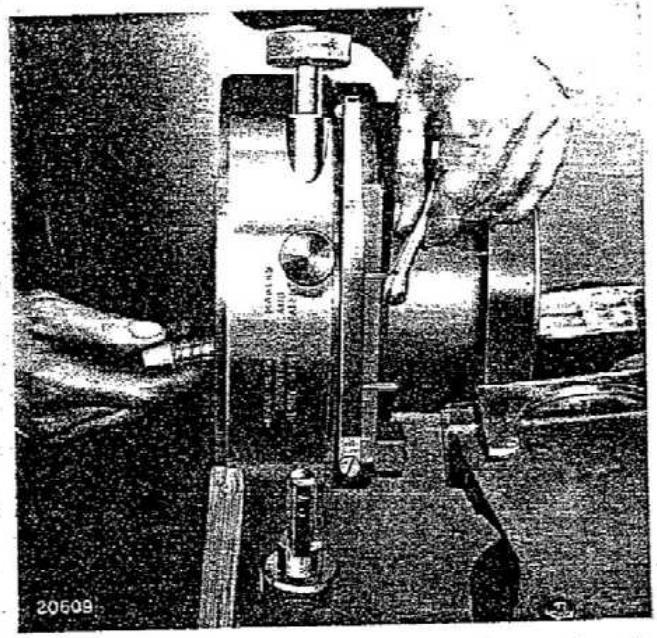
3. Rotate the adjusting ring until the hole for the detent pin is over the elongated slot in the adjusting ring support. Drive in the detent bush up to the shoulder towards the flanged adaptor. Ensure that the bush clears the 'Circlip' ring.



Operation 4

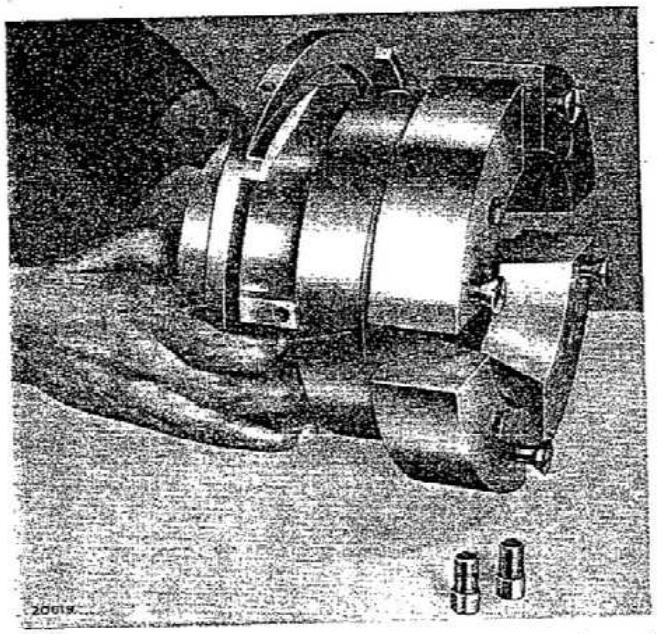
4. Using two suitable screwdrivers, compress the adjusting ring spring, coil by coil in the manner shown, until the spring is clear of the tapped hole. Holding the spring back, replace the screw through the slot in the adaptor. Replace the two long adjusting screws and the knurled head locking screw.

Re-assembling Style C.H. 3" and 4½" Dieheads (*contd.*)

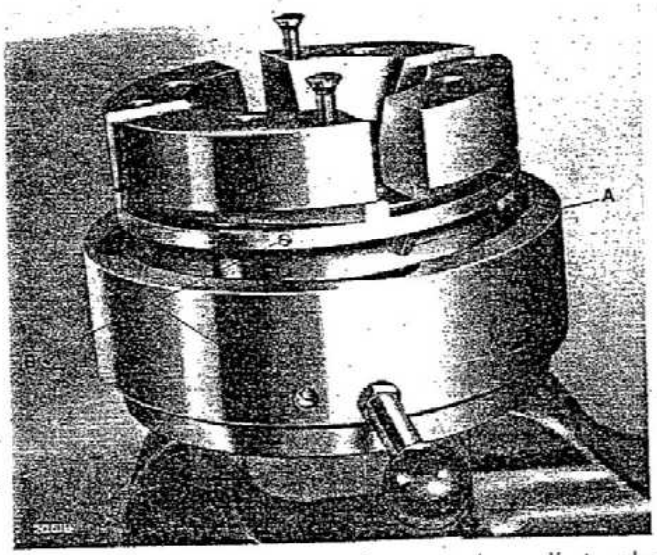


5. Replace the hinged detent pin lever, also the detent pin with its spring and handle. Note the relative position of the large flat on the detent pin to the detent pin handle, shown in operation 9.

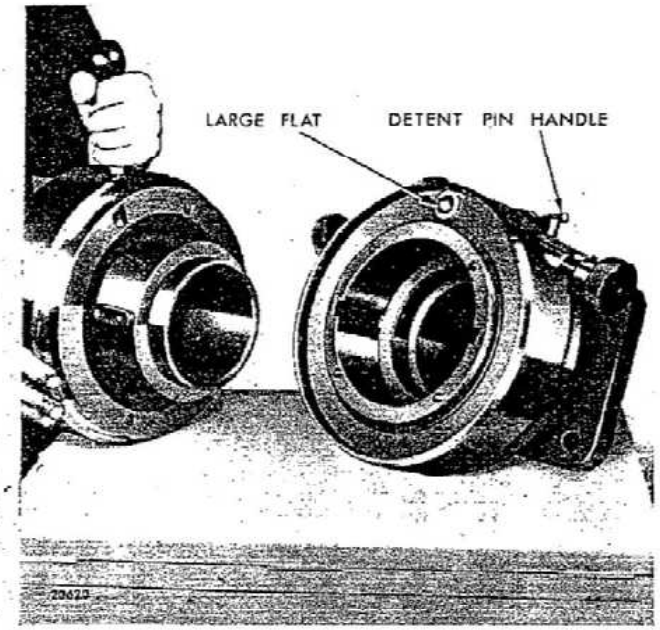
7. Replace the two opening springs with their respective pads at each end.



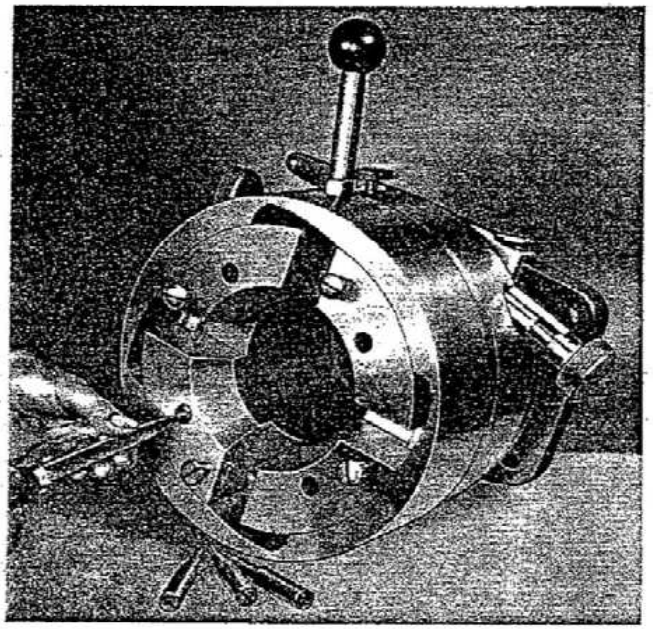
6. Replace the internal scroll on the body and secure with the two cheese-head screws.



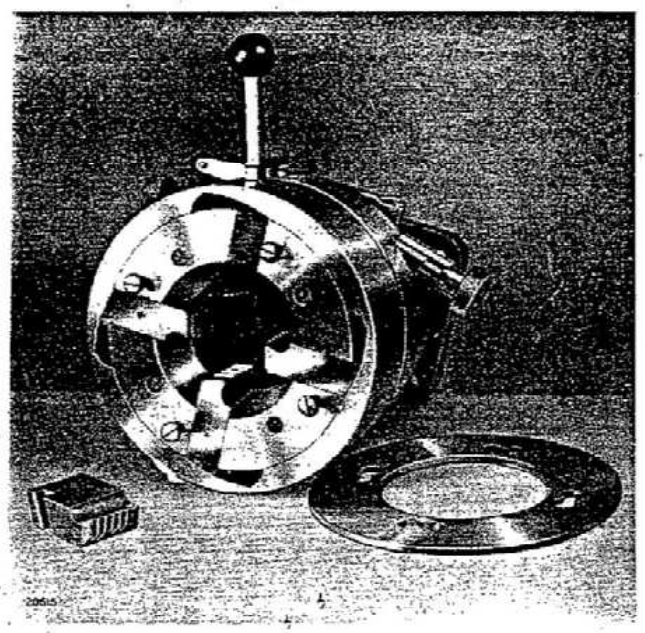
8. Replace the body with internal scroll, in the external scroll. Make sure that the two opening-spring screws 'A' fall into the gaps between the spring ends, and that the scroll screw holes 'B' line up. Replace the scroll screws which secure the inner scroll to the outer scroll.



9. Replace the assembled body and scroll into the adjusting ring support. Ensure that the numbered key on the body goes into the numbered keyway.



10. Replace the four body-retaining screws. Screw up tightly. The two extreme positions of the detent pin lever can now be checked. The lever should clear the limit pins at both positions.



11. Replace the dies in the correct order. Replace the front plate and tighten the screws.

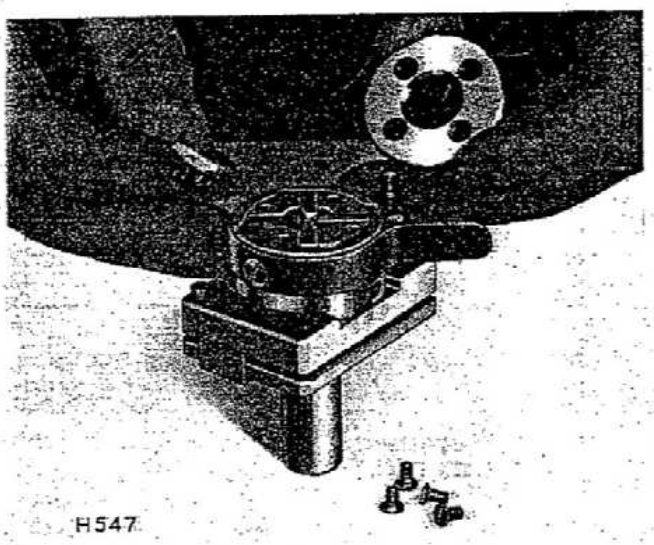
The Diehead is now completely re-assembled and ready for use.

INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING STYLE X.T.2 DIEHEADS — SIZES $\frac{1}{4}'' - \frac{1}{2}''$

When dismantling and re-assembling Style X.T.2 Dieheads, the following instructions should be followed.

The tools required are the Allen-type wrenches supplied with the diehead, suitable spanners and screwdrivers.

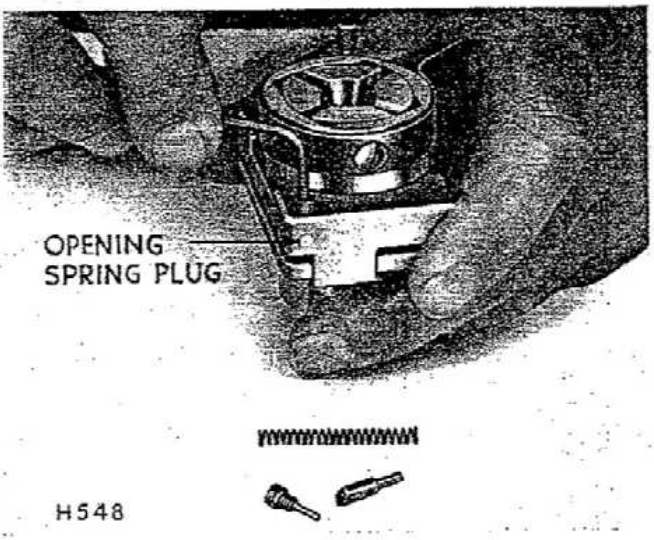
Dismantling Instructions



H547

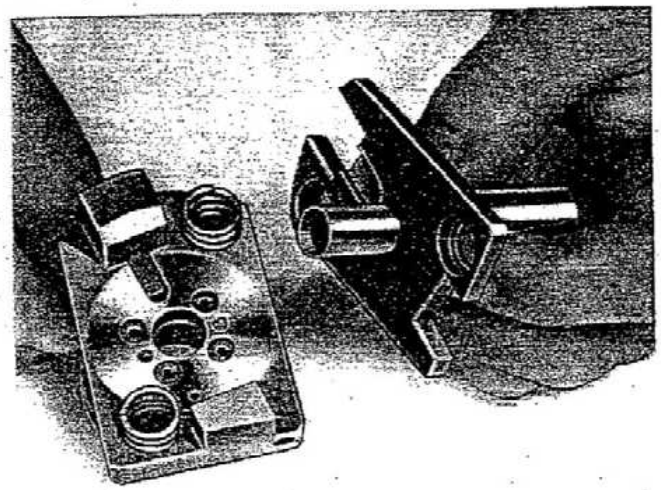
1. Close the diehead to relieve pressure on the dies. Remove front plate screws, front plate and dies. Re-open the diehead.

3. Unscrew the two draw-out-spring screws and remove springs, bushes and screws.



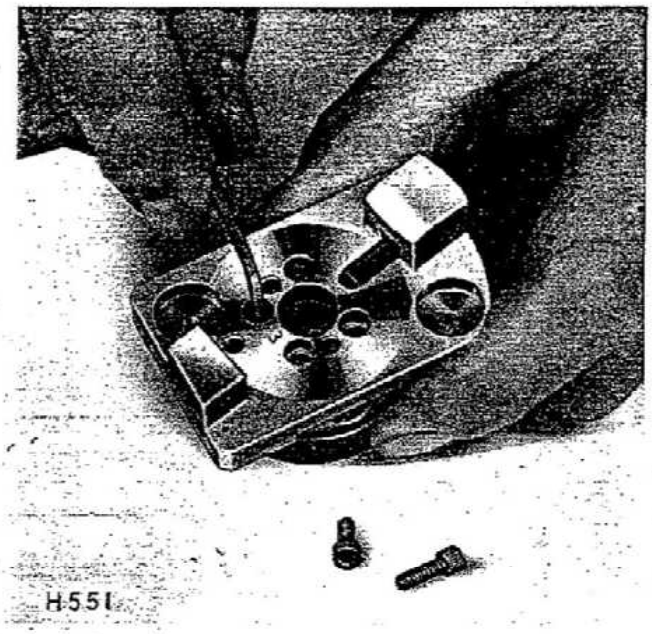
H548

2. Hold the opening-spring plugs in position with the thumb or finger, unscrew Allen-head pins and remove opening springs.



4. Remove the shank. This exposes two cushion springs which should be removed.

Dismantling Style X.T.2 Dieheads *(contd.)*

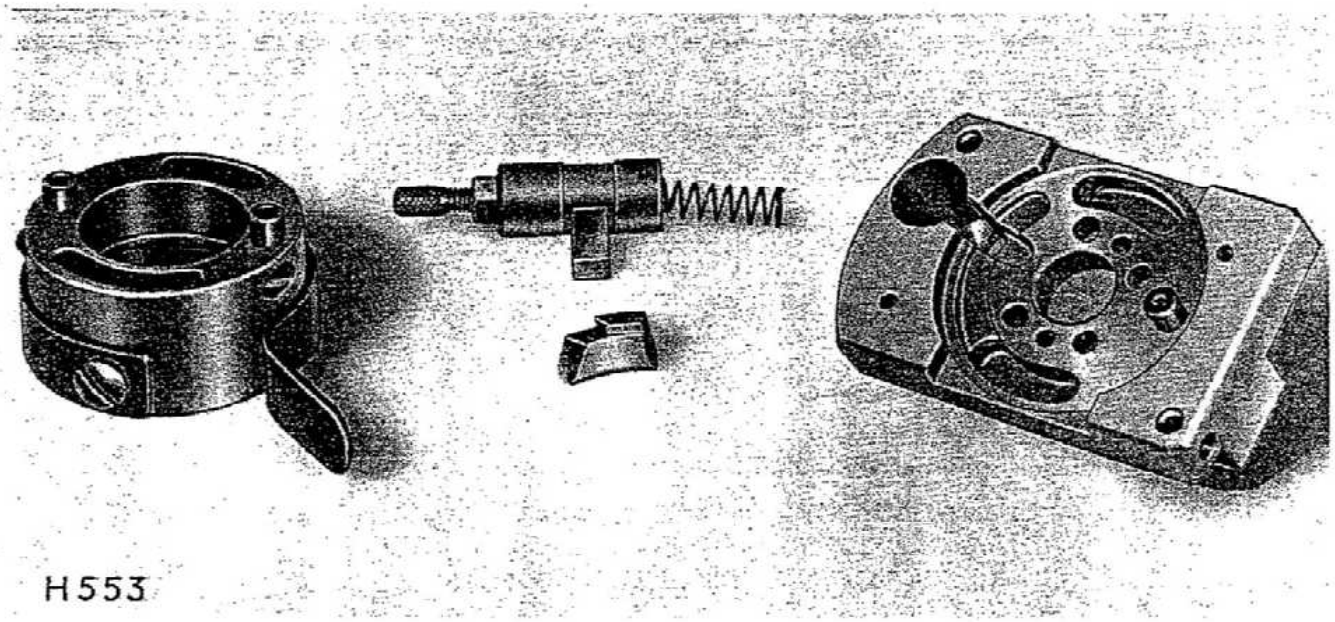


H551

5. Remove the four backplate screws and the backplate. The plunger and its spring can now be withdrawn and the body can be removed from the external scroll.

H550

6. Slacken off one of the two adjusting screws in the external scroll and remove the tooth.



H553

7. The condition of the projection on the plunger can now be examined. (These parts may be reconditioned, if necessary, by grinding a small amount off the face, ONLY of the plunger projection, and the front and top faces of the tooth.

E31

8. Remove the two screws and the spring-steel auto die closer. This uncovers two scroll screws which should now be removed.

E38

9. The internal scroll can now be removed from the external scroll.

The Diehead is now sufficiently dismantled for normal purposes.

Re-assembling Instructions

Before commencing, ensure that all parts are free from burrs, rust and dirt. All parts should be greased and the working parts lubricated with a good quality thin oil.

1. Replace the internal scroll in the external scroll. The number on the front face of the internal scroll should align with the corresponding number on the front face of the external scroll.

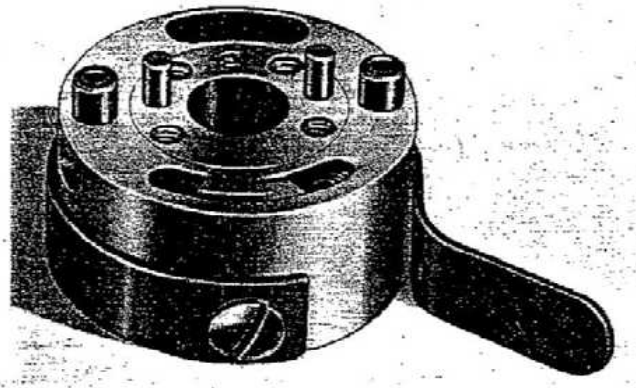
E38

Re-assembling Style X.T.2 Dieheads (*contd.*)

2. Replace and tighten the two scroll screws, and the auto die closer and screws.

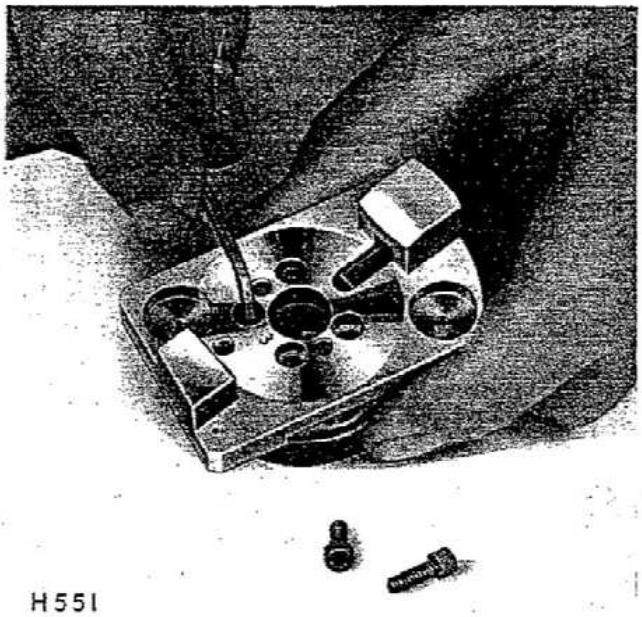
H550

3. Replace the detent tooth in the slot in the external scroll and lock securely with the adjusting screw.



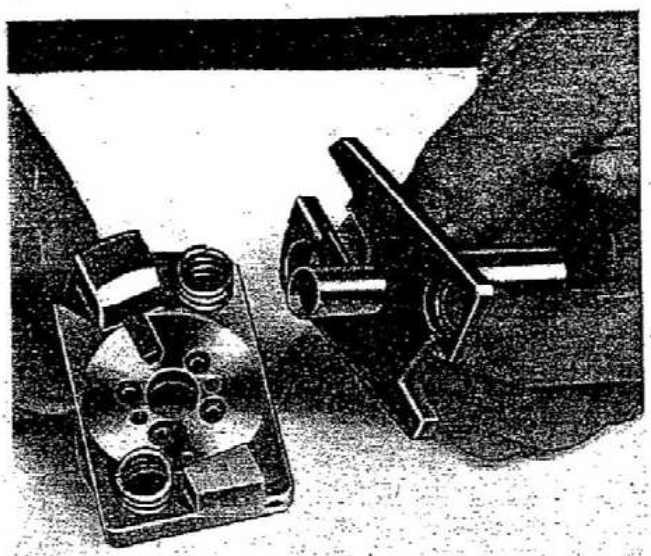
H579

4. Replace the body in the external scroll with the number on the back face diametrically opposite the tooth.



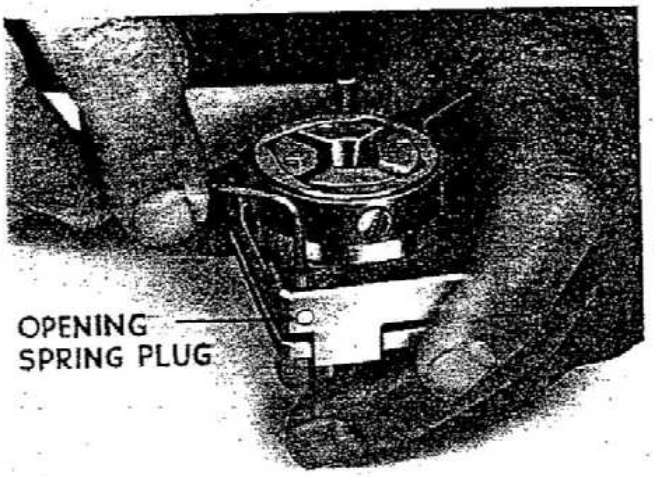
H551

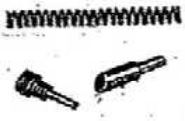
5. Replace the plunger and its spring in the back plate and assemble with the body and external scroll, engaging the body pins with the holes in the backplate and ensuring that the number on the back face of the backplate is over the number on the back face of the body. Tighten up the backplate screws.



H552

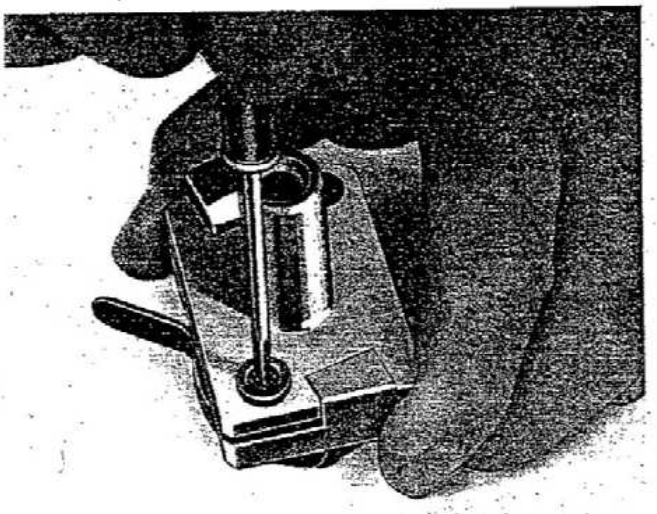
6. Replace the cushion springs and the shank.





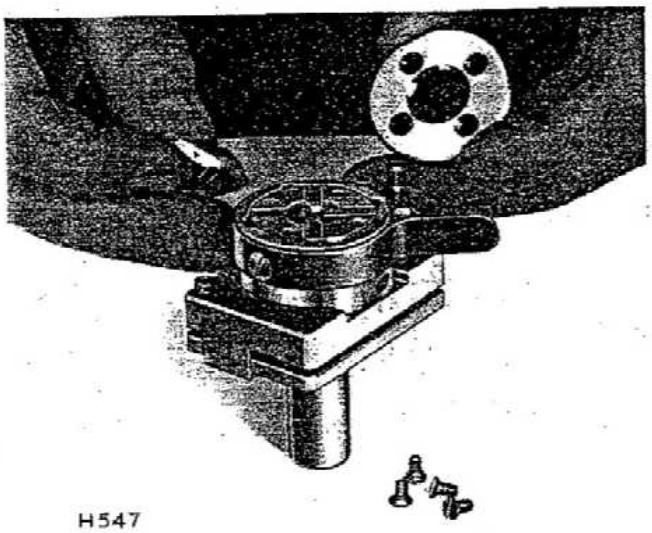
H548

8. Replace the opening spring and pad into the hole in the backplate. The end of the spring containing pad must be inserted first. Insert the relevant opening-spring plug and press this down with the thumb whilst inserting the Allen-head screwed pin. Repeat for the second opening spring.



H549

7. Replace the draw-out spring bushes, the springs and the screws. Tighten securely.



H547

9. Replace the dies and the front plate. Adjust the diehead to the zero position and tighten the screws securely.

The Diehead is now completely re-assembled and ready for use.

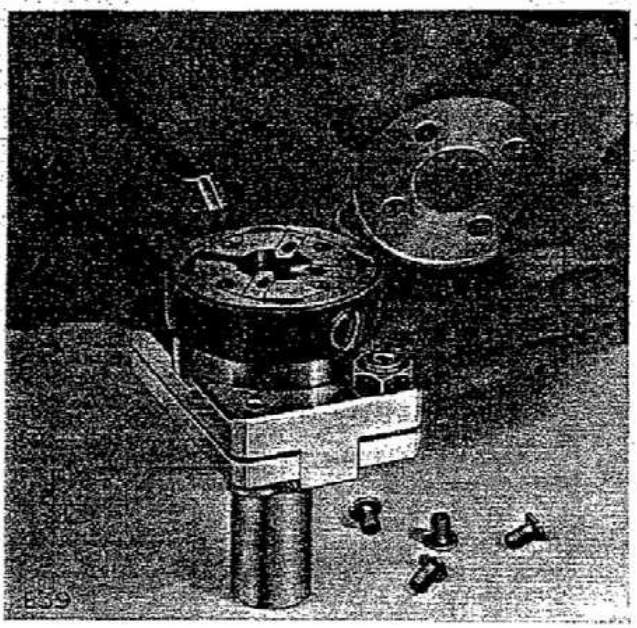
INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING STYLE X.T. DIEHEADS — SIZES ¼" and 5/16"

These dieheads have now been replaced by style X.T.2.

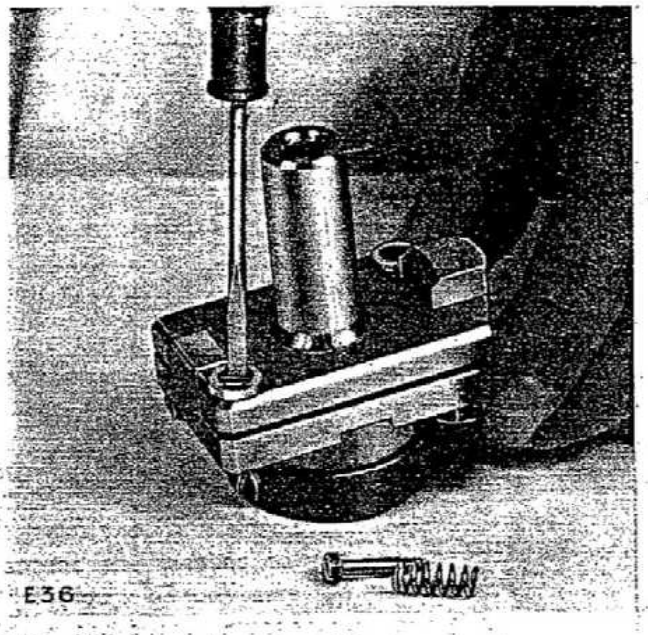
When dismantling and re-assembling Style X.T. Dieheads, the following instructions should be followed.

Tools required are the Allen-type wrenches supplied with the diehead, suitable spanners and screwdrivers.

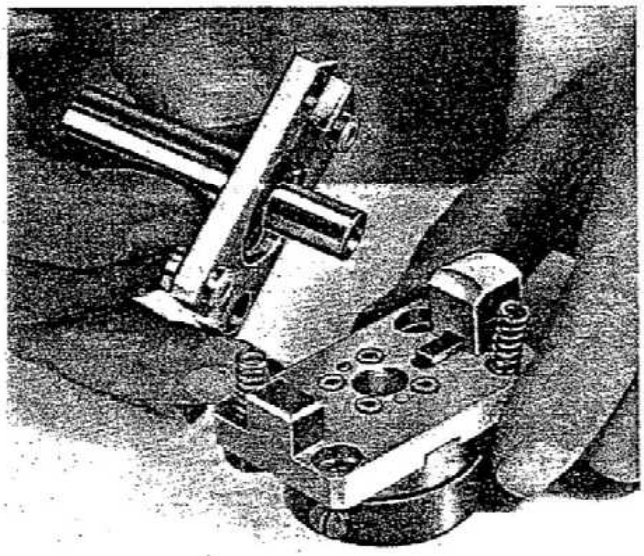
Dismantling Instructions



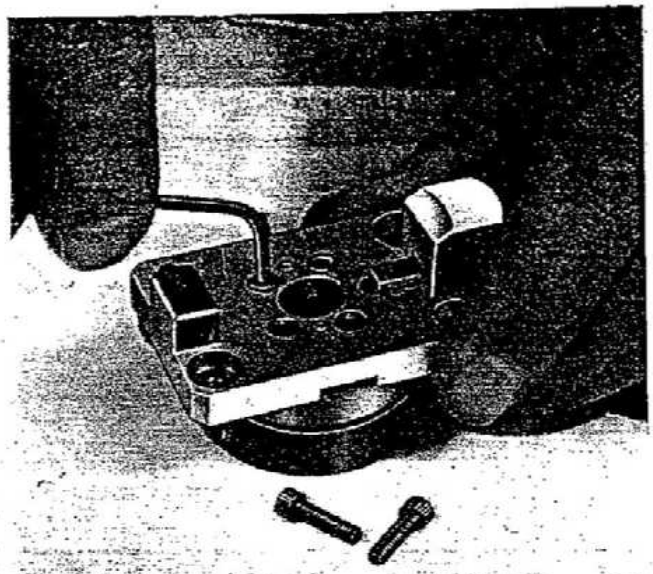
1. Close the diehead to relieve the pressure on the dies. Remove the front plate screws, front plate and the four dies. Open the diehead.



2. Unscrew the two draw-out spring screws, removing both springs and screws.



3. Remove the shank. This exposes the two cushion springs which should be removed.

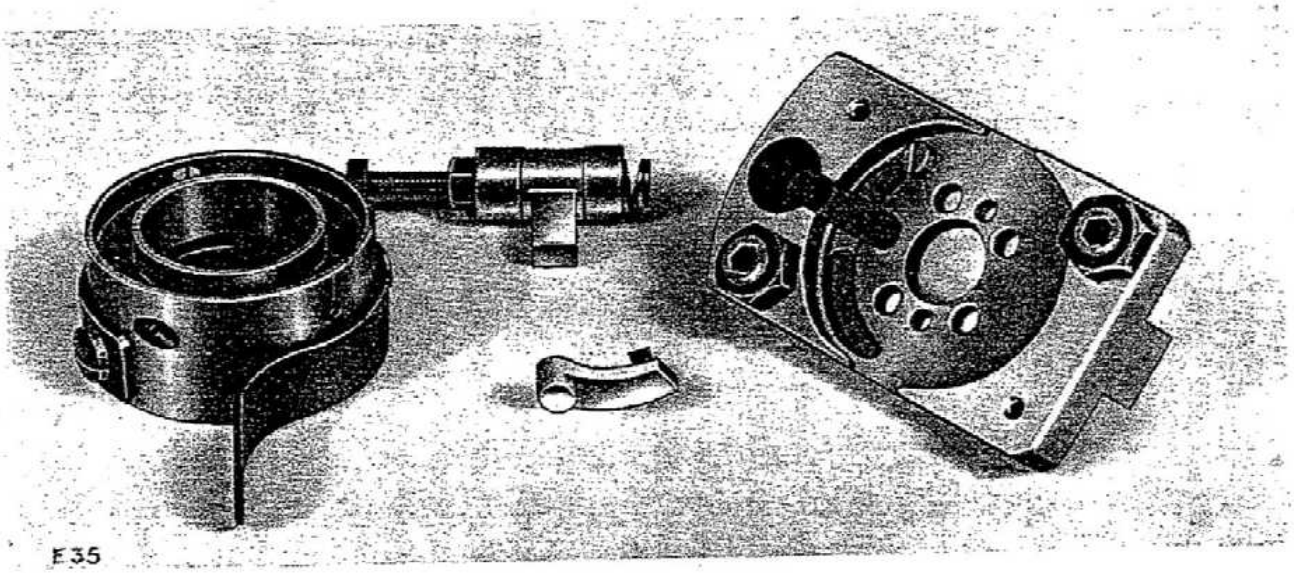


E30

4. Remove the four backplate screws. Hold the hands around the diehead to prevent the opening spring flying out. Gently ease the backplate off the two pins in the body. Plunger and spring can now be withdrawn and the body removed from the external scroll.

E33

5. Slack off one of the two adjusting screws in the external scroll, and the tooth can be extracted.



E35

6. The condition of the projection of the plunger and the tooth can now be examined. (These parts may be re-conditioned if necessary by grinding a small amount off the front face ONLY of the plunger projection, and the front and top faces of the tooth).

The two cushion-spring screws and locknuts can be removed if necessary.

Dismantling Style X.T. Dieheads (*contd.*)

E31

7. Remove the two screws and the spring-steel auto die closer. This reveals two scroll screws which can now be removed.

E38

8. The internal scroll can now be removed from the external scroll.

The Diehead is now sufficiently dismantled for normal purposes.

Re-assembling Instructions

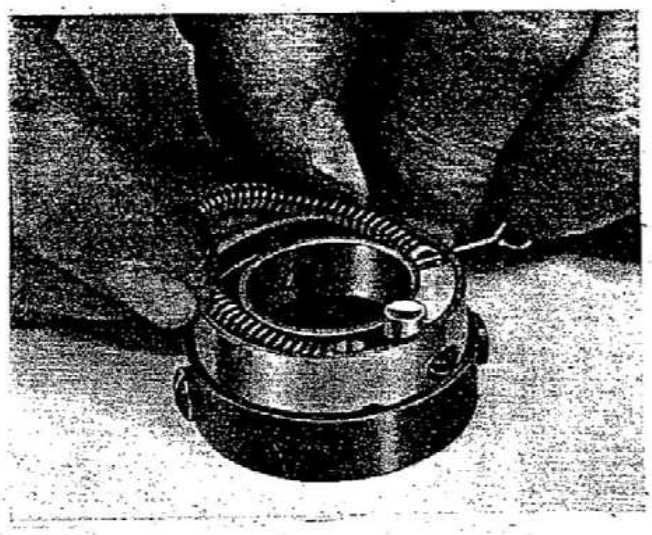
Before commencing, ensure that all parts are free from burrs, rust and dirt. All parts should be greased and working parts lubricated with a good quality thin oil.

1. Replace the internal scroll in the external scroll. The number on the front face of the internal scroll must be in line with the corresponding number on the front of the external scroll.

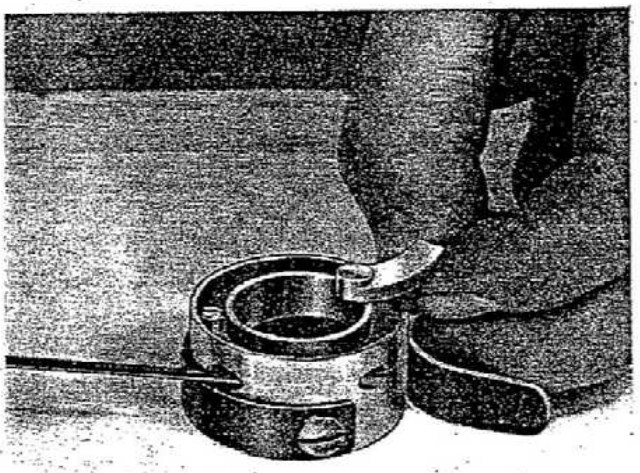
E38

E31

2. Replace and tighten the two scroll screws, and the auto die closer and screws.

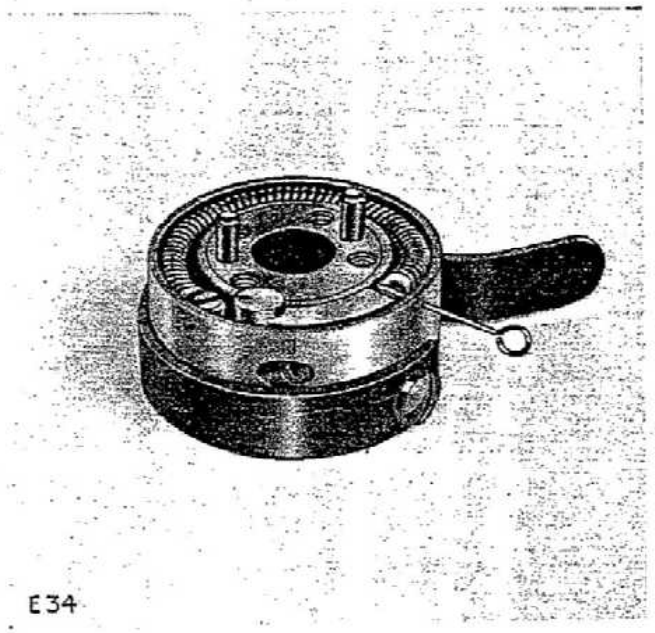


4. Insert a piece of wire of just an easy fit in the small hole in the periphery of the external scroll. Replace pads in the end of the opening spring. Place spring in the groove by putting one end against the wire and the other against the screw; now press the centre part into groove.



E33

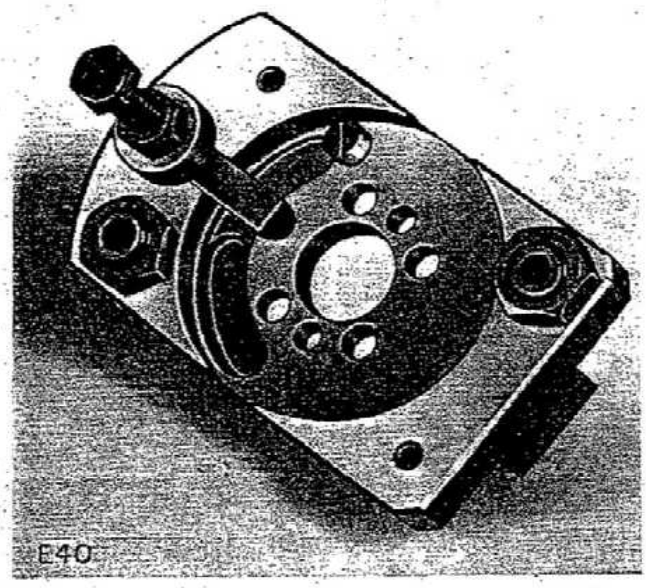
3. Replace the detent tooth in the groove of the external scroll, adjusting it as far as possible towards the opening spring screw. Lock securely by means of the two adjusting screws.



E34

5. Place the body in the external scroll with the number on the back face of the body diametrically opposite the tooth.

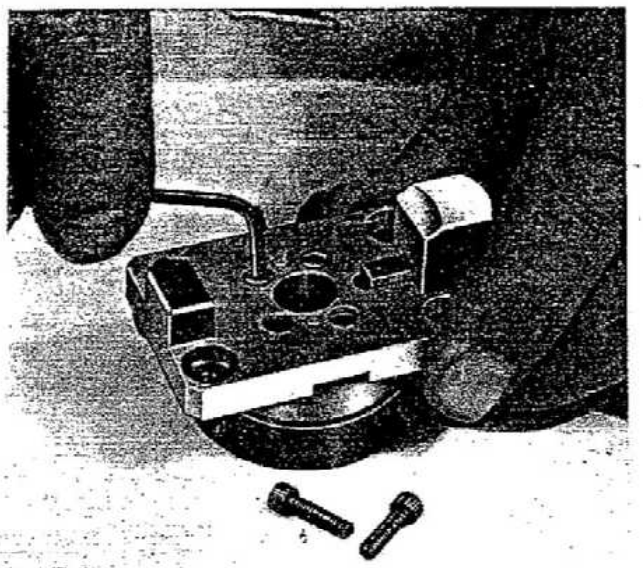
Re-assembling Style X.T. Dieheads *(contd.)*



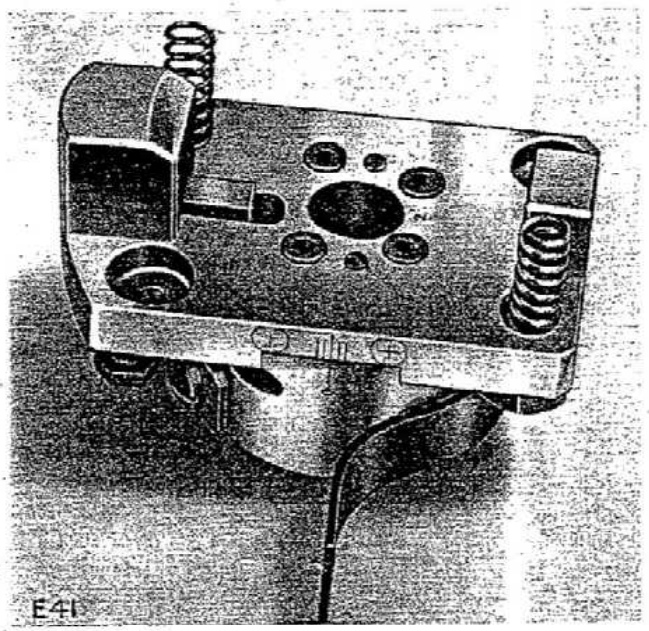
6. Replace the cushion spring screws and locknuts and the plunger with its spring in the backplate.

7. Replace the backplate on the body, engaging the body pins with the holes in the backplate. Ensure that the number on the backplate is over the number on the back face of the body.

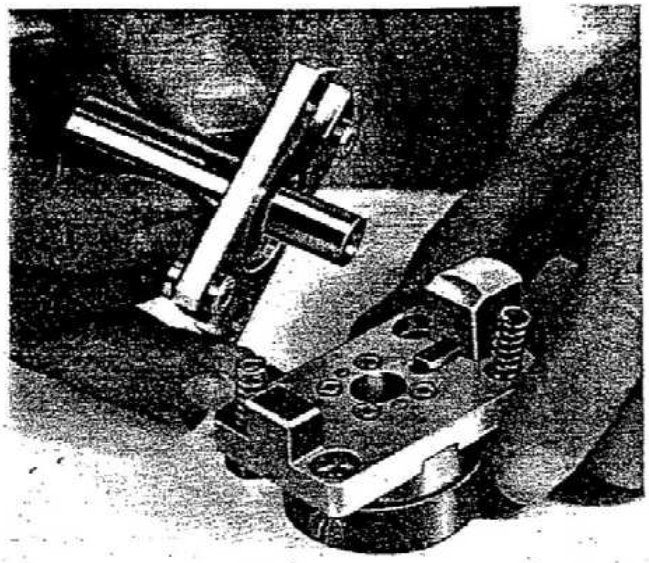
Whilst holding the body with the external scroll in the left hand, bring the opening spring screw in the backplate into the space between the wire and the end of the tooth. Withdraw the wire.



8. Replace and tighten the backplate screws.

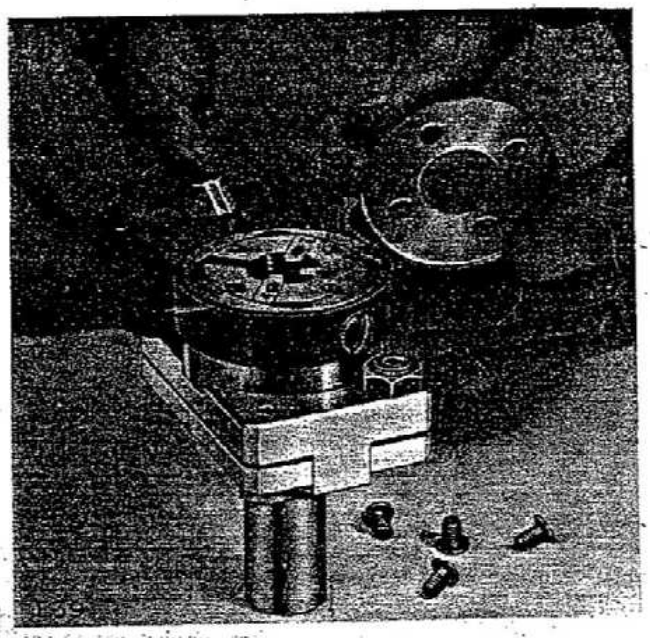


9. Place the cushion springs in place on their screws.

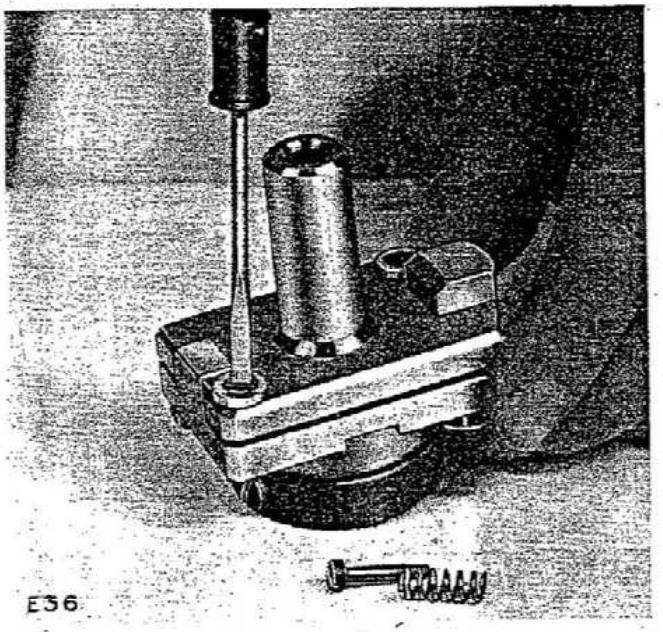


E32

10. Replace the shank.



12. Replace the dies and front plate. Adjust the diehead to the zero position, fixing the screws tightly.



E36

11. Replace and tighten the draw out springs and screws.

The Diehead is now completely re-assembled and ready for use.

CAPACITIES OF COVENTRY DIEHEADS

	Style C.H.S.								Style X.T. & X.T.2.		
SIZE OF DIEHEAD	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	¼"	⅝"	½"
Max. Capacity — inches	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	¼"	⅝"	½"
„ „ mm.	6	9	13	20	26	33	39	52	6	8	13
„ „ B.S.P.	—	—	¼"	½"	¾"	1"	1"	*1¾"	—	—	¼"
Min. „	12BA	6BA	6BA	2BA	0BA	¼"	⅜"	½"	12BA	10BA	6BA
Oversize fine threads which can be screwed — inches	⅜	½	11/16	1	1⅜	1⅝	1 15/16	2½	⅜	7/16	11/16
mm.	9·5	12·5	17	25·4	35	41	49	64	9·5	11	17
‡B.S.P.	—	¼"	⅜"	⅝"	1"	1¼"	1½"	2"	—	⅛"	⅜"
Max. length ins.	5/16	7/16	½	¾	⅞	15/16	1⅛	1⅞	5/16	⅜	½
„ „ mm.	8	11	12·5	19	22	24	29	48	8	9·5	12·5
When dieheads are fitted with Detent Withdrawing Lever or Detent Withdrawing Sleeve the above lengths are increased to the following:—											
Max. length ins.	17/32	1 1/16	1 3/16	1⅝	1⅞	2¼	2½	1⅞	—	—	—
„ „ mm.	13·5	27	30	41	48	57	63	48	—	—	—
Weight minus dies	10 oz.	1lb.6oz.	2½lb.	6¼lb.	9¼lb.	18lb.	25lb.	50lb.	14oz.	1lb. 10oz.	3lb. 2oz.
† When dieheads are fitted with special shanks smaller in diameter than standard the maximum length that the largest diameter can be screwed is:—	15/16"	1⅜"	1½"	2"	2 5/16"	2 11/16"	3"	4⅜"	15/16"	1⅛"	1½"
† When dieheads are fitted with Detent Withdrawing Levers or Detent Withdrawing Sleeves the above lengths are reduced to:—	⅝"	⅞"	1"	1 5/16"	1½"	1 13/16"	2"	4"	—	—	—

	Style C.H.									Fine Thread Style C.	
SIZE OF DIEHEAD	¼"	5/16"	½"	¾"	1"	1¼"	1½"	2"	3"	4½"	2½"	**3½"
Capacity — Max.	¼"	5/16"	½"	¾"	1"	1¼"	1½"	2"	3"	4½"	2½"	3½"
„ mm.	6	8	13	20	26	33	39	52	76	114	63	89
„ B.S.P.	—	—	¼"	½"	¾"	1"	1"	*1¾"	2½"	4"	2"	3"
Minimum diameter screwed	12BA	10BA	6BA	2BA	0BA	¼"	⅜"	½"	¾"	1½"	1⅜"	2½"
Minimum B.S.P. screwed	—	—	—	—	—	—	—	—	—	—	1"	2"
Coarsest pitch — t.p.i.	—	—	—	—	—	—	—	—	—	—	11	11
Coarsest pitch (pitch in mm.)	—	—	—	—	—	—	—	—	—	—	2·25	2·25
Maximum length screwed	1"	—	—	—	—	—	—	—	—	—	†2½"	†2⅝"
Weight minus dies	10oz.	1lb.2oz.	3¼lb.	8¼lb.	12lb.	18¾lb.	23lb.	45lb.	77lb.	160lb.	22½lb.	31½lb.
Average weight per set of dies for C.H., C.H.S. and X.T. dieheads	½oz.	1½oz.	¶3oz.	7oz.	9½oz.	14oz.	1lb.	3lb.1oz.	5½lb.	12lb.	7oz.	14oz.
When the diehead body is specially bored out, fine threads can be cut up to the following:— (Style C.H. only).												
Diameter	—	⅜"	11/16"	1 1/16"	1⅜"	1 11/16"	2"	2⅝"	3½"	5½"	—	—
Diameter — mm.	—	—	17	26	35	42	50	67	89	140	—	—
Length	—	11/16"	¾"	1⅛"	1¼"	1½"	1⅝"	1⅝"	2"	2⅝"	—	—
Length — mm.	—	—	19	28	32	38	42	42	51	66	—	—
‡Diameter — B.S.P.	—	—	⅜"	¾"	1"	1¼"	1½"	2¼"	3"	5"	—	—
†When the diehead is fitted with special shank smaller in diameter than standard the maximum length that the largest diameter can be screwed is	—	1¼"	2 1/16"	2¾"	3"	3½"	3¾"	4⅜"	5"	—	—	—

NOTES:—

* The 1¾" British Standard Pipe Thread can be screwed up to 1⅜" long only for C.H. and 1¼" for C.H.S., but the 1¾" Whitworth Gas Thread can be screwed any length.

† A flanged adaptor, Fig. 10, having a bore equal to that of the diehead can often be used instead of a small diameter shank thus allowing the maximum diameter thread to pass right through.

** All sizes have four dies per set, with the exception of the 3½" Fine Thread Diehead, which has six.

‡ On Brass only.

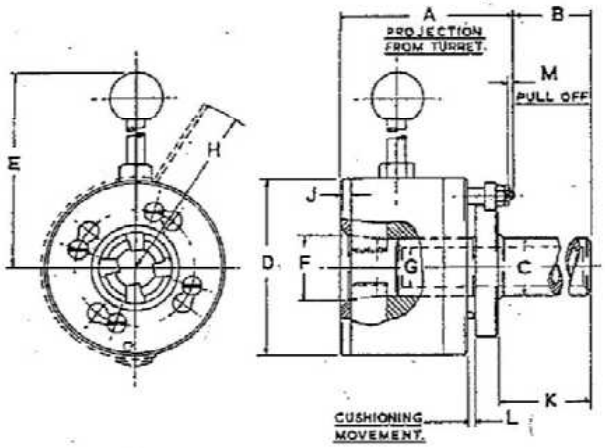
¶ Also for ⅜" C.H.S. Diehead.

HERBERT SOLID ADJUSTABLE DIEHEADS

SIZE OF DIEHEAD	¼"	⅜"	¾"	1"	1¼"	1½"	2"	2½" F.T.
Max. capacity—ins.	¼"	⅜"	¾"	1"	1¼"	1½"	2"	2½"
„ „ mm.	6	13	19	25	32	38	50	63
„ „ B.S.P.	—	¼"	⅜"	⅝"	⅞"	1"	1½"	2"
Min. capacity	10 B.A.	6 B.A.	2 B.A.	0 B.A.	¼"	⅜"	½"	1⅜"

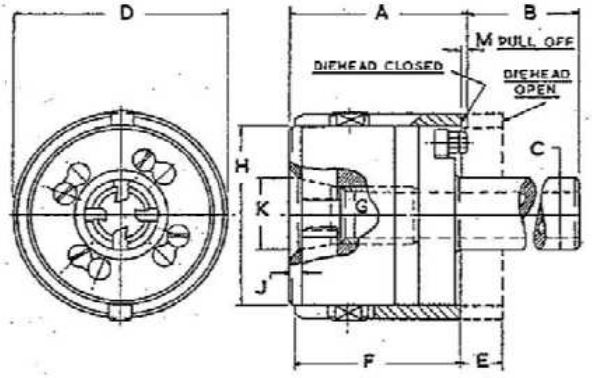
Note. Solid adjustable Dieheads are not suitable for threads larger than the nominal size of each diehead.

DIMENSIONS OF COVENTRY TYPE C.H.S. DIEHEADS



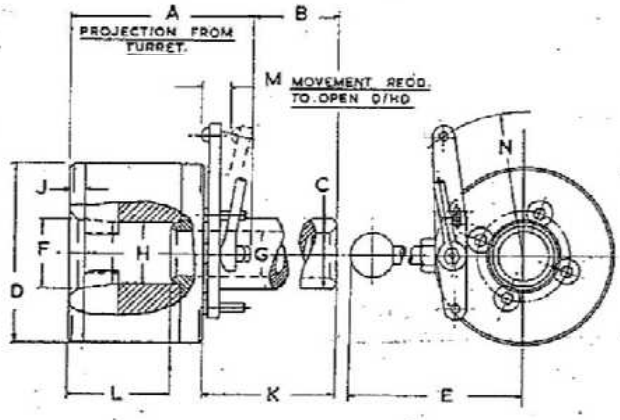
Size of Diehead	A	B	C	D	E	F	G	H	J	K	L	M
1/4"	1 1/2"	1 1/2"	5/8"	1 1/2"	1 3/4"	9/16"	5/16"	1 3/4"	3/32"	1 9/16"	3/32"	3/64"
3/8"	2 5/32"	1 1/2"	3/4"	2"	2 5/16"	23/32"	15/32"	2 1/4"	9/64"	1 5/8"	1/8"	1/16"
1/2"	2 7/16"	1 7/8"	1"	2 1/2"	2 3/4"	29/32"	5/8"	2 1/2"	5/32"	2 1/32"	1/8"	5/64"
3/4"	3 1/8"	2 1/2"	1 1/2"	3 7/16"	3 21/32"	1 11/32"	7/8"	3"	3/16"	2 23/32"	5/32"	3/32"
1"	3 3/4"	2 7/8"	1 3/4"	4"	4 1/2"	1 3/4"	1 3/16"	—	1/4"	3 1/8"	5/16"	7/64"
1 1/4"	4 3/16"	3 13/16"	2 1/8"	4 5/8"	5 5/16"	2 1/32"	1 3/8"	—	1/4"	4 1/16"	3/16"	1/8"
1 1/2"	4 5/8"	4 1/8"	2 1/2"	5 1/16"	5 1/2"	2 1/4"	1 5/8"	—	1/4"	4 3/8"	1/4"	1/8"
2"	6 1/4"	4 23/32"	3 1/4"	6 7/8"	7 15/16"	3 1/8"	2 1/8"	—	5/16"	4 11/16"	7/16"	5/32"

DIMENSIONS OF COVENTRY TYPE C.H.S. ROTATING DIEHEADS



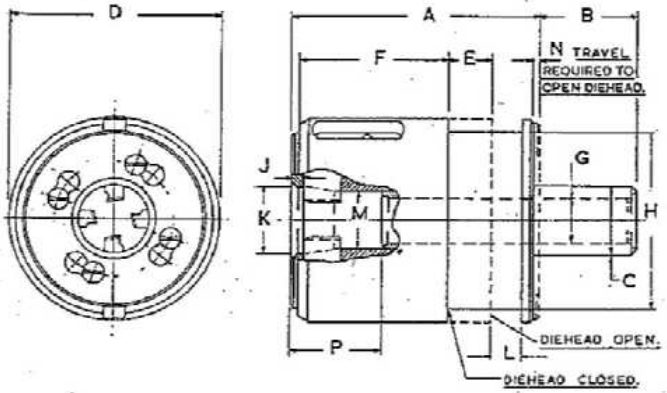
Size of Diehead	A	B	C	D	E	F	G	H	J	K	M
1/4"	1 1/2"	1 1/2"	5/8"	1 11/16"	3/8"	1 17/32"	5/16"	1 1/2"	3/32"	9/16"	3/64"
3/8"	2 9/64"	1 27/64"	3/4"	2 1/4"	13/32"	1 29/32"	15/32"	2"	9/64"	23/32"	1/16"
1/2"	2 27/64"	1 59/64"	1"	2 7/8"	9/16"	2 21/64"	5/8"	2 1/2"	5/32"	29/32"	5/64"
3/4"	3 1/8"	2 1/2"	1 1/2"	3 7/8"	13/16"	3 3/32"	7/8"	3 7/16"	3/16"	1 11/32"	3/32"

DIMENSIONS OF COVENTRY TYPE C.H.S. STATIONARY DIEHEADS WITH DETENT WITHDRAWING LEVER



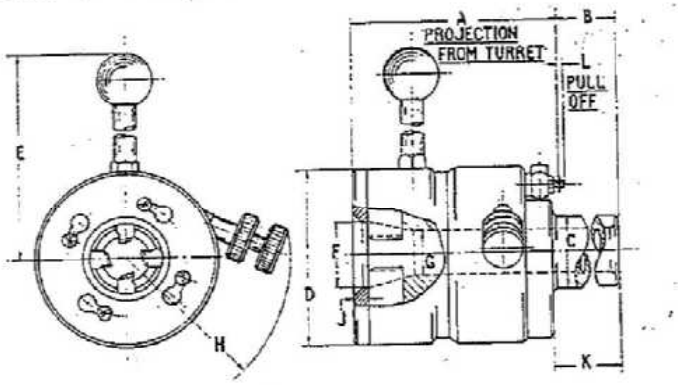
Size of Diehead	A	B	C	D	E	F	G	H	J	K	L	M	N
1/4"	1 1/2"	1 7/32"	5/8"	1 1/2"	1 3/4"	9/16"	5/16"	7/16"	3/32"	1 5/8"	21/32"	5/32"	1 7/16"
3/8"	2 1/8"	1 3/8"	3/4"	2"	2 5/16"	23/32"	15/32"	19/32"	9/64"	1 7/8"	1 1/4"	13/64"	1 13/16"
1/2"	2 21/64"	1 47/64"	1"	2 1/2"	2 3/4"	29/32"	5/8"	13/16"	5/32"	2 1/4"	1 3/8"	1/4"	1 15/16"
3/4"	3 1/8"	2 5/8"	1 1/2"	3 7/16"	3 21/32"	1 11/32"	7/8"	1 1/8"	3/16"	3 3/8"	1 7/8"	5/16"	2 13/16"
1"	3 43/64"	2 59/64"	1 3/4"	4"	4 1/2"	1 3/4"	1 1/16"	1 1/2"	1/4"	3 3/4"	2 3/16"	11/32"	3 1/4"
1 1/4"	4 3/16"	3 15/16"	2 1/8"	4 5/8"	5 5/16"	2 1/32"	1 3/8"	1 3/4"	1/2"	4 3/4"	2 7/16"	25/64"	3 5/16"
1 1/2"	4 5/8"	4 1/8"	2 1/2"	5 1/16"	5 1/2"	2 1/4"	1 5/8"	2 1/16"	1/4"	5 3/16"	2 13/16"	3/8"	3 5/8"
2"	5 21/32"	4 19/32"	3 1/4"	6 7/8"	7 1/4"	3 1/8"	2 1/8"	2 5/8"	1/4"	4 11/16"	2 1/16"	3/8"	3 7/8"

DIMENSIONS OF COVENTRY TYPE C.H.S. ROTATING DIEHEADS WITH DETENT WITHDRAW SLEEVE



Size of Diehead	A	B	C	D	E	F	G	H	J	K	L	M	N	P
1/4"	2 1/64"	1 29/64"	5/8"	1 11/16"	3/8"	1 5/16"	5/16"	1 1/2"	3/32"	9/16"	3/16"	7/16"	3/64"	21/32"
3/8"	2 49/64"	1 23/64"	3/4"	2 1/4"	13/32"	1 5/8"	15/32"	2"	9/64"	23/32"	1/4"	19/32"	1/16"	1 1/4"
1/2"	3 27/64"	1 21/64"	1"	2 7/8"	9/16"	2 3/32"	5/8"	2 1/2"	5/32"	29/32"	3/8"	13/16"	5/64"	1 3/8"
3/4"	4 19/32"	1 29/32"	1 1/2"	3 7/8"	13/16"	2 27/32"	7/8"	3 7/16"	5/16"	1 11/32"	1/2"	1 1/8"	3/32"	1 7/8"

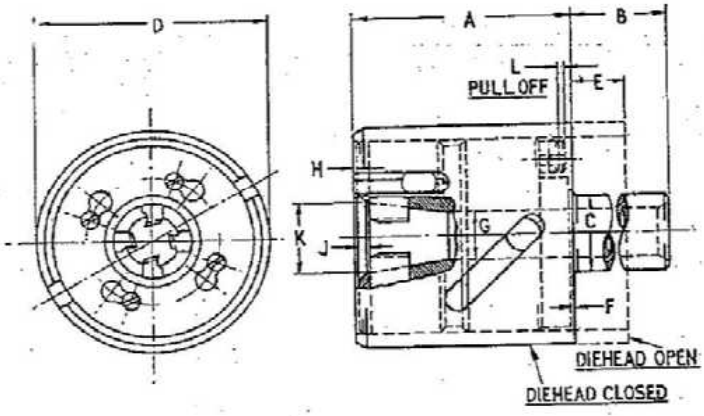
DIMENSIONS OF COVENTRY TYPE C.H. DIEHEADS



Size of Diehead	A	B	C	D	E	F	G	H	J	K	L
¼"	1 9/16"	1½"	†5/8"	1 5/8"	2 1/8"	9/16"	3/8" x 1 1/16" deep	—	3/32"	1 9/16"	3/64"
5/16"	1 15/16"	1 19/32"	3/4"	1 3/4"	2 1/4"	9/16"	3/8"	1 5/8"	7/64"	1 19/32"	3/64"
3"	6½"	4 7/32"	5"	8 5/8"	9"	4 1/8"	3 1/8"	6"	5/16"	4 1/8"	3/16"
4½"	11 9/16" overall including Adaptor		5½" dia spigot*	11½"	11 1/8"	5 7/8"	4 3/4"	11"	3/8"	—	7/32"
2½" Fine Thread	4 3/16"	3 5/32"	1 3/4"	5 9/16"	5 9/16"	3"	2 11/16" x 2 7/8" deep	4 1/4"	¼"	3 3/16"	7/64"
3½" Fine Thread	4 3/8"	3 27/32"	2 1/8"	6 7/8"	6 11/16"	4 1/8"	3 11/16" x 3" deep	4 7/8"	5/16"	3 15/16"	⅛"

†The ¼" C.H. Diehead has a spring holder shank as standard.
*The 4½" C.H. Diehead has a flanged adaptor as standard having four 5/8" clearance holes spaced 8½" x 5½" for fixing the diehead to machine.

DIMENSIONS OF COVENTRY TYPE C.H. ROTATING DIEHEADS

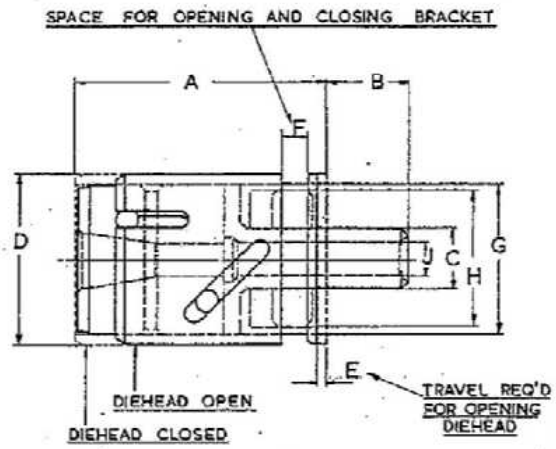


Size of Diehead	A	B	C	D	E	F	G	H	J	K	L
5/16" C.H.	1 15/16"	2 1/4"	3/4"	1 31/32"	½"	1/32"*	3/8"	1/32"	7/64"	9/16"	3/64"
1" C.H.	3 7/8"	3 7/32"	1 3/4"	4 5/8"	1"	3/32"*	1 3/16"	Nil	¼"	1 5/8"	⅛"
1¼"C.H.	4½"	4 1/16"	2 1/8"	5 7/32"	1 5/16"	Nil	1 7/16"	1/16"	¼"	2"	⅛"
1½"C.H.	4 27/32"	4 5/32"	2½"	5 7/8"	1 11/32"	5/32"	1 11/16"	Nil	¼"	2 1/4"	⅛"
2" C.H.	5 15/16"	4 5/8"	3 1/4"	7 3/4"	1 11/16"	5/16"	2 1/8"	Nil	5/16"	3 1/8"	5/32"
2½" Fine Thread	4½"	2 15/16"	1 3/4"	6 1/4"	1"	¼"	2 11/16" x 2 7/8" deep	⅛"	¼"	3"	7/64"
3½" Fine Thread	4½"	3 5/8"	2 1/8"	7 3/4"	1"	⅛"	3 11/16" x 3" deep	3/32"	5/16"	4 1/8"	⅛"

*Denotes the amount by which the shank flange protrudes beyond the end of the closing sleeve.

Alfred Herbert Ltd., Coventry, England

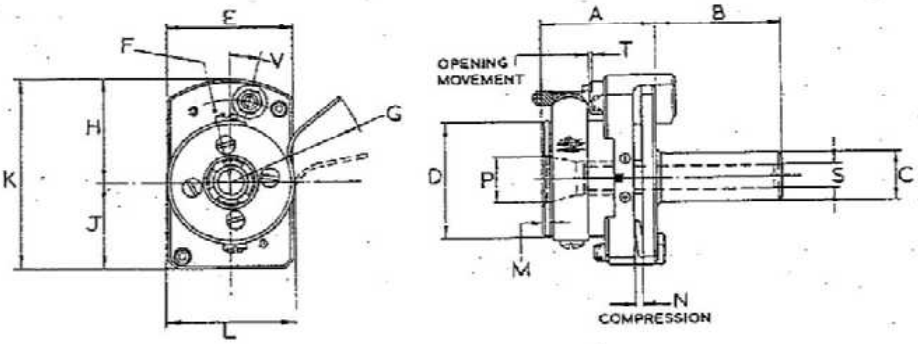
DIMENSIONS OF COVENTRY TYPE C.H. DIEHEADS WITH DETENT PIN WITHDRAWING SLEEVE



Size of Diehead	A	B	C	D	E	F	G	H	J
5/16"	3 1/32"	1 11/32"*	·7495	1 21/32"	3/64"	3/8"	1 3/4"	1 1/2"	9/8"
1"	5 13/16"	2 27/32"*	1·7495	4 5/8"	1/16"	1/2"	4"	3 5/8"	1 3/16"
1 1/4"	6 19/32"	3 3/4"*	2·1245	5 7/32"	1/8"	1/2"	4 5/8"	4 1/4"	1 7/16"
1 1/2"	6 31/32"	4 7/32"*	2·4995	5 7/8"	1/8"	1/2"	5 1/16"	4 11/16"	1 11/16"
2"	8 21/32"	4 9/16"*	3·2495	7 3/4"	5/32"	5/8"	6 3/8"	5 15/16"	2 1/8"
2 1/2" Fine Thread	6 1/4"	3"*	1·7495	6 1/4"	7/64"	1/2"	5 9/16"	5 3/16"	2 11/16"
3 1/2" Fine Thread	7 5/32"	3 7/16"*	2·1245	7 3/4"	1/8"	21/32"	6 7/8"	6 3/8"	3 11/16"

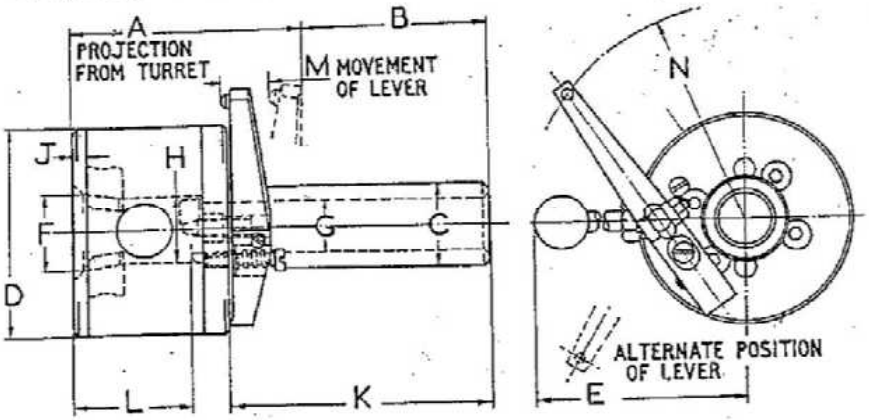
*May be altered to suit requirements.

DIMENSIONS OF COVENTRY STYLE X.T.2 DIEHEADS



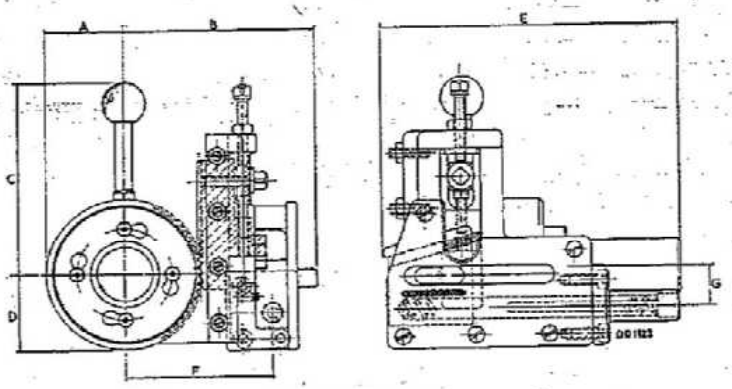
Size of Diehead	A	B	C	D	E	F	G	H	J	K	L	M	N	P	S	T	V
1/4"	1 7/16"	1 9/16"	5/8"	1 1/2"	1 9/16"	1 1/16"	1 3/4"	1 11/32"	1 3/32"	2 7/16"	1 5/8"	3/32"	3/32"	9/16"	5/16"	3/64"	13°
5/16"	1 57/64"	1 3/4"	3/4"	1 3/4"	1 13/16"	1 3/16"	2 1/8"	1 1/2"	1 5/16"	2 25/32"	1 7/8"	1/64"	1/8"	19/32"	3/8"	3/64"	14°
1/2"	2 1/4"	2"	1"	2 1/2"	2 1/2"	1 21/32"	2 1/2"	1 31/32"	1 25/32"	3 3/4"	2 5/8"	5/32"	1/8"	29/32"	5/8"	3/32"	7°

DIMENSIONS OF 'JUNIOR' TAPER THREADING DIEHEADS



Size of Diehead	A	B	C	D	E	F	G	H	J	K	L	M	N
½"	2 21/32"	1 13/32"	1"	2½"	2¾"	29/32"	5/8"	13/16"	5/32"	2¼"	1⅜"	19/32"	2 13/32"
¾"	3 13/32"	2 11/32"	1½"	3 7/16"	3 21/32"	1 11/32"	⅞"	1⅛"	3/16"	3⅜"	1⅞"	23/32"	3 3/32"
1"	4"	2 19/32"	1¾"	4"	4½"	1¾"	1 3/16"	1½"	¼"	3¾"	2 3/16"	27/32"	3 23/32"
1¼"	4⅝"	3½"	2⅛"	4⅝"	5 5/16"	2 1/32"	1⅜"	1¾"	¼"	4¾"	2 9/16"	31/32"	4¼"
1½"	4 31/32"	3 25/32"	2½"	5 1/16"	5½"	2¼"	1⅝"	2 7/16"	¼"	5 5/16"	2 13/16"	1 3/32"	4½"
2½" Fine Thread	6"	1 13/32"	1¾"	5 9/16"	5 9/16"	3"	—	2 11/16"	¼"	3 13/16"	3⅛"	1 29/64"	5 7/16"
3½" Fine Thread	6 25/64"	2⅛"	2⅛"	6⅞"	6 11/16"	4⅛"	—	3 11/16"	5/16"	3 15/16"	3 15/16"	1½"	6 13/32"

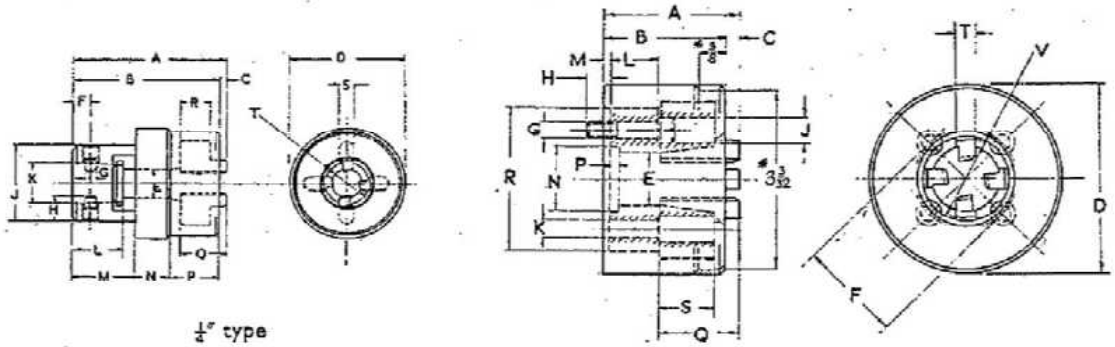
DIMENSIONS OF STANDARD TAPER THREADING DIEHEADS



STANDARD TAPER THREADING DIEHEADS

Size of Diehead	A	B	C	D	E	F	G	Dia. of Shank	Max length of Taper
½" CH.	1 11/32"	3 5/16"	3 15/32"	1 13/32"	5 3/16"	2 17/32"	23/32"	1"	1½"
¾" CH.	1⅞"	4 3/16"	4 5/32"	1⅞"	6 19/32"	3 9/32"	1"	1½"	1¾"
1" CH.	2 3/16"	4 9/16"	5"	2 3/16"	7 9/32"	3⅝"	1 9/32"	1¾"	2"
1¼" CH.	2½"	4 29/32"	5 23/32"	2½"	8¾"	3 31/32"	1 19/32"	2⅛"	2¼"
1½" CH.	2¾"	5 11/32"	6"	2¾"	9 7/16"	4⅜"	1 21/32"	2½"	2¾"
2" CH.	3 21/32"	6 19/32"	8⅛"	3 21/32"	10 25/32"	5 13/32"	2⅜"	3¼"	3¼"
3" CH.	4 9/16"	7 13/16"	9 5/16"	4 9/16"	11⅞"	6 17/32"	2 7/16"	5"	4"
2½" FT.	2 61/64"	5⅜"	5 27/32"	2 61/64"	7¾"	4 7/16"	2 1/16"	1¾"	2¼"
3½" FT.	3 13/16"	6½"	7 1/32"	3 13/16"	8¾"	5 9/16"	2 7/32"	2⅛"	2½"

DIMENSIONS OF HERBERT SOLID ADJUSTABLE DIEHEADS



¼" type

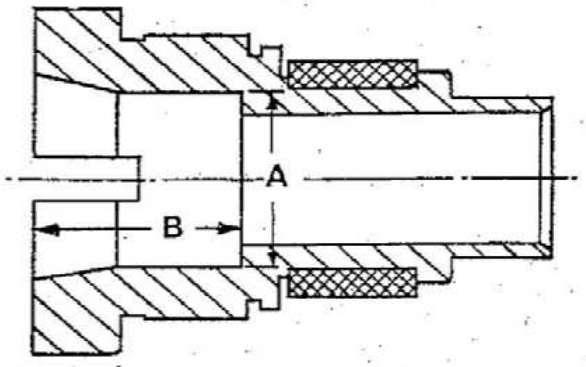
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
¼ Index Type	1⅝	1 17/32	3/32	1 3/16	5/16	3/16	1/8	9/32	13/16	12 mm Taper 4° Inc.	½	21/32	11/32	17/32	½	5/16	5/32
¼ Petermann Type	1⅝	1 17/32	3/32	1 3/16	8 mm	3/16	1/8	3/8	13/16	8 mm Parallel	—	21/32	11/32	17/32	½	5/16	5/32

Size of Diehead	Capacity	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
½	6BA—½	1 13/32	1 9/32	1/8	2⅛	11/16	1⅛	2BA	3/16	19/64	·195	27/64	5/64	11/10	—	13/16	1⅝	½	¼	31/32
¾	2BA—¾	1 31/32	1¾	7/32	2 13/16	13/16	1 15/32	¼BSF	5/16	25/64	·260	11/16	3/32	1	5/32	1⅛	2⅛	¾	5/16	1⅛
1	2BA—1	2 7/16	2 3/16	¼	3¼	1 1/16	1 11/16	5/16BSF	5/16	29/64	·323	⅞	⅛	1¼	5/32	1 5/16	2½	⅞	⅜	1 15/32
1¼	¼—1¼	2 25/32	2½	9/32	3½	1 5/16	1⅞	5/16BSF	5/16	29/64	·323	1	5/32	1½	5/32	1½	2 11/16	1	7/16	1 13/16
1½	⅜—1½	2 31/32	2 11/16	9/32	3 15/16	1 9/16	2 3/16	5/16BSF	½	29/64	·323	1	5/32	1¾	5/32	1 11/16	3 1/16	1⅛	½	2⅛
2	½—2	3 31/32	3⅜	9/32	5	2 1/16	2 13/16	⅜BSF	9/16	33/64	25/64	1 5/16	7/32	2 5/16	5/32	2⅛	4	1½	5/8	2 27/32
2½	1⅜—2½	2½	2⅜	⅛	5 5/16	2 11/16	3½	4 Tapped Holes in Body ⅜" B.S.F. × ⅞" Deep.					Nil	2 11/16	Nil	1⅛	4¼	¾	5/16	3

BORED-OUT DIEHEADS STYLE C.H. ONLY

C.H. Dieheads except the ¼" size can be bored-out to accommodate a diameter larger than nominal capacity, of short length and fine thread. The maximum recommended dimensions are shown below. It would be necessary to grind out the hardened bodies and we do not recommend this on account of the release of internal stresses. They should be bored-out before hardening.

Size of Diehead	A	B	Size of Diehead	A	B
5/16"	9/16"	¾"	1½"	2 3/16"	2⅛"
11/32"	13/16"	1"	2"	2 7/8"	2 1/4"
⅜"	1 3/16"	1⅛"	3"	3¾"	2 9/16"
¾"	1 9/16"	1 5/8"	4½"	5¾"	3¼"
1"	1 7/8"	1⅞"			
1¼"					



For oversize threads produced with Styles C.H., C.H.S. and X.T.2 Dieheads, see page 72.

SELF-OPENING DIEHEADS ON HERBERT CAPSTAN AND MONOSLIDE LATHES

Machine	Clearance over Turret Slide	Diameter of Turret Hole	Diehead Size.	Diameter of Shank		Fitting
				Standard	Special	
No. 0 Caps.	1⅜"	¾"	5/16" ⅜" ½"	¾" ¾" 1"	¾" x 2 27/32" long ¾" x 2¾" long ¾"	Direct with Special Shank Fitted with Auto Die-Closer
No. 1 Caps. (with 5⅝" centres)	1 15/16"	1"	½" ¾"	1" 1½"	1" x 3½" long 1" x 3" long	Direct with Special Shank
Nos. 1, 1S and 1SO (with 5" centres)	1 3/16"	1"	½"	1"	1" x 3½" long	Direct with Special Shank
Nos. 2D, 2S and No. 3 (New Type) with 6½" centres)	2 27/32"	1"	½" ¾" 1" 1¼" 1½" 2½"*	1" 1½" 1¾" 2⅛" 2½" 1¾"	— 1" 1½" 1½" 1½" 1½"	Direct or 1" Boring Bar Holder Special Shank, direct or 1" Boring Bar Holder or Standard Shank and 1½" Boring Bar Holder. Special Shank and 1½" Boring Bar Holder, or Flanged Adaptor†.
No. 2D Caps. with Auto-Robot Control	2 27/32"	1"	½" ¾" 1" 1¼"	1" 1½" 1¾" 2⅛"	— 1" 1½" 1½"	Direct or 1" Boring Bar Holder Fitted with Auto Die-Closer. Special Shank, direct or 1" Boring Bar Holder, or Standard Shank and 1½" Boring Bar Holder Fitted with Auto Die-Closer. Special Shank and 1½" Boring Bar Holder Fitted with Auto Die-Closer.
Nos. 2, 2S, 2SC, 2B and 2D (with 5½" centres)	1 27/32"	1"	½" ¾" 1" 1", 1¼", 1½" and 2½"*	1" 1½" 1¾" Minus Shanks	— 1" 1¾" with Keyway Plate Adaptor	Direct or 1" Boring Bar Holder. Special Shank Direct or 1" Boring Bar Holder, or Standard Shank and 1½" Boring Bar Holder. Hand-operated Elevating Holder. Cam-operated Elevating Holder.
Nos. 3, 4 and 4C	2 3/32"	1½"	½" ¾" ¾" 1" 1¼", 1½" and 2½"* 1¼", 1½" and 2½"*	1" 1½" 1¾" — Minus Shanks	— — 1½" 2⅛" with Keyway Plate Adaptors	With Bush, direct or 1½" Boring Bar Holder. Direct, or 1½" Boring Bar Holder. Special Shank, direct or 1½" Boring Bar Holder, or Standard Shank and 1¾" Boring Bar Holder, or Flanged Adaptor†. Hand-operated Elevating Holder. Cam-operated Elevating Holder.

†See 'Flanged Adaptors' Page 9.
*The 2½" and 3½" Dieheads are for fine threads only.

SELF-OPENING DIEHEADS ON HERBERT CAPSTAN AND MONOSLIDE LATHES *(contd.)*

Machine	Clearance over Turret Slide	Diameter of Turret Hole	Diehead Size	Diameter of Shank		Fitting
				Standard	Special	
No. 4 Senior and No. 4 S.E. (with 7¾" centres) No. 4 Senior Monoslide	3 1/32"	1½"	½"	1"	—	With Bush, direct or 1½" Boring Bar Holder.
			¾"	1½"	—	Direct or 1½" Boring Bar Holder.
			1"	1¾"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Standard Shank and 1¾" Boring Bar Holder, or Flanged Adaptor†.
			1¼"	2⅛"	1½" 1¾"	Special Shank direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder, or Standard Shank and 2⅛" Boring Bar Holder, or Flanged Adaptor†.
			1½"	2½"	1½" 1¾" 2⅛"	Special Shank direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder, or Special Shank and 2⅛" Boring Bar Holder, or Flanged Adaptor†.
			2½"	1¾"	1½"	Special Shank direct or 1½" Boring Bar Holder or Standard Shank and 1¾" Boring Bar Holder, or Flanged Adaptor†.
No. 4 Sen. and Nos. 5A, 5B and 5E (with 7⅛" centres)	2 13/32"	1½"	½"	1"	—	With Bush, direct or 1½" Boring Bar Holder.
			¾"	1½"	—	Direct, or 1½" Boring Bar Holder.
			1"	1¾"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Standard Shank and 1¾" Boring Bar Holder, or Flanged Adaptor†.
			1¼"	2⅛"	1½" 1¾"	Special Shank, direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder, or Standard Shank and 2⅛" Boring Bar Holder, or Flanged Adaptor†.
			1½" and 2½"*	—	2⅛" with Keyway Plate Adaptor	Hand-operated Elevating Holder.
			1½" and 2½"*	Minus Shanks		Cam-operated Elevating Holder.
No. 5 Sen. and No. 5 Sen. Monoslide	3 15/32"	2⅝"	1"	1¾"	—	With Bush, direct or 2⅛" Boring Bar Holder,
			2½"*	1¾"	—	
			1¼"	2⅛"	—	Direct with Bush, or 2⅛" Boring Bar Holder.
			3 1/32"*	2⅛"	—	
			1½"	2½"	2⅛"	Special Shank, direct with Bush or 2⅛" Boring Bar Holder, or Flanged Adaptor†.
			2"	3¼"	2⅝" 2⅛"	Special Shank direct, or Special Shank and 2⅛" Boring Bar Holder, or Flanged Adaptor†.
No. 2 Programauto Lathe	3"	1½"	½"	1"	—	With Bush and 1½" Boring Bar Holder Fitted with Auto Die-Closer.
			¾"	1½"	—	Direct or 1½" Boring Bar Holder Fitted with Auto Die-Closer.
			1"	1¾"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Standard Shank and 1¾" Boring Bar Holder Fitted with Auto Die-Closer.
			1¼"	2⅛"	1½" 1¾"	Special Shank, direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder, or Standard Shank and 2⅛" Boring Bar Holder. Fitted with Auto Die-Closer.
			1½"	2½"	1½" 1¾" 2⅛"	Special Shank, direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder, or Special Shank and 2⅛" Boring Bar Holder Fitted with Auto Die-Closer.
			2½"*	1¾"	1½"	Special Shank direct or 1½" Boring Bar Holder, or Standard Shank and 1¾" Boring Bar Holder Fitted with Auto Die-Closer.

†See 'Flanged Adaptors' Page 18.
*The 2½" and 3½" Dieheads are for fine threads only.

SELF-OPENING AND SOLID ADJUSTABLE DIEHEADS ON HERBERT FLASHCAP LATHES

Machine	Clearance over Turret Slide	Dia. of Turret Hole	Diehead Size	Diameter of Shank		Fitting
				Standard	Special	
No. 2 Flashcap	$2\frac{27}{32}$"	1"	½" C.H.S.	1"	—	Direct or 1" Boring Bar Holder.
			¾" C.H.S.	1½"	1"	Special Shank, direct or 1" Boring Bar Holder, or Std. Shank and 1½" Boring Bar Holder.
			1" C.H.S.	1¾"	1½"	Special Shank and 1½" Boring Bar Holder.
			1¼" C.H.S.	2⅛"	1½"	
			½" S.A.	—	1"	Special Shank, direct or 1" Boring Bar Holder.
			¾" S.A.	—	1"	
			1" S.A.	—	1"	
			1¼" S.A.	—		With Special Two-diameter Shank and Shank Holder.
			1½" S.A.	—		
			2½" S.A.*	—		
No. 2 Flashcap (8 Station Turret)	$2\frac{27}{32}$"	1" & 1½"	As Above	—	1" or 1½"	Special Shank Direct
No. 4 Flashcap	$3\frac{9}{16}$"	1½"	½" C.H.S.	1"	—	With Bush, direct or 1½" Boring Bar Holder.
			¾" C.H.S.	1½"	—	Direct or 1½" Boring Bar Holder
			1" C.H.S.	1¾"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Std. Shank and 1¾" Boring Bar Holder.
			1¼" C.H.S.	2⅛"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Special Shank and 1¾" Boring Bar Holder or Std. Shank and 2⅛" Boring Bar Holder.
					1¾"	
			1½" C.H.S.	2½"	1½"	Special Shank, direct or 1½" Boring Bar Holder or Special Shank and 1¾" Boring Bar Holder, or Special Shank and 2⅛" Boring Bar Holder.
					1¾"	
					2⅛"	
			2½" C.H.S.*	1¾"	1½"	Special Shank, direct or 1½" Boring Bar Holder, or Std. Shank and 1¾" Boring Bar Holder.
			½" S.A.	—	1"	Special Shank, with Bush, direct or 1½" Boring Bar Holder.
			¾" S.A.	—	1½"	Special Shank, direct or 1½" Boring Bar Holder.
			1" S.A.			
			1¼" S.A.			
			1½" S.A.			
			2½" S.A.*			

*The 2½" and 3½" Dieheads are for fine threads only.

NOTE: C.H.S. Dieheads on Herbert Flashcap Lathes require to be fitted with an Auto Die Closer.

SELF-OPENING DIEHEADS ON HERBERT COMBINATION TURRET LATHES

Machine	Diameter of Turret Hole	Diehead Size	Diameter of Shank	Fitting
No. 6 and Universal	2⅛"	1¼"	2⅛"	Holder or Direct
No. 3 and No. 7	3¼"	1¼"	2⅛"	Holder or Bush
Nos. 7 Junior and 7B	2⅛"	1½"	2½"	Holder (Special)
No. 7 Universal	3¼"	1½"	2½"	Holder or Bush
Nos. 7A and 7A Universal	2⅛"	1½"	2½"	Holder or Direct with Special Shank
No. 7 Preoptive	2⅛"	1½"	2½"	Holder or Direct with Special Shank
No. 8	3¼"	2"	3¼"	Holder or Direct
No. 8 Preoptive	3 1/16" Rough Bore	2"	3¼"	Flanged Adaptor
No. 9 and Universal	3¼"	2"	3¼"	Holder or Direct
No. 9A	3¼"	2"	3¼"	Holder or Direct
Nos. 9B and 9B/30	3 5/16" Rough Bore	2"	3¼"	Holder 6" or 9" long
No. 10	3½"	2"	3¼"	Holder or Direct
No. 12	4 13/16"	2"	3¼"	Holder or Bush
No. 15	3¼"	1¼"	2⅛"	Holder or Bush
No. 16	3¼"	2"	3¼"	Holder or Direct
No. 17	3¼"	3"	—	Flanged Holder
No. 20	4¾"	3"	—	Flanged Adaptor
No. 20	4¾"	4½"	With 5½" dia. spigot	Flanged Adaptor
No. 21	4¾"	3"	With 5½" dia. spigot	Flanged Adaptor
No. 21	4¾"	4½"	With 5½" dia. spigot	Flanged Adaptor
No. 22 and No. 22A	5 1/16"	3"	With 6" dia. spigot	Flanged Adaptor
No. 22 and No. 22A	5 1/16"	4½"	With 6" dia. spigot	Flanged Adaptor

SELF-OPENING DIEHEADS ON HERBERT HEXAGON TURRET LATHES

Machine and Capacity	Diameter of Turret Holes	Diehead Size	Diameter of Shank	Fitting
No. 1 1⅝" x 27"	2⅛"	1" 1¼" 1½"	1¾" 2⅛" 2½"	Bush Direct Boring Bar Holder
No. 2 Preoptive 2" x 20"	2⅛"	1" 1¼" 1½"	1¾" 2⅛" 2½"	Bush Direct Boring Bar Holder
No. 11 2" x 30"	2⅛"	1" 1¼" 1½" 2½" F.T.	1⅝" 2⅛" 2½" 1¾"	Bush Direct Flanged Adaptor Bush
No. 3 Preoptive 3" x 38"	3¼"	1½" 2"	2½" 3¼"	Bush Direct or with Boring Bar Holder
No. 13 2¾" x 36"	3¼"	1¼" 1½" 2" 2½" F.T.	2⅛" 2½" 3¼" 1¾"	Bush Bush Direct Bush
No. 9B 4½" x 60"	3 5/16"	1½" 2" 3"	2½" 3¼" 5"	Boring Bar Holder and Bush Boring Bar Holder Flanged Adaptor (Diehead minus Shank)

SELF-OPENING DIEHEADS ON SINGLE-SPINDLE AUTOMATICS

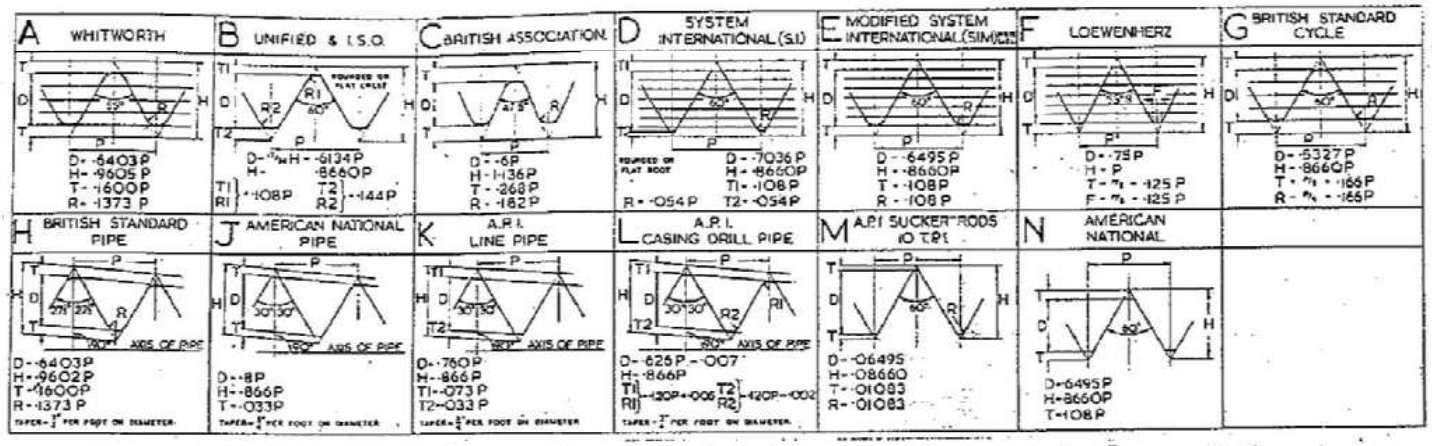
Diehead Size	Diehead Style	Shank Diameter	Shank Length	Machine on which used
1/4"	X.T.2 or C.H.S.	5/8"	1 9/16"	No. 48 3/8" B.S.A. Auto B. & S. Type
5/16"	X.T.2 or *C.H.	5/8"	1 3/4"	No. 48 3/8" B.S.A. Auto B. & S. Type
5/16"	X.T.2 or *C.H.	3/4"	1 3/4"	No. 68 5/8" — 3/4" B.S.A. Auto B. & S. Type
1/2"	X.T.2 or C.H.S.	3/4"	2"	No. 68 5/8" — 3/4" B.S.A. Auto B. & S. Type
1/2"	X.T.2 or C.H.S.	1"	2"	No. 98 1" — 1 1/2" B.S.A. Auto B. & S. Type
3/4"	C.H.S.	1"	2"	No. 168 1" — 1 1/2" B.S.A. Auto B. & S. Type
1/4"	X.T.2 or C.H.S.	5/8"	1 9/16"	No. 00 B. & S. Autos
5/16"	X.T.2 or *C.H.	5/8"	1 3/4"	No. 00 B. & S. Autos
5/16"	X.T.2 or *C.H.	3/4"	1 3/4"	Nos. 0 & 0G B. & S. Autos
1/2"	X.T.2 or C.H.S.	3/4"	2"	Nos. 0 & 0G B. & S. Autos
1/2"	X.T.2 or C.H.S.	1"	2"	Nos. 2 & 2G B. & S. Autos
5/16"	*C.H.	7/8"	4"	3/8" & 9/16" Cleveland Autos
5/16"	*C.H.	1 1/16"	4"	5/8" Cleveland Autos
1/2"	C.H.S.	1 1/16"	4"	5/8" & 7/8" Cleveland Autos
1/2"	C.H.S.	1 1/4"	5 5/8"	7/8" — 1 1/4" & 1 3/8" Type A Cleveland Autos
3/4"	C.H.S.	1 1/4"	3 13/16"	7/8" & 1 1/4" Cleveland Autos
1"	C.H.S.	1 1/4"	3 13/16"	7/8" & 1 1/4" Cleveland Autos
1"	C.H.S.	1 1/2"	5"	2" & 2 1/2" Cleveland Autos
1"	C.H.S.	1 3/4"	5"	2 1/4" Cleveland Auto
1 1/4"	C.H.S.	1 1/2"	5"	2" Cleveland Auto
1 1/4"	C.H.S.	1 3/4"	4 1/2"	2 1/4" Cleveland Auto
1 1/2"	C.H.S.	2 1/4"	6 3/8"	3 1/4" Cleveland Auto
5/16"	X.T.2 or *C.H.	3/4"	1 3/4"	No. 12 Index Auto
5/16"	X.T.2 or *C.H.	3/4"	1 3/4"	Nos. 18 & 25 Index Autos
1/2"	X.T.2 or C.H.S.	1"	2"	No. 24 Index Auto
1/2"	X.T.2 or C.H.S.	22 mm.	2"	No. 24 Index Auto
1/2"	X.T.2 or C.H.S.	1"	2"	No. 36 Index Auto
1/2"	X.T.2 or C.H.S.	1"	2"	No. 52 Index Auto
1/4"	X.T.2 or C.H.S.	5/8"	1 9/16"	No. 8 C.V.A. Auto
5/16"	X.T.2 or C.H.	3/4"	1 3/4"	No. 12 C.V.A. Auto
1/2"	X.T.2 or C.H.S.	3/4"	1 3/4"	No. 12 C.V.A. Auto
3/4"	C.H.S.	1"	2"	No. 20 C.V.A. Auto

* With Spring Shank.

SELF-OPENING DIEHEADS FOR MULTI-SPINDLE AUTOMATICS

Size of Diehead	Machine on which used	Number of Spindles
½"	9/16", ¾" & ⅞" Types F & G Gridley Autos	4
½" and ¾"	1¼" Types F & G Gridley Autos	4
½", ¾" and 1"	1¾" Types F & G Gridley Autos	4
1", 1¼" and 1½"	2¼" Types F & G Gridley Autos	4
½"	No. 60 New Britain Autos	6
1", 1¼", 1½" and 2½" F.T.	Nos. 61 & 65 New Britain Autos	6
½", ¾" and 1"	No. 12A New Britain Autos	4
1", 1¼", 1½" and 2½" F.T.	No. 23A New Britain Autos	4
½"	⅞", 1" & 1⅛" B.S.A. Gridley Autos	4
¾"	1⅜" & 1⅝" B.S.A. Gridley Autos	4
1¼"	2" & 2¼" B.S.A. Gridley Autos	4
½"	9/16" Styles R. & R.A. Acme-Gridley Autos	6
½"	1" Style R.A.6 Acme-Gridley Autos	6
½" and ¾"	1" Style R.6 Acme-Gridley Autos	6
½" and ¾"	1¼" Style R.A.6 Acme-Gridley Autos	6
½" and ¾"	1⅝" Style R.6 Acme-Gridley Autos	6
¾" and 1"	1⅝" Style R.A.6 Acme-Gridley Autos	6
¾", 1" and 1¼"	2" Style R.A.6 Acme-Gridley Auto	6
1" and 1¼"	2½" Style R.6 Acme-Gridley Auto	6
1" and 1¼"	2⅝" Style R.6 Acme-Gridley Auto	6
½" and ¾"	1⅜" & 1¾" Wickman Autos	5
½"	⅞" Conomatic Auto	4
½" and ¾"	1¼" Conomatic Auto	6
½", ¾", 1" and 1½"	1½" Conomatic Auto	4
1" and 1½"	2" Conomatic Auto	4

STANDARD THREAD SERIES



The sizes below $\frac{1}{4}$" were included in the original Whitworth system, but are not, with the exception of $\frac{3}{16}$" and $\frac{1}{8}$" sizes, specified by the British Standards Institution. They are, however, still frequently used.

Reference should be made to the tables of thread sizes on the following pages.

Columns 12 to 14

These columns give particulars of old American Standard Threads which are still frequently used. A number of these are incorporated in the N.C. and N.F. Threads.

Columns 17 to 22

These are all Systeme Internationale Thread forms. Under 6 mm. diameter the French Systeme Internationale Metric Threads are generally used. Over 6 mm. to 80 mm. diameter the Standard S.I. Metric Fine — Swiss Standard and Swiss Fine, D.I.N. Standard and D.I.N. Fine — follow each other very closely.

Columns 7 and 15

The numbers by which the Small Size American and B.A. Threads are specified in these columns.

Columns 26 and 30

These columns give the nominal bore size of B.S.P., A.N.P. and A.P.I. pipe sizes. The outside diameter at the gauging point is given under Column b.

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Screw Thread Systems			British Threads						Unified and American Threads								Metric Threads											Pipe Threads				A.P.I. Pipe Threads				
			B.S. Whit.	B.S. Fine	Adm. Fine	B.S.C.	Brass	Conduit	Machine Screw No.	U.N.C. & N.C.	U.N.F. & N.F.	U.N.E.F.	N.E.F.	S.A.E.	A.S.M.E. Std.	A.S.M.E. Spec.	B.A. No.	B.A.	S.I.	Metric Fine	Swiss Fine	Swiss Std.	S.I. (D.I.N.)	S.I. Fine (D.I.N.)	Lowenherz	I.S.O. Coarse	I.S.O. Fine	Pipe Sizes	B.S.P.	A.N.P.	Copper Tube	Pipe Sizes	Line Pipe	Casing Pipe Drill: Non-Upset	Casing Pipe Drill: Upset	Casing Pipe Drill: Sucker Rods
Thread Form			A	A	A	G	A	A		B/NC	B/NF	B	N	N	N	N		C	D	D	D	D	E	F	F	B	B		H	J	H		K	L	L	M
Thread Angle			55	55	55	60	55	55		60	60	60	60	60	60	60		47½	60	60	60	60	60	60	53° 8′	60	60		55	60	55	60	60	60	60	60
Full Dia. of Screw: Inches	Inches	mm.	Threads per Inch						Threads per Inch								Pitch in Millimetres											Threads per Inch				Threads per Inch				
	·0311	·79															16	·19																		
	·0354	·90															15	·21																		
	·0394	1·00															14	·23	·25	·20	·12	·25	·25	·20	·25											
	·0472	1·20															13	·25	·25	·20	·12	·25	·25	·20	·25											
	·0511	1·30															12	·28																		
	·0551	1·40																	·30	·20	·12	·30	·30	·20	·30											
	·0591	1·50															11	·31																		
	·0600								0		80				80																					
1/16	·0625		60																																	
	·0634	1·60																																		
16 swg.	·0640					56																				·35										
	·0669	1·70															10	·35	·35	·20	·20	·35	·35	·20	·35											
	·0709	1·80																								·35										
15 swg.	·0720					56																														
	·0730								1	64	72				72	64																				
	·0748	1·90															9	·39																		
5/64	·0781		56																																	
	·0787	2·00																	·40	·25	·25	·40	·40	·20	·40	·40										
14 swg.	·0800					56																														
	·0860								2	56	64				64	56																				
	·0866	2·20															8	·43								·45										
	·0906	2·30																	·40	·25	·25	·40	·40	·20	·40											
13 swg.	·0920					56																														
3/32	·0937		48																																	
	·0984	2·50															7	·48								·45										
	·0990								3	48	56				56	48																				
	·1024	2·60																	·45	·35	·25	·45	·45	·25	·45											
12 swg.	·1040					56																														
7/64	·1094		48																																	
	·1102	2·80															6	·53																		
									4	40	48				48	40 36																				

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	·1260	3·20														30	5	·59																		
10 swg.	·1280					40																														
	·1378	3·50																	·60	·35	·35	·60	·60	·35	·60	·60										
	·1380								6	32	40				40	36 32																				
9/64	·1406		40																																	
	·1417	3·60															4	·66																		
9 swg.	·1440					40																														
	·1510								7						36	32 30																				
	·1540					40																														
5/32	·1562		32			32																														
	·1575	4·00																	·75	·50	·50	·70	·70	·35	·70	·70										
8 swg.	·1600					32																														
	·1614	4·10															3	·73																		
	·1640								8	32	36				36	32 30																				
11/64	·1719		32																																	
	·1750					32																														
	·1770								9						32	30 24																				
	·1772	4·50																	·75	·50	·50	·75	·75	·50	·75	·75										
	·1850	4·70															2	·81																		
3/16	·1875		24	32		32	26																													
	·1900								10	24	32				30	32 24																				
	·1969	5·00																	·90	·50	·50	·80	·80	·50	·80	·80										
13/64	·2031		24																																	
	·2087	5·30															1	·90																		
	·2160								12	24	28	32	32		28	24																				
	·2165	5·50																			·50	·90	·90	·50	·90											
7/32	·2187		24	28		26																														
15/64	·2344		24																																	
	·2362	6·00															0	1·0	1·0	·75	·75	1·0	1·0	·75	1·0	1·0										
	·2420				24				14						24	20																				
	·2480																											⅛			28					
¼	·2500		20	26	24	26	26			20	28	32	32	28																					
17/64	·2656					26																														
	·2660					26																														
	·2680								16						22	20																				
	·2756	7·00																	1·00	·75	·75	1·00	1·00	·75	1·10	1·0										
9/32	·2813			26	24	26	26																													

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Screw Thread Systems			British Threads						Unified and American Threads								Metric Threads											Pipe Threads				A.P.I. Pipe Threads				
			B.S. Whit.	B.S. Fine	Adm. Fine	B.S.C.	Brass	Conduit	Machine Screw No.	U.N.C. & N.C.	U.N.F. & N.F.	U.N.E.F.	N.E.F.	S.A.E.	A.S.M.E. Std.	A.S.M.E. Spec.	B.A. No.	B.A.	S.I.	Metric Fine	Swiss Fine	Swiss Std.	S.I. (D.I.N.)	S.I. Fine (D.I.N.)	Lowenherz	I.S.O. Coarse	I.S.O. Fine	Pipe Sizes	B.S.P.	A.N.P.	Copper Tube	Pipe Sizes	Line Pipe	Casing Pipe Drill		
																																		Non-Upset	Upset	Sucker Rods
Thread Form			A	A	A	G	A	A		B/N	B/N	B	N	N	N	N		C	D	D	D	D	E	E	F	B	B		H	J	H		K	L	L	M
Thread Angle			55	55	55	60	55	55		60	60	60	60	60	60	60		47½	60	60	60	60	60	60	53° 8′	60	60		55	60	55	60	60	60	60	60
Full Dia. of Screw	Inches	mm.	Threads per Inch						Threads per Inch								Pitch in Millimetres											Threads per Inch				Threads per Inch				
	·2940	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....	20	18																				
5/16	·3125	.....	18	22	24	26	26	.....	.....	18	24	32	32	24																						
	·3150	8·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·25	1·00	1·00	1·25	1·25	·75	1·20	1·25	1·00									
	·3200	.....	.....	.....	.....	.....	26	.....	20	.....	.....	.....	.....	.....	20	18																				
	·3460	.....	.....	.....	.....	.....	.....	.....	22	.....	.....	.....	.....	.....	18	16																				
	·3543	9·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·25	1·00	1·00	1·25	1·25	1·00	1·30											
	·3720	.....	.....	.....	.....	.....	.....	.....	24	.....	.....	.....	.....	.....	16	18																				
3/8	·3750	.....	16	20	24	26	26	.....	.....	16	24	32	32	24																						
	·3830	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	⅛	28							
	·3890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	¼	.....	.....	20					
	·3937	10·00	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·50	1·00	1·00	1·50	1·50	1·00	1·40	1·50	1·25									
	·3980	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	.....	.....	.....	16	14																				
	·4044	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	⅛	.....	27	.....	⅛	27			
	·4240	.....	.....	.....	.....	.....	.....	.....	28	.....	.....	.....	.....	.....	14	16																				
	·4331	11·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·00	1·50	1·50	1·00												
7/16	·4375	.....	14	18	24	26	26	.....	.....	14	20	28	28	20																						
	·4500	.....	.....	.....	.....	.....	.....	.....	30	.....	.....	.....	.....	.....	14	16																				
	·4724	12·00	.....	.....	.....	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·75	1·50	1·25	1·75	1·75	1·50	1·60	1·75	1·25									
½	·5000	.....	12	16	20	26	26	18	.....	13	20	28	28	20																						
	·5140	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	⅜	.....	.....	20					
	·5180	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	¼	19							
	·5343	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	¼	.....	18	.....	¼	18			
	·5512	14·00	.....	.....	20	26	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2·00	1·50	1·25	2·00	2·00	1·50	1·80	2·00	1·50									
9/16	·5625	.....	12	16	20	26	26	.....	.....	12	18	24	24	18																						
5/8	·6250	.....	11	14	20	26	26	18	.....	11	18	24	24	18																						
	·6299	16·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2·00	1·50	1·25	2·00	2·00	1·50	2·00	2·00	1·50									
	·6390	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	½	.....	.....	20					
	·6560	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	⅜	19							
	·6714	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	⅜	.....	18	.....	⅜	18			
11/16	·68[illegible]	.....	11	14	20	26	26	16	.....	.....	.....	24	24																							
	·70[illegible]	18·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2·50	1·50	1·50	2·50	1·50	1·50	2·20	2·50	1·50									
¾	·7500	.....	10	12	14	26	26	16																												

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	·8250				14																							½	14							
	·8																																			
	·8661	22·00																	2·50	1·50	1·50	2·50	2·50	1·50	2·80	2·50	1·50	½		14		½	14			
⅜	·8750		9	11	14	24	26	16		9	14	20	20	14																						
	·8890																																			
	·9020																											¾			20					
15/16	·9375		9		14		26					20	20															⅝	14							
	·9449	24·00																														⅝				10
	·9675					30													3·00	2·00	1·50	3·00	3·00	1·50	2·80	3·00	2·00									
31/32	·9687					30																														
1	1·0000	25·40	8	10	12	24	26	16		8	12	20	20	14																						
	1·0140																																			
	1·0236	26·00																										⅞			20					
	1·0410																								3·20											
	1·0460																											¾	14			¾	14			
1 1/16	1·0625											18	18															¾		14		¾				10
	1·0630	27·00																	3·00	2·00	2·00	3·00	3·00	1·50		3·00	2·00									
	1·1024	28·00																							3·20											
1 1/8	1·2500		7	9	12	26	26			7	12	18	18	12																						
	1·1550																																			
	1·1811	30·00																	3·50	2·00	2·00	3·50	3·50	1·50	3·60	3·50	2·00	1			20					
1 3/16	1·1875											18	18																			⅞				10
	1·1890																											⅞	14							
1 1/4	1·2500		7	9	12		26	16		7	12	18	18	12																						
	1·2598	32·00																							3·60											
	*1·2900					24																														
	1·2992	33·00																	3·50	2·00	2·00	3·50	3·50	1·50		3·50	2·00					1	11½			
	1·3082																											1		11½						
	1·3090																											1	11							
1 5/16	1·3125											18	18																							
	†1·3700					24																										1				10
1 3/8	1·3750		6	8	12	24	26	16		6	12	18	18	12																						
	1·4050																											1¼			20					
	1·4173	36·00																	4·00	3·00	2·00	4·00	4·00	1·50	4·00	4·00	3·00									
1 7/16	1·4375				12	24	26					18	18																							
	†1·4500					26																														
1½	1·5000		6	8	12	24	26	14		6	12	18	18	12																						
	1·5354	39·00																	4·00	3·00	2·00	4·00	4·00			4·00	3·00									
†1 9/16	1·5625					24						18	18																							
	1·5748	40·00																						1·50	4·40							1⅛				10
1 5/8	1·6250		5	8	12	24						18	18	12																						
	1·6500																											1¼	11			1¼	11½			
	1·6530																											1¼		11½						

* Left Hand † R.H. or L.H.

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Screw Thread Systems			British Threads						Unified and American Threads								Metric Threads											Pipe Threads				A.P.I. Pipe Threads				
			B.S. Whit.	B.S. Fine	Adm. Fine	B.S.C.	Brass	Conduit	Machine Screw No.	U.N.C. & N.C.	U.N.F. & N.F.	U.N.E.F.	N.E.F.	S.A.E.	A.S.M.E. Std.	A.S.M.E. Spec.	B.A. No.	B.A.	S.I.	Metric Fine	Swiss Fine	Swiss Std.	S.I. (D.I.N.)	S.I. Fine (D.I.N.)	Lowenherz	I.S.O. Coarse	I.S.O. Fine	Pipe Sizes	B.S.P.	A.N.P.	Copper Tube	Pipe Sizes	Line Pipe	Casing Pipe Drill		
																																		Non-Upset	Upset	Sucker Rods
Thread Form			A	A	A	G	A	A		8 N	8 N	B	N	N	N	N		C	D	D	D	D	E	E	F	B	B		H	I	H		K	L	L	M
Thread Angle			55	55	55	60	55	55		60	60	60	60	60	60	60		47½	60	60	60	60	60	60	53 8′	60	60		55	60	55	60	60	60	60	60
Full Dia. of Screw			Threads per Inch						Threads per Inch								Pitch in Millimetres											Threads per Inch				Threads per Inch				
Inches	Inches	mm:																																		
	1·6536	42·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4·50	3·00	2·00	4·50	4·50	1·50	.....	4·50	.....									
	1·6550	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
1 1/16	1·6875	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	18	18	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1½	.....	.....	20					
1¼	1·7500	.....	5	7	12	.....	.....	14	.....	5	.....	.....	16																								
	1·7716	45·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	4·50	3·00	2·00	4·50	4·50	1·50	.....	4·50	.....									
1⅛	1·8750	.....	4½	.....	12																											1·66	.....	.....	10	
	1·8820	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	1·8898	48·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1½	11							
	1·8919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5·00	3·00	2·00	5·00	5·00	1·50	.....	5·00	.....					1⅛	11½			
	1·9290	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1½	.....	11½	.....	1·9	.....	10		
	1·9685	50·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1¾	.....	.....	16					
2	2·0000	.....	4½	7	8	.....	.....	14	.....	4½	.....	.....	16	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·50	.....	.....	.....									
	2·0472	52·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5·00	3·00	2·50	5·00	5·00	1·50	.....	5·00	.....									
	2·1160	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1¾	11	.....	.....	1·9	.....	.....	10	
2⅛	2·1250	.....	4½	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·1790	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	16					
	2·2047	56·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5·50	4·00	2·50	5·50	5·50	2·00	.....	5·50	.....									
2¼	2·2500	.....	4	6	8	.....	.....	.....	.....	4½	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·3470	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	11	.....	.....					
	2·3622	60·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5·50	4·00	2·50	5·50	5·50	2·00	.....	5·50	.....					2	11½			
	2·3659	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	11½	.....	2⅛	.....	10		
2⅛	2·3750	.....	4	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·4290	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2¼	.....	.....	16					
2½	2·5000	.....	4	6	8	.....	.....	14	.....	4	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·5197	64·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00	4·00	2·50	6·00	6·00	2·00	.....	6·00	.....									
	2·5870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2¼	11	.....	.....	2⅛	.....	.....	8	
2⅝	2·6250	.....	4	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·6772	68·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00	.....	2·50	6·00	6·00	2·00	.....	6·00	.....									
	2·6790	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2½	.....	.....	16					
2¾	2·7500	.....	3½	6	8	.....	.....	.....	.....	4	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	2·83[illegible]	72·00																																		
	2·8[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2½	.....	8	.....	2½	8			
2⅞	2·8750	.....	3½	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....					2¼	.....	10		

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	2·9600																																			
	2·99	6·00																	0		2·50	6·00	6·00	2·00				2¾	11							
3	3·0000		3½	5	8					4				10																						
3⅛	3·1250		3½		8									10																						
	3·1496																		6·00	4·00	2·50	6·00	6·00	2·00								2⅞			8	
	3·2030																											3			16					
	3·2100																											2¾	11							
3¼	3·2500		3¼		8					4				10									6·00													
	3·3071	84·00																						2·00												
	3·3465	85·00																										3¼			16					
3⅜	3·3750		3¼		8									10														3	11							
	3·4530																											3		8		3	8			
	3·4600																						6·00													
	3·4885																							2·00				3½			16					
3½	3·5000		3¼		8					4				10														3¼	11							
	3·5039	89·00																					6·00													
	3·5433	90·00																						2·00												
3⅝	3·6250		3¼		8									10														3¼	11							
	3·7000																											3½			16					
	3·7008	94·00																						2·00								3⅛			8	
	3·7270																						6·00					3½			16					
	3·7402	95·00																						2·00								3⅛			8	
3¾	3·7500		3		8					4				10																						
3⅞	3·8750		3		8									10																						
	3·8976	99·00																					6·00													
	3·9370	100·00																						2·00												
	3·9500																											3½	11							
	3·9770																											3¾			16					
	3·9888																											3½		8		3½	8			
4	4·0000		3		6					4				10																						
	4·0158	102·00																						3·00												
	4·0945	104·00																					6·00									3½		10		
4⅛	4·1250		3		6									10																						
	4·1339	105·00																						3·00												
	4·2000																											3¾	11							
4¼	4·2500		2⅞		6									10																						
	4·2510																											4			16					
	4·2520	108·00																						3·00												
	4·2913	109·00																					6·00													
	4·3307	110·00																						3·00												
4⅜	4·3750		2⅞		6									10																						
	4·4094	112·00																						3·00												
	4·4500																											4	11							
	4·4871																											4		8		4	8			

a	b	c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Screw Thread Systems			British Threads						Unified and American Threads								Metric Threads											Pipe Threads				A.P.I. Pipe Threads				
			B.S. Whit.	B.S. Fine	Adm. Fine	B.S.C.	Brass	Conduit	Machine Screw No.	U.N.C. & N.C.	U.N.F. & N.F.	U.N.E.F.	N.E.F.	S.A.E.	A.S.M.E. Std.	A.S.M.E. Spec.	B.A. No.	B.A.	S.I.	Metric Fine	Swiss Fine	Swiss Std.	S.I. (D.I.N.)	S.I. Fine (D.I.N.)	Lowenherz	I.S.O. Coarse	I.S.O. Fine	Pipe Sizes	B.S.P.	A.N.P.	Copper Tube	Pipe Sizes	Line Pipe	Casing Pipe Drill		
																																		Non-Upset	Upset	Sucker-Rods
Thread Form			A	A	A	G	A	A		B/N	B/N	B	N	N	N	N		C	D	D	D	D	E	F	B	B		H	J	H		K	L	L	M
Thread Angle			55	55	55	60	55	55		60	60	60	60	60	60	60		47½	60	60	60	60	60	60	53 8′	60	60		55	60	55	60	60	60	60	60
Full Dia. of Screw			Threads per Inch						Threads per Inch								Pitch in Millimetres											Threads per Inch				Threads per Inch				
Inches	Inches	mm.																																		
	4·4882	114·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00														
4½	4·5000	.....	2⅞	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	4·5276	115·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
4⅝	4·6250	.....	2⅞	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	4·6458	118·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
	4·6852	119·00																																		
	4·7244	120·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
4¾	4·7500	.....	2¾	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	4·8032	122·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
4⅞	4·8750	.....	2¾	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	4·8820	124·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00													
	4·9214	125·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
	4·9500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4½	11							
	4·9859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4½	.....	8						
5	5·0000	.....	2¾	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	5·0395	128·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
	5·0785	129·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00													
	5·1182	130·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
5⅛	5·1250	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	5·1969	132·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
5¼	5·2500	.....	2⅞	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	5·2757	134·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00													
	5·3151	135·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
5⅜	5·3750	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	5·4332	138·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3·00	.....	.....	.....									
	5·4500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									
	5·4725	139·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6·00					5	11							
5½	5·5000	.....	2⅝	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....									