PART 4

Matrices, matrix holders, mould oilers and mould blade forks – cooling the mould and an outline description of the moulds

PART 4

Key references

Chapter 19

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5 Matrix squaring plungers (2)
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CHAPTER 18

Matrices

The matrices, which provide the final sealing of the mould during casting, are precision made to produce the character cast centrally on the head of the type body. The character punching ('intaglio') in the matrix is likewise of an exact uniform depth (depth of drive) according to the point size, in order to ensure that all type is cast to the required 'height to paper'.

18.1 Composition type matrices

Composition type matrices are made of bronze. The four long sides of each matrix are machined to produce an accurately sized end section in which is impressed the intaglio which forms the character on the head of the type body. Matrices are produced in this manner in four different sizes, to accommodate the full range of composition type point sizes, up to the required maximum set-width, as follows:

a) 0·2in pointwise × 0·2in setwise
b) 0·2in pointwise × 0·4in setwise
c) 0·4in pointwise × 0·2in setwise
d) 0·4in pointwise × 0·4in setwise

a) covers the standard small type composition range up to 14pt; (b), (c) and (d) are all used in the extended small type composition range up to 14pt; whilst matrix sizes (c) and (d) are also used for large type composition matrices in the 14–24pt range.

Matrix dimensions always give the 'point' measurement first. Thus, a 0·2in × 0·4in matrix is a standard small type composition matrix extended setwise, designed to accommodate a wide character, whilst a 0·4in × 0·2in large type composition matrix indicates a matrix limited setwise to 0·2in for a narrow character.

Into the other end face of the matrix is machined a tapered socket which accepts the matching nose of the centring pin of the matrix lifter, to ensure precise alignment of the matrix over the mould at the moment of casting.

Type produced from composition matrices is cast to units of set, as dictated by the design of the type fount – a unit being one-eighteenth of the body em. The number of units allocated to each character therefore in turn dictates the setwise dimension of the matrix required to produce the character – and this in consequence determines the width of the type body. Relevant wedge screw settings for adjustment of the mould blade in respect of all composition type faces, ranging from 3 units to 26 units, covering all applicable set values, are contained in the tables of 'Micrometer Head Settings' at the end of the book. These are also produced in card form for use on the machine.

Refer also to Chapter 6 which deals with the theory of 'Basic unit and set'.

18.2 Depth of drive

The depth of the character impression (depth of drive) in a composition matrix is 0·05in for all sizes, with the exception of those produced for type less than 5pt, which have a drive of 0·03in. Type produced with 0·03in drive has a shoulder height which is 0·02in greater than normal, the mould being designed accordingly to cast product of correct 'height to paper'.

18.3 Side-wall measurements

The position of the impression punched on the matrix face is normally measured from one side of the matrix body. The distance between the outside edge of the profile of the character punching and the side of the matrix body is known as the side-wall measurement. With a few exceptions, the following dimensions apply in this respect:

In English founts, up to and including 11 pt, the standard side-wall measurement on composition matrices is 0·035 in; in 12 pt founts it is 0·025 in, whilst in some large type composition matrices it is reduced to 0·02 in or 0·15 in.

The maintenance of a constant side-wall measurement (as relevant to the point size) ensures that each character, no matter what its unit value, will cast centrally setwise on the correct set-width body.

18.4 Matrix markings

Each composition matrix in the fount is stamped with the fount designation and point size; for example, the figures 327 stamped over the figures 10 indicate series 327 in 10 pt. Special characters which do not form part of a normal fount (such as typographical, medical, botanical etc.) bear a series number, the point size and a special number printed at right-angles to the other figures. A dash above the point size, in place of the series number, signifies a special character which does not belong to any specific type series.

Two varieties of blank matrices are available for use when casting both high and low quads and spaces from the composition moulds, one of which has a normal cone hole, whilst the other is fitted with a steel insert. The blank matrix with the cone hole is the one you should use on the Super caster.

18.5 Line

The term 'line' is used to indicate the position taken on the type body or the matrix, by the lower serifs of both capitals and lower-case characters (descenders excepted). The 'line' measurement varies with each typeface series, and in almost every instance, for each point size in the series. The object basically is to ensure that the matrix will always seat centrally on the type body, no matter what the body size, or the position of the character formed on the head of the body, as dictated by the design of the fount in each case. This is achieved to the nearest half of one-thousandth of an inch.

Control of the type 'line' in the cast product is exercised by means of a type alignment gauge in conjunction with the relevant slip gauge as explained in Chapter 5 which deals with 'Type alignment'. The slip gauge size required for this purpose is notified with each type fount supplied; it is also indicated in the *Specimen book of 'Monotype' printing types*. The alignment figures given in the specimen book, for small type composition sizes up to 14 pt, are prefixed by the letter 'M', whilst those for large type composition of 14 pt and over are prefixed 'T'. This is due to the fact that, broadly speaking, up to 14 pt, the 'line' measurement given is from the rear edge of the matrix, whereas above 14 pt it indicates the distance from the back of the type body. From this, it automatically follows that the figures with the 'T' prefix indicate the slip gauge required to check the alignment, whilst those prefixed 'M' do not.

18.6 Display type matrices

Display type matrices are made in various sizes within specified minimum limits as dictated by the point-size and set-width of the character, as follows:

a) 1 in pointwise × 1 in (or more) setwise

b) $1\frac{1}{8}$ in pointwise × $1\frac{1}{8}$ in (or more) setwise

These matrices are for casting display type from 14 pt to 72 pt, and they are marked with the typeface series number and point-size, together with the set

measurement in points. Thus 199-18 marked on one edge of the matrix, indicates that the face series is No. 199 and the body size is 18pt, whilst at the opposite end of the same edge is a number indicating the set-size in points to which the type must be cast. For example $16\frac{3}{4}$ indicates that the micrometer wedge of the mould blade sizing mechanism must be adjusted to $16\frac{3}{4}$ points.

The 'set' number, together with the point body size of the type, dictates the speed at which the type should be cast. A speed table is provided at the end of the book, in which the speed of casting is given on this basis, relative to any matrix marking. This information is also given on the reverse of the 'Product Information Table' which is supplied in card form for use on the machine, and is also reproduced at the end of the book.

18.7 Depth of drive

Display matrices up to and including 36pt, have a depth of drive of 0·050in, whilst the drive of matrices 42pt and over is 0·065in. The shoulder height of type cast to 0·065in drive is consequently 0·015in less than type with 0·050in drive, the mould being so designed accordingly; thus ensuring uniformity of 'height to paper' in the finished product.

18.8 Side-wall measurement

Display type matrices in the 14–60pt range have a side-wall measurement of 0·150in, whilst for 72pt (and for 60D) the measurement is reduced to 0·1025in. This ensures (as with the composition matrices) that each character, regardless of its unit value, will cast centrally setwise on the correct set-width body.

18.9 American display type matrices

These are special matrices used principally in the United States of America for casting display type from 14pt to 36pt. They are used in conjunction with a special matrix holder.

These matrices are marked with the typeface series number, the point-size and the set-width. Thus, 159-24-*9-6 indicates typeface series 159 in 24pt, whilst the asterisk against the figures *9-6 indicates a set-width of $9\frac{3}{4}$ points. The same figures, 159-24-9-6, without the asterisk, signify the same series and point-size, with a set-width of $26\frac{3}{4}$ points, the absence of the asterisk implying an increase of 17 points. The second figure of the set-width marking indicates any fraction of a point involved. Thus, *9-6 indicates $9\frac{3}{4}$ points, 9-6, $26\frac{3}{4}$ points; whilst *9-2 would indicate $9\frac{1}{4}$ points and 9-4 $26\frac{1}{2}$ points, since 2 indicates $\frac{1}{4}$ point, 4 indicates $\frac{1}{2}$ point and 6 indicates $\frac{3}{4}$ point.

A special table of 'Micrometer Head Settings' is provided for these display matrices at the end of the book along with all the other tables. This gives you set-widths expressed in decimal fractions of an inch, relative to all matrix markings, including 42–48pt, of which a limited number are in use. These latter have special markings, the significance of which is indicated in the table.

18.10 Rule matrices

Rule matrices are used on the strip moulds, for casting strip rules in various point-sizes and differing line strengths, of either single or multiple line. These matrices remain fixed to the mould during casting.

18.11 Continuous border matrices

These matrices are for use with the strip moulds for casting strip material with a continuous unbroken border design. A special matrix holder is provided. The matrix is seated on the mould whilst a section of the strip is cast, then lifted off the mould to allow the strip to be pushed forward to make room for the next cast which follows.

18.12 Quotation core blocks

The core blocks used for casting quotations are used like matrices to seal the mould and also to form the cored body. The core block is lowered on to the mould like a matrix, the projections on the block entering the mould and producing a cast with a cored body. Quotations are cast from the 42–72 pt mould, which is provided with special insets and a special crossblock to correspond with the height of the quotations being cast.

18.13 Care of matrices

All matrices, if properly cared for, will continue to produce good type for a very long time. They should always be handled carefully, and when not in use should be stored in a dust-free cabinet. Their life, under such conditions can be measured in years.

Matrices should always be thoroughly cleaned and lightly brushed before they are used – every morning when in continual use; otherwise grit could accumulate on the matrix face or in the punching and cause excessive wear, or result in the casting of faulty type. The cone holes of composition matrices should be examined to ensure that no fragments of type metal or other foreign matter is deposited there, as this can seriously affect type alignment.

Matrices should be cleaned by applying a clean volatile (quickly evaporating) solvent to both faces with a soft brush, and by using an air line to blow out any residual dirt. Ample fresh air and complete absence of naked lights are essential precautions to be observed.

Oil should be kept away from the face of the matrix when the machine is running. Excessive oil, if unchecked, can drain on to the matrix or it can be picked up from the mould, and form a film on the working face which seats on the mould, where it can cause burrs to be cast on the type.

If by chance, a character should break off in the matrix, you should never attempt to remove the broken type from the matrix punching with a pointed tool; by striking the matrix against a hard surface in an effort to dislodge it; or by dipping the matrix in hot metal.

Characters which break off in the matrix must be melted out as follows: Adjust the mould blade to produce the quad of the point-size with which you are dealing, and allow the machine to run for a few revolutions with the pump mechanism engaged. Examine the matrix to confirm that it is clear and dispose of the 'quads' thus cast, since they will doubtless be of incorrect set-width.

CHAPTER 19

Matrix holders

A range of matrix holders is supplied, each of which is specially designed to carry a particular type of matrix in the correct position over the mould.

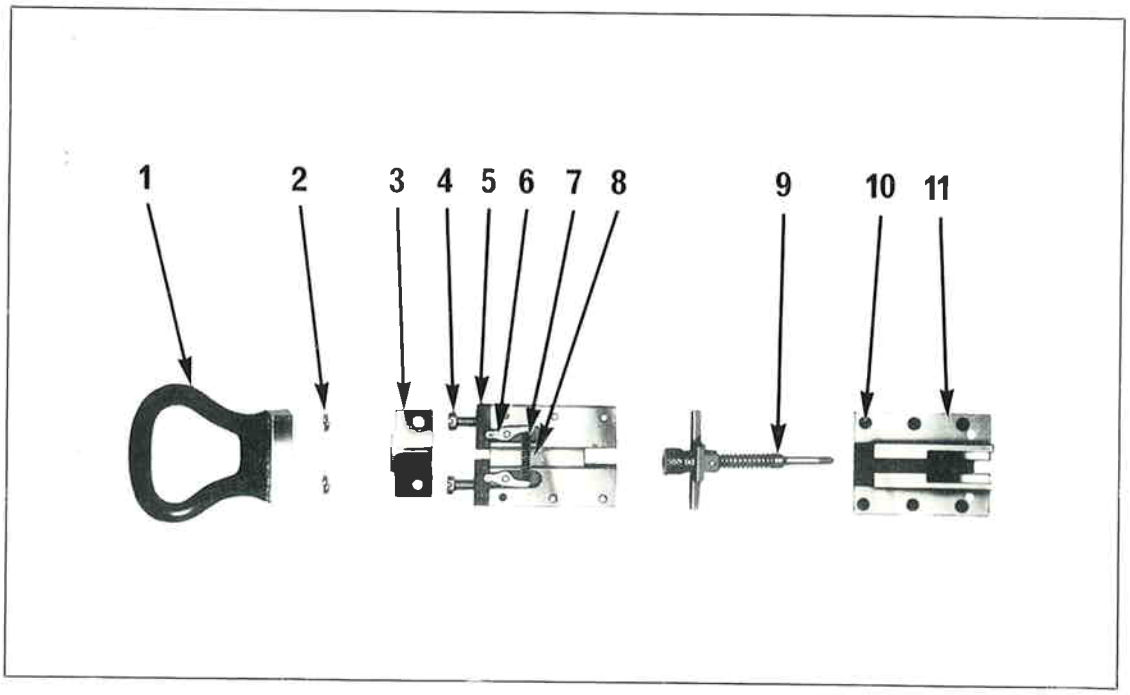
Separate holders are provided for standard (small type) composition matrices (0·2in × 0·2in), extended (small type) composition matrices (0·2in × 0·4in, 0·4in × 0·2in and 0·4in × 0·4in), and large type composition matrices (0·4in × 0·2in and 0·4in × 0·4in). A holder is also supplied for display matrices (1in × 1in, 1in × 1⅛in and 1in × 1·35in), and another which accommodates the larger display sizes (1⅛in × 1⅛in and 1⅛in × 1·35in).

Other holders provided include the continuous border matrix holder, the dash matrix holder and the holder for quotation cores. There is also the special electro (USA) matrix holder which is not dealt with in detail here.

Instructions are included for dismantling and assembling each of the holders. This you can do for your own satisfaction and information, though under normal circumstances you should never have need to do so, except perhaps for cleaning purposes, or the replacement of any parts in due course.

19.1 The 0·2in × 0·2in matrix holder (Xa3SL)

This holder is used only for 0·2in × 0·2in standard (small type) composition matrices. The matrix must be placed in the holder with the designation number to the right (towards the pump) when the holder is located in the matrix lifter, on the composition matrix head. Two squaring plungers provided in the holder ensure that the matrix is always held squarely in position.



19.2 **Dismantling the 0·2in × 0·2in matrix holder**

Remove the two handle screws (4) and remove the handle (1), complete with the handle plate (3) and the two handle screw spring washers (2).

Remove the six guide plate screws (10) and slide the matrix holder guide plate (11) off the holder, together with the matrix retainer (9). The two matrix squaring plungers (5), together with the two matrix squaring plunger levers (6), the plunger lever spring (8) and the support wire, can now be removed.

19.3 **Assembling the 0·2in × 0·2in matrix holder**

Replace the matrix squaring plunger levers (6), the plunger lever spring (8), the support wire (7) and the matrix squaring plungers (5).

Slide the matrix holder guide plate (11) into position, together with the matrix retainer (9), and secure in position with the six guide plate screws (10).

Replace the handle (1), together with the handle plate (3), and secure with the handle screw spring washers (2) and screws (4).

19.4 **0·2in extended matrix holder (Xa4SL)**

This holder is used for 0·2in extended (small type) composition matrices, and is provided with a matrix locating block which can be positioned as required to accommodate extended small type composition matrices 0·2in × 0·4in, 0·4in × 0·2in and 0·4in × 0·4in. The matrix must be placed in the holder with the designation number to the right when the holder is in the matrix lifter, on the composition matrix head. The matrix locating block is secured in the desired position by a retaining screw.

When using 0·2in extended matrices other than 0·4in × 0·4in, another matrix (or blank matrix) must also be inserted in the holder to make up an over-all size of 0·4in × 0·4in, and you must make certain that the cone hole of the matrix you are casting from is correctly positioned to engage with the centring pin of the matrix lifter.

19.5 **Dismantling the 0·2in extended matrix holder**

Remove the matrix wire and plate assembly complete; then slacken the matrix locating block retaining screw and remove the matrix locating block.

Take out the four cover screws and remove the cover. You can now remove the two matrix wire plate retainer plungers, together with the plunger springs.

Remove the two handle screws and take off the handle, together with the two handle insulating packing pieces.

19.6 **Assembling the 0·2in extended matrix holder**

Assemble the handle together with the two insulating packing pieces and secure with the two handle screws.

Replace the two plate retainer plungers and the plunger springs; then replace the cover and secure with the four cover screws.

Place the matrix locating block in position and tighten the retaining screw; then replace the matrix wire and plate assembly.

19.7 **The 0·4in × 0·4in matrix holder (Xa5SL)**

This holder is used for 0·4in × 0·4in and 0·4in × 0·2in large type composition matrices. When a 0·4in × 0·2in matrix is being used, another matrix of the same size must also be located in the holder to retain the casting matrix in the correct position. The matrix must be positioned in the holder with the designation number to the right when the holder is located in the matrix lifter, on the composition matrix head.

19.8 **Dismantling the 0·4in × 0·4in matrix holder**

Take out the two handle screws and remove the handle, together with the handle plate and the two insulating handle packing pieces.

Remove the six guide plate screws and slide the guide plate off the holder, together with the matrix retainer.

19.9 **Assembling the 0·4 in × 0·4 in matrix holder**

Slide the guide plate into position on the holder, together with the matrix retainer, and secure with the six guide plate screws.

Replace the handle, the handle plate and the two insulating packing pieces, and secure with the two handle screws.

19.10 **The 1 in × 1 in matrix holder (Xa6SL)**

This holder is used for 1 in × 1 in, 1 in × 1⅛ in and 1 in × 1·35 in matrices. To position the matrix in the holder, you must pull back the matrix clamp until it can be given a quarter-turn to permit the matrix to be inserted.

The matrix must be placed in the holder with the designation number towards the handle. Secure the matrix in the holder by reversing the matrix clamp until the clamp projection abuts on the matrix. When using 1 in × 1 in or 1 in × 1⅛ in matrices, the matrix clamp must be turned so that the right-angled projection clamps the matrix, but when a 1 in × 1·35 in matrix is in the holder the straight projection must be used.

A knurled-head matrix adjusting screw provided in the holder controls the matrix locator, by means of which the alignment of the matrix can be adjusted setwise on the mould as necessary.

19.11 **Dismantling the 1 in × 1 in matrix holder**

Take out the two handle screws and remove the handle, complete with the matrix adjusting screw lock plunger and spring, and the two heat insulating handle washers.

Knock out the matrix clamp pin and remove the matrix clamp; the matrix clamp shaft, together with the matrix clamp spring can now be taken out.

Unscrew the knurled-head matrix adjusting screw with the aid of a pin wrench, and remove the matrix locator and matrix locator spring.

19.12 **Assembling the 1 in × 1 in matrix holder**

Replace the matrix locator and spring, securing by means of the knurled-head adjusting screw, which must be locked again with a pin wrench.

Re-assemble the matrix clamp spring, shaft and matrix clamp, and insert the matrix clamp pin.

Place the matrix adjusting spring and plunger in the handle, and secure the handle and the two insulating washers to the body of the matrix holder with the two handle screws.

19.13 **The 1⅛ in × 1⅛ in matrix holder (Xa7SL)**

This holder is used for 1⅛ in × 1⅛ in and 1⅛ in × 1·35 in matrices. It is constructed on similar lines to the 1 in × 1 in matrix holder, the detailed instructions for which apply in every respect.

19.14 **The low space and quotation matrix holder (8SLL)**

This holder is used for locating low space blanks and quotation cores on the mould. It is very similar to the 1 in × 1 in matrix holder, the instructions for which again apply in this respect.

19.15 **Continuous border matrix holder (Xa9SL)**

With this holder, the matrix is pushed into position against the matrix sealing plunger abutment and held there by a spring-operated matrix clamp.

You are not advised to remove either the clamp or the spring, as both parts are somewhat difficult to reassemble.

19.16 **Dash matrix holder (10SL1)**

This holder consists of a block into which the dash matrices are fitted. It is used with the 4–18 pt lead and rule mould, in conjunction with a matrix guide which locates it in position. The matrix must be put in the holder with the side on which the size is marked, facing the matrix guide.

CHAPTER 20

Mould oilers and mould blade forks

20.1 Mould oilers

Super caster mould oilers consist of three complete assemblies used with the 'type' moulds (moulds fitted with crossblocks), a crossblock oiler used with the composition moulds, and an adjustable drip feed mould oiler (comprised of a base and three separate oil pipe assemblies) to cater for each of the strip moulds.

The type mould oilers each clip in to the oil holes in the mould (the 14–36pt oiler also has a screw). They must be kept filled with mould oil when in use on the machine.

The crossblock oiler has two pads which lubricate the crossblock. The cup on the body of the oiler, above the lubricating pads, must be kept filled with mould oil during casting.

The adjustable drip feed mould oiler used with the strip moulds is a little more complex.

20.2 Adjustable drip feed mould oiler

This mould oiler is used for lubricating the furniture mould and the 1–3pt and 4–18pt lead and rule moulds.

20.3 How the oiler works

The oiler consists of a base which is attached to the counter bracket; and three separate oil pipe assemblies, one for each mould.

The base is provided with three valves which control the drip feed oil supply. Each oil pipe assembly is attached to a post, whereby the pipes are connected to the base as required, by means of the knurled screw. The pipes are shaped to enable them to carry oil from the drip feed to a position just clear of the mould oil holes.

To fill the oiler, rotate the dust cover above the container until the hole in the cover corresponds with the hole in the filler cap; fill with castor oil (or Mould Oil No. 1) and return the dust cover to close the inlet hole.

20.4 How to adjust the oiler

The flow of oil to each pipe is independently adjusted at each needle valve, to give the correct supply as required, the extent of the flow being visible at the drip feed. When the valve lifters are vertical, the oil will feed through, whereas the supply can be shut off completely by placing them in the horizontal position.

20.5 How to adjust the supply

Raise the valve lifters and rotate the valve adjusting screws until they are just out of contact with the lifters. In this position the valve needles are on their seatings and the oil supply is shut off. The adjusting screws can now be turned back a few notches to allow the oil to drip the desired amount, bearing in mind that an excessive supply of oil can adversely affect the printing surface of the cast product.

20.6 Mould blade forks

All moulds (other than the strip moulds) are linked with the mould blade sizing mechanism by means of a mould blade fork. The fork is connected first to the mould blade slide, the fork bar being secured in position (with the markings in view on the upper surface) by the mould blade fork connecting pin, which is in turn locked with a set screw. It is subsequently connected to the mould blade by the mould blade fork pin, with the aid of the fork pin handle; the joint being made firm by adjusting the knurled nuts to lock the mould blade fork guide pin in position, in contact with the rear of the mould blade, as described in detail in respect of the small type composition mould in 24.10.

There are two forks in general use; one marked 5-36 is used with all the composition type moulds, the quad and space mould, the short lead and rule mould, the 14–36pt display type machine mould and the Super caster 14–36pt display type mould. The other, marked '40-72' is used with Super caster display type moulds 42–72pt.

A third fork, now obsolete (marked 'SORTS 42-48') is used with 42–48pt display type machine moulds on the Super caster. These moulds have been superseded by the Super caster 42–72pt display type moulds.

CHAPTER 21

Cooling the mould

The water supply for cooling the mould is fed to the Super caster through a water supply pipe, controlled by the water supply valve located on the water service bracket, and returned to waste through a water drain pipe. The copper piping used throughout is easily identified on the machine. The water fed through the supply pipe passes through a strainer mounted on the inside of the machine base, before it is circulated through the mould. The strainer can be dismantled for cleaning should the necessity ever arise.

The piping (both supply and drain) is delivered up through the main stand, via the pad seating at the base of the stud provided on the main stand for the mould water supply piping block. From this point, it is fed through the mould by the mould water supply piping, which you fit to the mould when setting up the machine for casting, the piping being connected to the main stand via the stud, and secured with a nut and washer. A screw secures the piping to the mould.

There are four different mould water supply piping assemblies. The piping marked 'AB' is used with all the moulds which require an adaptor base, while the others are supplied for the Super caster moulds and marked accordingly.

CHAPTER 22

Introduction to the moulds

An outline description of the moulds used on the Super caster, together with a brief summary of their fundamental principles, is given in the Introduction to the working of a 'Monotype' Super caster in Chapter 2 which immediately follows the foreword. This you should read before proceeding further.

It can be said that the moulds constitute the central feature of the Super caster, in that all else of which the machine is comprised is directed to supplying it with the necessary molten metal, controlling all the moving parts involved in the sizing and sealing of the mould during casting, and the ejection and disposal of the cast product on completion. Some understanding of the principles of mould design and the degree of accuracy to which they are required to conform, is therefore essential if you are to fully appreciate the necessity for extreme care in their handling and maintenance, along with the basic thinking behind their extremely high standard of performance, and the functions of all the other parts of the Super caster which are designed to this end.

All the moulds will be seen to consist, broadly speaking, of an assembly of steel blocks mounted on a base, the several parts of which contribute to the formation of a casting chamber. Basically, the walls of the two side blocks form a channel in which slides a mould blade which acts as a rear wall, whilst the front of the channel of the type moulds can be sealed off by a crossblock which moves across the open end and serves as a front wall. The four vertical walls so constituted are mounted on a base which contributes part of the floor, in which is located an aperture through which molten metal is injected at the moment of casting; the casting chamber thus formed being completed by a matrix which is lowered on to the mould to seal the cavity, or by the upper mould blade which is moved forward to effect the seal when casting low quads and spaces.

The body or point-size dimension of the casting cavity is determined by the walls which form the channel in the mould (or mould inset) in the type moulds; and by adjustment of the distance between the side blocks in the case of the strip moulds.

Control of the movement of the mould blade determines the width or 'set-width' of the cast in all cases, and this is governed by the extent to which the mould blade is withdrawn prior to each cast, as controlled by the mould blade sizing mechanism.

The mould blade thus moves between the two walls which control the body or point-size of the product, and in consequence (except in the case of the furniture mould) it also forms the rear wall which conforms to both the point-size and the height of the casting cavity. The furniture mould blade is a composite part of an adjustable rear wall, the mould blade itself acting only as a pusher to eject the product.

The height of the side walls of the casting cavity of the type moulds, being exactly the same as the mould blade, thereby controls the height of the type

body from foot to shoulder. The type character is formed within the 'intaglio' of the matrix which seats on the mould to seal the casting cavity; the finished cast being of the correct 'height to paper' from foot to printing surface.

With the strip moulds, the mould blade height varies with the type of product, since for some a matrix or a high blade cap is used, positioned on top of the mould, whilst for others low blade caps are required, which sit on the mould and project into the casting cavity.

In the case of the furniture mould, the caps used to seal the top of the casting cavity (together with the various core pieces with which the side blocks are lined for the differing products) likewise project into the cavity and thereby control the 'height' of the product in the mould; whilst the mould blade itself, being only part of the adjustable rear wall as already indicated, does not conform to either the shape or dimension of the product.

In all moulds (other than the strip moulds) the front wall of the casting cavity is provided by the crossblock, which, like the mould blade, is also a moving part. The crossblock slides back and forth between the front faces of the side blocks and a gib plate attached to the front wall of the mould, which rises from the mould base. An inward projection of the base of the crossblock forms part of the floor of the casting cavity. In this projecting crossblock floor is located a jet aperture through which the molten metal is injected into the cavity at the moment of casting, delivery being effected by the pump nozzle which is precisely timed to seat itself in the conical recess on the underside of the mould base, and to withdraw immediately on completion of each cast.

The strip moulds have a sliding jet block which serves in the same capacity as the projecting floor of the crossblock. It does not have to provide a front wall, since this requirement is met by the cast strip in the mould.

When casting type, the casting cavity of the type mould is sealed by the matrix, which is brought down on top of the mould to complete the seal and produce the character on the top of the type body. When casting low quads and spaces the top of the mould casting cavity is sealed by the upper mould blade (high spaces being cast, using a blank matrix to seal the mould) whilst a fixed cap or matrix is used when casting product from the short lead and rule mould. Continuous borders and dashes cast from the strip moulds are also produced from matrices which are lowered on to the mould. For all other strip material, fixed matrices or caps are used, as they do not have to be lifted off the mould in order to eject the strip as each successive fusing cast is completed; the product being pushed out of the matrix on its way out of the mould.

The six-sided sealed chamber required to form the casting cavity for casting type can therefore be said to be made up of the two side walls which form the channel in which the mould blade slides; the mould blade itself which forms the rear wall; the crossblock which provides both the front wall and part of the cavity floor, and the matrix which finally seals the mould and produces the character on the head of the type body. The cast type, when solidified, 'trimmed', ejected from the mould and having subsequently cooled, will in every case be of the required standard height from foot to printing surface, in addition to being of the exact body or point-size and desired set-width; the latter of course dependent on the correct adjustment of the mould blade sizing mechanism.

With the strip moulds, which are designed to produce a variety of products in lengths made up of a succession of fusing casts (single casts only being required for dashes and clumps) the same provisions are met in a very similar

manner, except that the cast strip already completed in the mould provides the front wall of the casting cavity, being pushed forward the required distance by the mould blade on completion of each cast, a jet block being provided instead of a crossblock. The final sealing of the casting cavity is either by means of a fixed cap or matrix, or a matrix which is lowered on to the mould, according to the type of product being cast.

The moving parts which control the mould casting chamber

22.1 **Matrices**

The matrices which seal the top of the mould casting cavity when casting type or continuous borders and dashes (and the cores used when casting quotations) are each housed in matrix holders and controlled by a matrix lifter which is part of the composition matrix head, the display matrix head or the counter bracket, as the case may be. The matrix movement is controlled by either a lifter lever connecting rod or a lock wedge and spring box, which is connected through to the matrix cam lever.

22.2 **Mould blade**

The mould blade is connected to the mould blade slide, which is activated by the mould blade slide drive lever, its movement being controlled by the mould blade cam lever, via the mould blade slide drive lever connecting tube and the intermediate lever, which regulates the movement as required. The degree of movement imparted to the mould blade is controlled by the setting of the wedge screw of the mould blade sizing mechanism which determines the distance the blade is withdrawn for each cast. When casting from the strip moulds, its forward movement when ejecting the product is controlled by means of a stop.

22.3 **Crossblock (and type carrier)**

The crossblock has a coupling hook which engages with a complementary hook on the end of the type carrier, which is part of the matrix heads base. The type carrier thus controls the movement of the crossblock, both parts moving as one. The movement of the type carrier is controlled by the type carrier cam, through the type carrier cam lever extension and the type carrier connecting rod. When it moves to the right-hand position it pushes the crossblock clear of the front of the casting cavity to allow the mould blade to eject the finished cast into the carrier; whilst when in the left-hand position, the crossblock seals the front of the cavity ready for the next casting and the finished cast in the carrier is brought into line with the type pusher.

The type carrier is steadied at the limits of its traverse both to left and right, by the type carrier cushion spring, housed in the type carrier cover. This spring has a plunger at either end, the left-hand plunger (which is concealed) abutting against the rounded end of the slotted portion of the carrier when it is located to the right, receiving type from the mould, whereas the right-hand plunger similarly abuts against the carrier when it is located to the left, positioned for the type pusher to pass through it to eject the cast.

The type carrier is provided with a safety device in the form of the type carrier connecting rod yoke pin which is so designed that it will shear should the traverse of the carrier be obstructed due to any form of blockage. This device, which severs the connection with the cams, ensures that the carrier is halted, even though the cam lever continues its reciprocal motion.

22.4 Type pusher

The type pusher, which is an integral part of the matrix heads base, obtains its movement via the type pusher lever and the type pusher lever connecting rod, which is connected to the type pusher cam lever.

The type pusher lever connecting rod spring box contains a cushion spring which compresses in the event of the type pusher being impeded in its traverse, thus providing a safety device which prevents the pusher being damaged should any obstruction occur in the type carrier, whereby the type pusher is unable to pass through it to push the finished cast into the type channel.

22.5 Jet block (strip moulds only)

The jet block has a coupling hook which engages in a hook in the slide formed on the end of the jet block driving rod connecting rod, which is located on the counter bracket. The movement of the jet block is thus controlled by the rod which is attached to the type carrier cam lever extension.

22.6 Type moulds (or moulds fitted with crossblocks)

How the moulds function

On completion of a cast, the finished product in the casting cavity, though still hot, cools almost immediately to the point of solidification. At this stage the type has a metal 'tang' attached to its foot, formed by the metal retained in the cavity beneath the jet aperture in the crossblock projection which forms part of the cavity floor. This tang must be removed before the product can be ejected. To achieve this, the type carrier moves slightly to the left, the action causing the cutting edges of the crossblock jet to completely shear the tang, leaving the type with a clean-cut foot. The type carrier then moves to the right until the inner face of the crossblock momentarily clears the front of the mould cavity, thus bringing the type carrier into position to receive the product from the mould. The movement of the type carrier causes a track-cam in the crossblock channel on the mould floor to activate a sliding jet blade which presses the cut-off tang out of the jet cavity, whereupon it falls through an opening in the base of the mould, back into the melting pot.

With the type carrier thus positioned, the mould blade moves forward and ejects the product from the mould into the space provided in the carrier, where it is held in position by the type support spring. The mould blade subsequently withdraws again in readiness for the next cast.

Immediately the cast product has been deposited in the type carrier it moves over to the left, carrying the product to a position outside the mould. This movement brings the crossblock back again to the casting position. Meantime the type in the carrier is gripped by the type clamp (which is held back in readiness by the type clamp operating block located on the mould) and the type support spring is withdrawn. The type carrier is thus temporarily halted during the period of pause in the casting cycle, whilst the next cast is being made. During this brief moment, the type pusher passes through the type carrier and pushes the product out of the carrier, into the type channel on the type carrier cover, *en route* for the galley. The process is then repeated with the new cast already completed in the mould casting cavity, there always being two casts 'on hand' simultaneously when the crossblock is in the casting position; one in the sealed casting cavity, whilst its predecessor is in the type carrier about to be despatched on its way into the type channel by the type pusher.

22.7 Strip moulds

When producing strip product, each successive fusing cast, although still hot, likewise cools almost immediately to the point of solidification, as also does the long non-fusing cast produced as required in the furniture mould. The product, like that of the type moulds, at this stage has a metal 'tang' attached to its foot. This is formed by the metal retained in the cavity beneath the jet aperture in the jet block, which slides back and forth through the mould and forms part of the floor of the casting cavity. The tang must be removed before the product can be pushed forward by the mould blade to make room for the next cast. This is achieved by the movement of the jet block, which first shears the tang by moving slightly to the left, and then ejects it into the melting pot by a subsequent movement to the right; a track cam in the jet block channel activating a jet blade or jet pusher, which presses the cut-off tang out of the jet cavity. (The furniture mould incidentally has two jets and two jet pushers). The jet block then moves over to the left before returning again to the casting position for the next cast.

Each strip mould has a lead clamp which is controlled by the mould lead clamp lever; this is in turn connected through to the matrix cam lever from which it obtains its movement, by means of the lead clamp intermediate lever rod, the intermediate lever and the spring box, which are located on the counter bracket. The purpose of the lead clamp is to firmly clamp the cast product in the mould to prevent it being pushed forward by the pressure of the molten metal in the casting cavity, and then to release it to allow the mould blade to eject the strip sufficiently to clear the casting cavity for the next cast.

22.8 Mould construction, care and maintenance

From the foregoing, it will be appreciated that several of the mould parts are, of necessity, machined to such fine tolerances that although two of the cavity walls of the moulds fitted with crossblocks are made up of moving parts, apart from the cavity floor (strip moulds have only one moving wall), molten metal under pressure will not penetrate where the contacting surfaces meet, when the movable faces are held stationary against the side blocks at the moment of injection. The degree of accuracy required is exemplified in that molten metal injected under such pressure can find its way through smaller crevices than water would normally penetrate.

The demands put upon the mould in this respect consequently call for a level of precision of the highest order, both in the manufacture and assembly of the parts concerned and in their subsequent handling, to ensure the perfect functioning of the six faces of the casting cavity; since there must be no risk of seizure despite the high temperature to which the moving parts are subjected. To this must be added the essential requirement of consistently smooth action, completely free from any tendency to bind when the assembled parts are in one position and from excessive clearance when in another.

Efficient lubrication under these circumstances is vitally important and is effectively provided for; whilst water piped to internal channels in the blocks likewise provides for the essential cooling of the mould.

It will in consequence be evident that the adjustment of the component parts of the mould must always be maintained to similar high standards of precision. It is this requirement that dictates the degree of caution demanded in the handling and care and maintenance of the moulds, since some details of the initial precision assembly must of necessity be disturbed when stripping, cleaning and re-assembling. Other settings made during manufacture, which remain undisturbed, will last the life of the mould, or at least the period

between overhauls by The Monotype Corporation, when they can be re-established with the aid of precision gauges designed for this specific purpose.

In conclusion, to the uninitiated it could appear that the stripping and re-assembly of a mould could prove to be a difficult and somewhat precarious business, but in reality it demands much more understanding, patience, common sense and conscientious workmanship than actual skill; and provided that reasonable precautions are taken in respect of care and cleanliness, and the detailed instructions in respect of each mould are observed, it is by no means a difficult undertaking.

It should be borne in mind that generally speaking, for all normal purposes, except when changing insets, a well-cared-for and properly lubricated mould need never be taken apart or even partially dismantled as long as it continues to cast satisfactory product, the quality of which cannot be adversely criticised. This does not take account of a possible accidental splash or some other mishap which could result in it being imperative for you to do so. Strip moulds however, along with the quad and space mould and the short lead and rule mould, have to be partially dismantled each time a size or product change is made, as you will be instructed.

CHAPTER 23

Moulds available for use on the Super caster

All 'Monotype' moulds (with the exception of the lead and rule mould designed for the composition caster) can be used on the Super caster. The moulds designed for the composition caster and the display type machine require an adaptor base.

There are two adaptor bases; one which is used with the composition moulds, the quad and space mould and the short lead and rule mould (and the Duplex, Triplex, dual-type and split-fraction moulds) and another which is used with the display type machine mould.

The moulds range from small type composition moulds (5–14pt) and large type composition moulds (14–24pt), to moulds which cast display type in the 14–36pt and 42–72pt range (together with cored quotations) and the strip moulds which produce a wide variety of leads, rules and borders in 1–3pt and 4–18pt (with dashes, clumps and tie-up slugs); together with furniture, foundry furniture, mounting material and tie-up slugs from 24pt to 72pt.

There are also the Super caster Palace script moulds (and the italic mould) the Duplex, Triplex and dual-type composition moulds designed for casting exotic faces, and the split-fraction mould.

The full range of products obtainable from the moulds is listed in 1.1.

The following briefly summarises all the moulds, which (with the exception of the dual-type mould and the split-fraction mould) are given detailed coverage in Part 5.

The type moulds (moulds with crossblocks)

23.1 Small type composition moulds 5–14pt

The small type composition moulds, designed for use on the composition caster, cast type in the 5–14pt range from 0·2in matrices (or extended small type matrices measuring 0·2in × 0·4in, 0·4in × 0·2in and 0·4in × 0·4in in exceptional cases), a separate mould being supplied for each point size.

The 13pt and 14pt moulds produce type with a slight bevel on the shoulders. This is necessary in these sizes in order to give the matrix a larger seating area on the mould. The type nick is on the right-hand side block.

These moulds are used with an adaptor base on the Super caster.

23.2 Quad and space mould 6–12pt

This mould, designed for use on the composition caster and on the display type machine, casts spacing material in the 5–14pt range in any set-width up to 3 ems; a mould blade being supplied for each point size.

The mould is adjustable and basically similar in construction to the small type composition moulds. It incorporates a clamping bar (instead of side block springs) which also serves as a blade cap; and a distance plate which is used when casting in 6–8pt. The type nick is on the right-hand side block.

This mould is used with an adaptor base on the Super caster.

23.3 Large type composition moulds 14–24 pt

The large type composition moulds, designed for the composition caster, consist of a mould base, together with interchangeable insets for each point size. They cast type in 14pt, 18pt and 24pt from 0·4in matrices. The type nick is on the right-hand side block.

These moulds are used with an adaptor base on the Super caster.

23.4 Display type machine moulds 14–36 pt

These moulds, designed for the display type machine, consist of a mould base together with interchangeable insets for each point size; for casting type in 14pt, 18pt, 24pt, 30pt and 36pt from large display type matrices. The type nick is on the left-hand side block.

These moulds are used with an adaptor base on the Super caster. The base used is different to the one used with moulds originally designed for the composition caster.

23.5 Short lead and rule moulds 1½ pt, 2 pt and 3 pt

The short lead and rule moulds, designed for use on the composition caster and on the display type machine, consist of a mould base, with interchangeable insets for casting 1½ pt, 2pt and 3pt leads and rules from special matrices, in lengths ranging from 2 to 36 points. The upper edge of the mould blade is shaped to fit in the matrix groove and thus forms a complete rear wall for the casting cavity; while the upper edge of the crossblock is high enough to act as a front wall when in the casting position, a stop being provided to ensure the matrix is correctly located. Rules can be cast flush-sided, central or full-faced.

Special low blades and corresponding matrices are supplied for casting low leads.

These moulds are used with an adaptor base on the Super caster.

23.6 Super caster display type moulds 14–36 pt

Designed for the Super caster, these moulds consist of a mould base with interchangeable insets for each point size, for casting type in 14pt, 18pt, 24pt, 30pt and 36pt from large display type matrices. The type nick is on the left-hand side block.

23.7 Super caster display type moulds 42–72 pt

Designed for the Super caster, these moulds consist of a mould base with interchangeable insets for each point size, for casting type in 42pt, 48pt and 60pt and 72pt from large display type matrices. The type nick is on the left-hand side block.

23.8 Super caster low space and quotation insets 48 pt, 60 pt and 72 pt

Special insets are provided for use with the base of the 42–72pt display type mould, for casting low spaces and cored quotations.

23.9 Palace script moulds 14–42 pt

The Palace script mould (derived basically from the italic mould) is designed for casting series 429 Palace script. It produces type of unusual shape, with the cast character supported on a head which overhangs the body.

Special equipment (including a mould blade slide, a connecting tube and a type pusher) is required on the machine when casting from this mould.

23.10 Italic moulds 14–42 pt

The italic mould (which can be used for casting italic type faces) is basically the same as the Palace script mould and produces type bodies of like shape which cater for similar character overhang.

Special equipment (as with the Palace script mould) is required on the machine when casting from this mould.

23.11 **Duplex moulds 14–18pt**

The Duplex mould (used for casting exotic type faces) has two blades, the upper portion of the main blade being cut away to allow an auxiliary blade to operate by its side; thus enabling the mould to be used with either 0·2in × 0·2in or 0·2in × 0·4in matrices (with the main blade withdrawn) or 0·4in × 0·4in matrices (auxiliary blade also withdrawn flush with main blade).

The auxiliary blade is operated by the low quad lever on the adaptor base, being set as required, to position it to provide the correct seating for whichever matrix is used.

23.12 **Duplex low quad moulds 14–18pt**

The Duplex low quad mould is designed on similar lines to the Duplex mould, except that the main blade has a top blade; thus in effect providing two auxiliary blades which have to be controlled individually by the low quad lever on the adaptor base, to accommodate 0·2in × 0·2in, 0·2in × 0·4in or 0·4in × 0·4in matrices, or to produce low quads. A special lever bracket attachment (as used with the Triplex mould) is supplied for this purpose; it can be attached to the adaptor base in place of the standard bracket as required.

23.13 **Triplex mould**

The Triplex mould (designed to accommodate the high and low accented characters of Arabic series 589) has three blades, and functions on lines similar to the Duplex low quad mould; the two auxiliary blades being individually adjusted and controlled by the low quad lever on the adaptor base, to provide correct seating for the matrix used. A special lever bracket attachment (as used with the Duplex low quad mould) is supplied for this purpose: it can be attached to the adaptor base in place of the standard bracket as required.

23.14 **Dual-type mould**

The dual-type mould (designed for casting Hebrew) has two full depth blades assembled side by side, each being 4½pt. The blades can be adjusted to produce either 4½pt or 9pt type bodies as necessary, to meet the requirements of accented characters.

One of the two blades is operated by the low quad lever of the adaptor base, being set as required, to position it to provide the correct size type body.

This mould, which is not given any detailed coverage in Part 5, is similar, in broad outline, to the 5–14pt composition mould, and is dismantled and assembled accordingly.

23.15 **Split-fraction mould**

This mould (designed for casting split-fractions of any value, in the 8–12pt range) is similar to the dual-type mould, with two blades side by side. It is equipped with interchangeable blades in 4pt, 4½pt, 5pt, 5½pt and 6pt.

One of the two blades (when used in pairs) is operated by the low quad lever of the adaptor base.

The split-fraction mould, which is not given any detailed coverage in Part 5, is similar, in broad outline, to the 5–14pt composition mould, and is dismantled and assembled accordingly.

The strip moulds

23.16 **Super caster lead and rule mould 1–3pt**

The 1–3pt lead and rule mould is designed to cast rules and high and low leads in 1pt, 1½pt, 2pt and 3pt. The mould is adjustable, and interchangeable mould blades, insets and distance pieces are supplied for each point size, together with matrices and blade caps which seal the top of the mould.

23.17 Super caster lead and rule mould 4–18pt

The 4–18pt lead and rule mould is designed to cast high and low leads, rules, continuous borders and dashes and clumps in the 4–18pt range. The mould is adjustable, and interchangeable mould blades, insets and distance pieces are supplied for each point size, together with matrices and blade caps which seal the top of the mould.

The mould can also be equipped with special parts for casting full-faced rules and 12pt and 18pt tie-up slugs.

23.18 Furniture mould

The furniture mould is designed to cast a variety of products in predetermined lengths. This includes furniture in the 24–72pt range, plate supporting material in 24pt, 36pt and 48pt, two-piece type-high foundry furniture in 36pt, 48pt, 60pt and 72pt, and 18pt full-faced rules.

The mould is adjustable, the wide product range being achieved by means of interchangeable parts which include a combined mould blade and rear wall, distance pieces, packing plates and core pieces, which, together with matching caps, control the length of the cast, form the shape of the product and seal the top of the mould.