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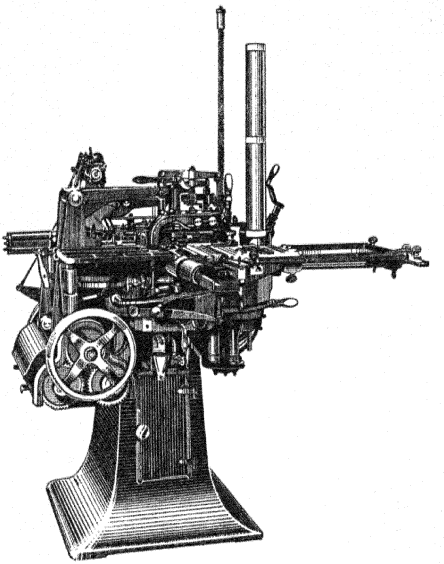


A "MONOTYPE" CASTING MACHINE

"MONOTYPE"
CASTER
INSTRUCTION BOOK

Prepared for the Guidance
of Attendants and Learners

THE MONOTYPE CORPORATION LIMITED
43 Fetter Lane, London, E.C.4
1935

INDEX

Index to Symbols Used in this Book

This index shows the pages on which the symbols referred to appear. Where the page number is printed in italic figures it indicates that the symbol appears more than once on that page.

INTRODUCTION

The object of this handbook is to provide concise information regarding "Monotype" casting machines, so that attendants in charge can have at their disposal information regarding derangements in adjustment of any particular part of a machine.

It is essential that all parts should be adjusted to the standards laid down in this book; and if these adjustments are maintained, and the machine properly lubricated, it will function correctly, and with proper metal and a satisfactory air supply, will give a product satisfactory in every way.

A "Monotype" casting machine consists of a series of complete and distinct mechanisms, each performing a separate function during each revolution of the machine. These mechanisms cause a required matrix to become accurately positioned upon the mould, and adjust the blade in the mould so as to give types of correct thickness.

The mould blade adjustment is regulated according to the position of the following six wedges:—

THE NORMAL WEDGE.—This regulates the mould blade position in measurements of units, according to the width of the type face to be cast. These units of measurement usually range from 5 to 18 units.

TWO JUSTIFICATION WEDGES.—These are brought into operation each time a justifying space is required. These wedges, when in operation, cause the mould blade to be opened sufficiently so that each space is cast of the required size, making the finished line correct in length.

TWO TRANSFER WEDGES.—These operate one above the other. When the lower transfer wedge is in operation, the normal wedge which abuts against it produces the definite unit openings in the mould blade. When the upper transfer wedge is in operation, the adjustment of the mould blade as decided by the position of the normal wedge, is increased according to the position of the two justification wedges, because the normal wedge abuts against the upper transfer

wedge, and the upper transfer wedge abuts against the justification wedges.

THE MICROMETER ADJUSTMENT WEDGE.—This is for increasing or reducing the type width measurement by microscopic dimensions, so that the length of the line may be exact.

The normal wedge and justification wedges take up 15 positions, decided by the 15 stop pins in the front pin block. Each move to the rear of one justification wedge adds ·0075″ to the adjustment of the mould blade, as decided by the normal wedge, and each move of the other justification wedge to the rear adds ·0005″.

The pump mechanism forces molten metal into the mould, on the top of which a matrix is positioned, and another mechanism withdraws the type from the mould and takes it to a position whence it may be pushed into a storage channel until a line is complete. Another mechanism then takes charge of the completed line, and positions it in a galley.

The main mechanisms are actuated by cams, designated by letters, and arranged on two opposing shafts in the following order:—

A. TYPE CARRIER CAMS.—These bring the mould cross-block to position for a matrix to be seated upon the mould, and after the type is cast, cause it to be carried to a position from which it can be pushed into a storage channel until all the types in the line have been assembled.

B. PUMP CAMS.—Actuate the pump which forces the molten metal into the mould.

C. TRANSFER WEDGE CAMS.—Control two wedges which decide whether character type bodies or space type bodies should be cast. No matter which transfer wedge is in use, immediately a type has been cast the transfer wedge is moved forward to give the necessary clearance to the mould blade sizing wedge, should a smaller type be required next. The required transfer wedge then returns to its operating position before the next type is cast.

D. CENTRING PIN LEVER CAMS.—These move the centring pin lever, which takes the matrix-case to and from the mould, locks the normal wedge in correct position, accurately positions the matrix upon the mould, and clamps it

ready to receive the molten metal against the punched end. It also operates the low quad mechanism.

I. LOCKING BAR CAMS.—Operate two toothed bars for fixing two stop racks in the positions in which they have been placed to decide the casting position of the matrix-case.

E. JAW TONGS SPRING BOX CAMS.—Move two bell cranks, to each of which are attached tongs for moving the matrix-case to the required position.

F. PAPER TOWER CAMS.—Work the gear for advancing the paper ribbon, the perforations in which indicate the position to which the matrix-case must be moved.

G. MOULD BLADE CAMS.—Pull the mould blade open to a width decided by the sizing wedges, and then push the blade to eject the type into the type carrier.

H. TYPE PUSHER CAMS.—Propels the type through the type carrier into a channel, prior to its being conveyed to the galley when the line is complete.

GALLEY CAM.—Draws the completed line to a position in front of the galley, raises a rule which supports the last line at the galley entrance, and pushes the line towards the galley.

DRIVING

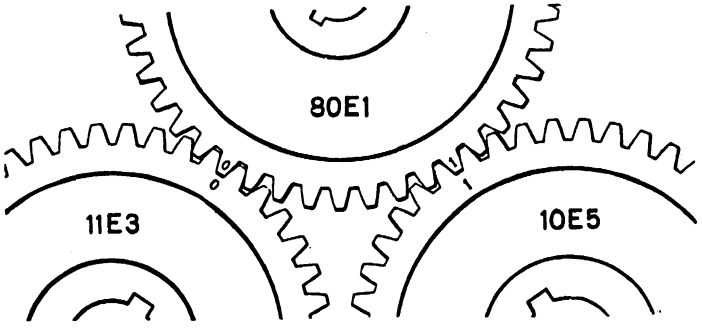
The machine is driven by a pulley keyed to the front cam shaft, and the speed should be varied, by means of a coned pulley or other speed-varying gear, from 140 revolutions per minute for 12-point type, up to 160 revolutions per minute for 6-point type. The speed depends upon the cubic content of metal in the type cast, as the greater the amount of metal forming the type, the greater the time required to cool it. In the case of the larger type sizes such as 12 point and above, the *quality* of the metal also affects the speed of casting, as the harder the metal the higher the temperature required to melt it. This raises the temperature of the mould, and increases the time required for the types to solidify.

The driving belt travels through a shifter eye, for the purpose of bringing it, when required, on to a "loose" pulley running by the side of the "fixed" pulley. The pulley runs clockwise, and the shifter eye should encircle and lead the belt as the latter approaches the pulley. *Care should be taken that the belt joint or fastener does not hit the shifter eye*, as in that event the shifter is likely to be broken. The belt should

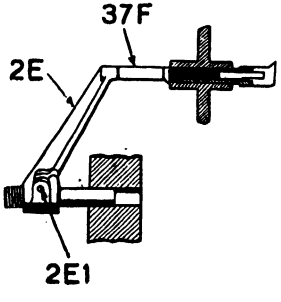
be 1¼" wide, and should be kept fairly tight in running, otherwise the machine will run irregularly.

TIMING THE CAMS

The two sets of cams are geared together by means of an intermediate gear, two teeth of which are marked "o" and "1" respectively. One tooth on the gear of the driven cam shaft is marked "o" and one tooth on the gear of the driving cam shaft is marked "1"; this mark is positioned at 340°. The intermediate gear is fixed on a shaft that carries the hand wheel and a worm that also drives the galley mechanism. When positioning the "o" and "1" in cam gears, the "o" on worm should be placed between the two "o-o" of worm gear, thus synchronising the galley with the cams. At a certain position in the machine's revolution the figures "o-o" and "1-1" must synchronise.



BELT SHIFTER OR STARTING GEAR

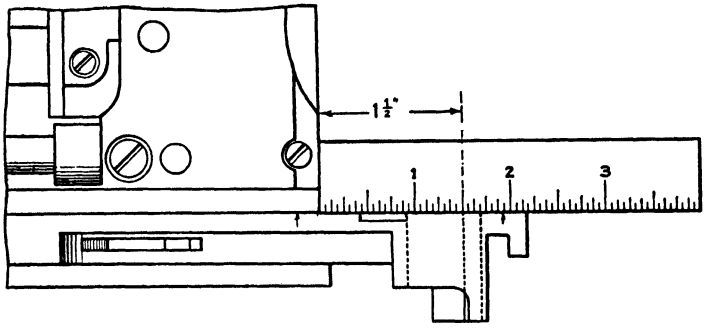


With the starting lever out of action, adjust the projecting arm (2E) on spring rod (6E) so that the operating lever spring box has $\frac{1}{64}$" play between the end of the projecting arm and the end of starting lever.

TYPE CARRIER

The type carrier is connected to the mould crossblock, which it brings to position for a type to be cast. After a cast has been made, the mould crossblock is moved so that the jet at the foot of the type is sheared and ejected into the melting pot. The type is then ejected from the mould into the type carrier, which again returns the crossblock to casting position. During the time that a type is being cast, the type previously cast is pushed out of the type carrier into the type channel.

The type carrier extension (a22B) must be adjusted so that there is a measurement of 4 inches from the end of carrier to the face of the sleeve (a22B2), against which the spring abuts.



When the inner hole in the type carrier forked eye (a21B5) is connected to the lower hole in the cam lever extension, the movement of the carrier from the casting position to the position in which it receives type from the mould must be exactly 2 $\frac{5}{32}$". Raise or lower the cam lever extension to obtain this dimension.

Having obtained the correct length of stroke, turn machine to casting position (220°), and adjust the carrier connecting rod (21B) until the face of carrier against which the type is clamped is exactly level with the face of the fixed type channel block (a51FF). Turn machine to 90°, and check that the face of carrier against which the type is clamped is exactly 1½" from end face of "B" pin block.

PUMP

The pump mechanism includes a pump body fitted at one end with a nozzle and at the other end with a piston.

Levers lift the pump body so that the nozzle makes contact with the mould, and the piston then forces metal into the mould against the face of the matrix, thus forming a type. The nozzle is then moved away from the mould, so that it shall not become cooled by too long contact with the mould.

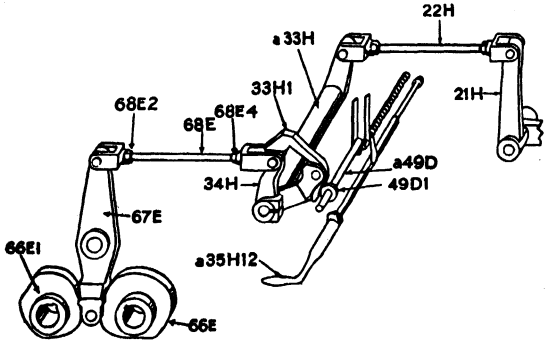
The molten metal gets beneath the piston on its return stroke by passing down the inside of the movable end of the piston, and when pumping takes place the pressure beneath the piston closes the metal inlet, and full force is thus maintained on the metal injected into the mould.

A valve prevents the bulk of metal in the pump body from following the piston on the return stroke, so that the supply must enter through the inlet. A small hole in this valve, however, allows sufficient metal to return so that no metal will remain at the nozzle point.

PUMP CONNECTING RODS

Adjust the pump body lever connecting rod (68E) so that the pump body operating lever (34H) contacts firmly on the pump rocker arm (a33H) without compressing buffer spring (a33H6) more than $\frac{1}{64}$" when the cam lever is at the end of its forward stroke.

Adjust the pump bell crank connecting rod (22H) between the pump rocker arm and the bell crank (21H) so that the distance between the centres of the connecting pins is $10\frac{3}{4}$".



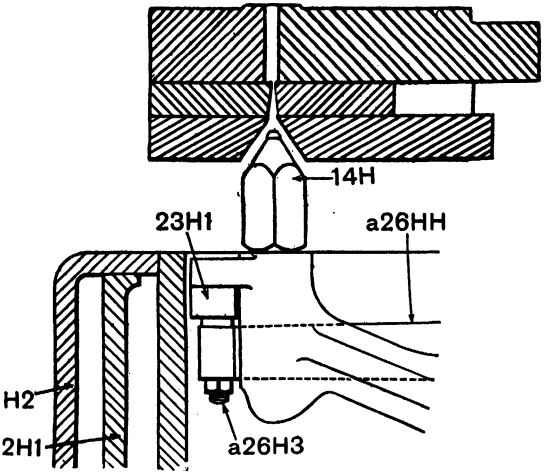
NOZZLE POSITION

The melting pot must be positioned so that the nozzle is quite free to seat in the mould. To test, remove the piston, attach the nozzle gauge (8CT3) and place the machine and

melting pot in casting position. Depress the operating lever (29H), and see that nozzle seats quite freely in the gauge when the operating lever is released.

SQUARING NOZZLE TO MACHINE BASE

With the melting pot and machine still in casting position, place between the lifting lever and stand support sufficient packing to just fill the gap, then lower the melting pot.



The nozzle must rest and lift centrally to its seating in the mould base, otherwise a flat will wear on one side of the nozzle point, and this in time will cause a leak between mould and nozzle.

Remove the nozzle and nozzle gauge, and return the melting pot to casting position with the packing still in the gap. Attach the nozzle squaring post (8CT6) and regulate the nuts (28H4 and 28H5) which raise the lifting lever, so that the squaring post is correctly at right angles with the machine base.

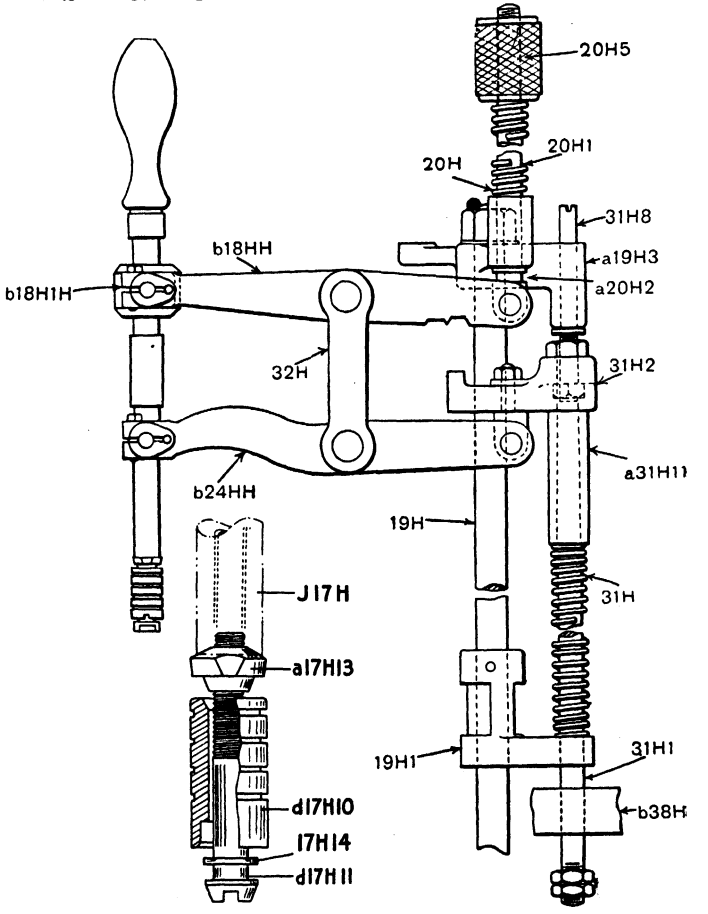
Remove the packing and squaring post, replace the nozzle and nozzle gauge, and, if necessary, readjust the nozzle position.

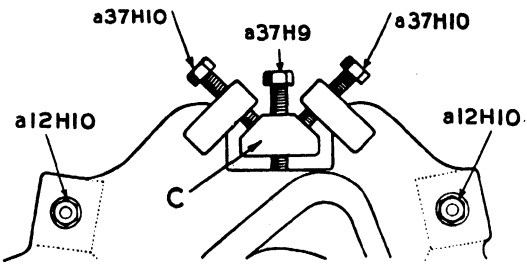
THE PUMP

With the mould and matrix-case in position, insert the piston in pump body, and raise metal pot to casting position. Loosen the nuts at lower end of rod (31H1), so that they are

well clear of the casting, release hand trip and turn machine to 220°. Adjust the crosshead stop (31H8) so that the connecting pin (32H1) is free in the hole in piston lever; most of the $\frac{1}{32}$" clearance between pin and hole should be on the underside of pin. Rotate the upper nut (31H13) at lower end of rod (31H1) until it contacts with the casting.

Adjust the nuts at top end of the pump body operating rod, so that the operating lever (29H) has about $\frac{1}{16}$" clearance in the shallow slot of piston lever. Turn machine, and lock nuts (31H13) in position.





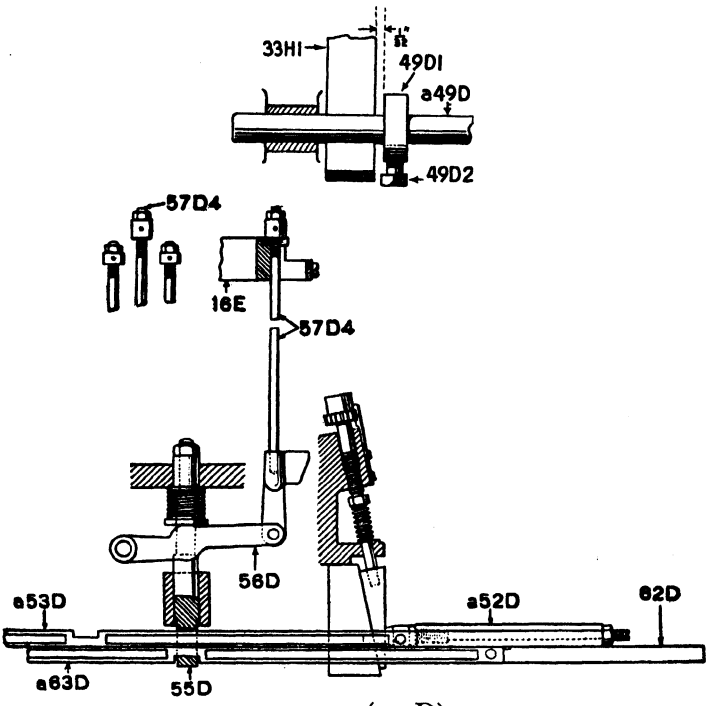
To move nozzle left or right in relation to its mould seating, adjust the screw (a37H9) to move it to back or front, adjust by the two screws (a37H10).

THE PISTON

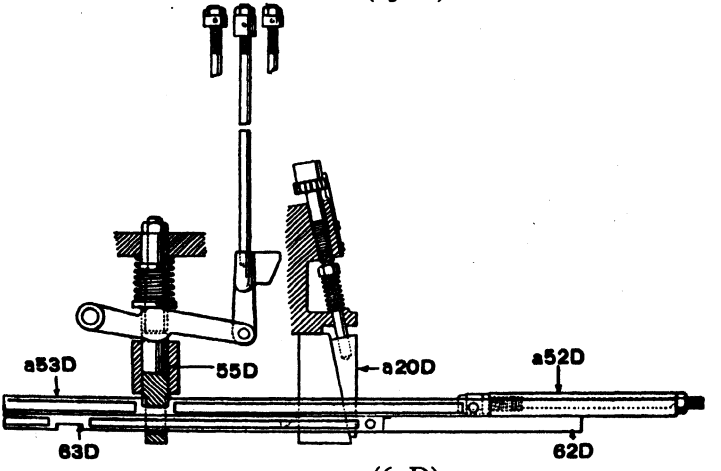
The loose end on piston should have $\frac{1}{32}$" movement. The loose end (d17H10) is adjusted by loosening the nut (a17H13) and moving the screw (d17H11) as required, to increase or reduce the metal supply. Between the lower face of the piston end and the stud is a washer (17H14). This washer has grooves on one side; when in position, these grooves must face towards the upper end of the piston. As the piston descends, the lower face of the nut (a17H13) makes a metal tight joint with the loose end of piston; as the piston rises, the loose end comes away from the nut, permitting the metal to flow down the inside of the piston end, and past the grooves in the washer.

PUMP TRIP TUBE COLLAR

Release the hand trip and turn the machine to 100°, so that the pump rocker arm latch engages with the pump operating lever. Adjust the collar (a49D1) on the tube (a49DD), so that the side of collar is $\frac{1}{32}$" clear of the latch. Lock the collar firmly in position. The end of the adjusting screw (49D5), provided to prevent the collar striking the water pipe, should protrude $\frac{1}{16}$" beyond the water pipe. This screw can be adjusted without removing the main galley, and is locked in position by the nut (49D6) on inside of casting.



SPACE TRANSFER WEDGE (a52D) IN OPERATION



TYPE TRANSFER WEDGE (62D) IN OPERATION

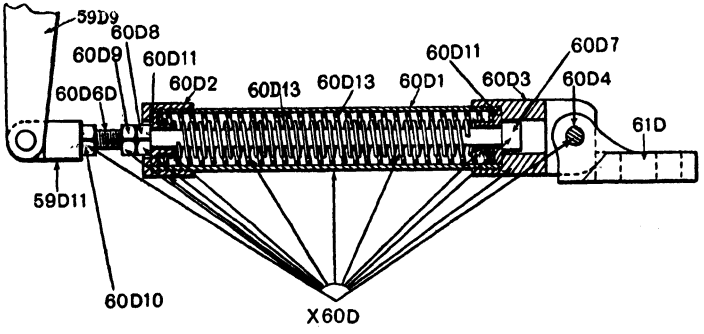
TRANSFER WEDGES

There are two transfer wedges, positioned one over the other. These decide whether types should be cast to widths of definite units, according to the position of the normal wedge, or that they should be cast to an increased thickness (according to the positions of the justification wedges) when spaces are cast.

Immediately the type has been cast, the tension of the mould blade sizing spring is released, and the transfer wedge is moved forward to permit the normal wedge or justification wedges to be freely moved to a new position.

SPRING BOX

Adjust the nut (60D8) so that the rod is not slack lengthwise in the tube; fasten by the lock nut (60D9).



Adjust the rod (60D6D) into the eye (59D11) until the amount of compression on the spring in the spring box at the end of the outward movement of the cam lever is approximately double that shown at the end of the inward movement of the lever. Adjust the extension post (59D1) to give about $\frac{3}{16}$" compression at the end of the outward movement of the cam lever; the inward compression should then be about $\frac{3}{32}$

SPACE TRANSFER WEDGE

Place the justification wedge (11D) in the No. 8 position, and the wedge (10D) in the No. 3 position. Cast some type (from the 18-unit position for preference) with the type transfer wedge in operation, and a similar number from the

same unit position with the space transfer wedge in operation. If the screw (52D1) in the space transfer wedge is correctly adjusted, the two castings will be exactly the same in width measurement. In connection with this adjustment it is useful to know that one complete turn of the screw will alter the size of product approximately ·003″.

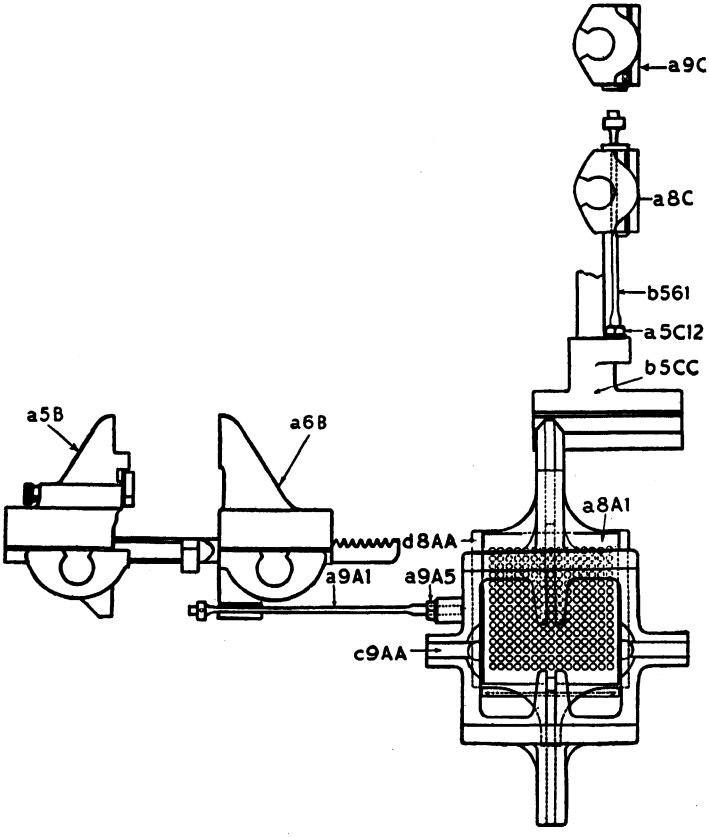
MATRIX CENTRING PIN LEVER AND BRIDGE

The centring pin lever functions as follows:—

Takes the matrix-case to and from the mould.

Operates the matrix centring pin.

Provides movement for operating the low quad mechanism.



Depresses the normal wedge locking pin.
Raises the justification wedge lever arm rods (15D3).
Raises the transfer wedge shifter lever arm rod (57D4).

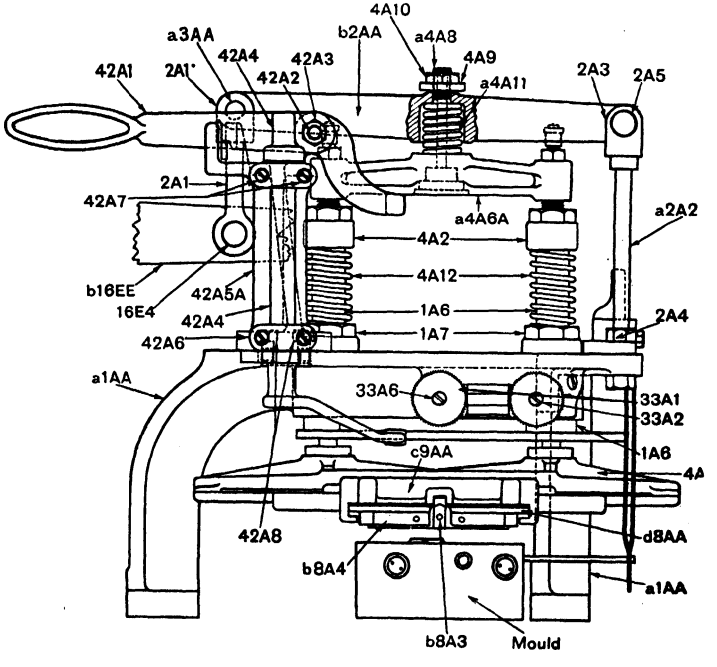
The centring pin bushing, matrix-case draw rods and bridge lever fulcrum rod must be adjusted before making the adjustments in connection with the first three items.

CENTRING PIN BUSHING

Before placing the bridge on machine, adjust the sleeve (a6A6) at the top end of bushing, and the nut (a6A22) at the lower end, so that the centring pin will slide freely without the slightest shake.

DRAW RODS

Turn the machine slowly until the centring pin is about to contact on a low space matrix, and adjust the draw rod so that the centring pin is approximately central over the matrix. Position a character matrix over the mould, and see that the centring pin enters coned hole without moving the



matrix-case. If there is the slightest movement, readjust the rods and firmly tighten in position.

BRIDGE LEVER FULCRUM ROD

See that the fulcrum rod (a2A2) is screwed tightly into the forked eye (2A3), and that the distance from the upper surface of the bridge casting to the centre of the hole in the forked eye is $4\frac{15}{16}$". After tightening the rod firmly in position, see that the end of the bridge lever (b2AA) enters freely into the fork of the bridge lever connecting link (2A1).

DESCENT OF MATRIX-CASE

With the matrix-case in the central position, and machine at about 345°, remove the link pin (a3AA), loosen the two carrying frame stop nuts (4A2), and insert two thicknesses of spool paper between the mould and matrix-case.

Depress the bridge lever (b2AA) to ensure that the full pressure of the crosshead spring (a4A11) is being exerted, and bring down one stop nut (4A2) until the paper can be moved without tearing if lightly pulled. Continue to depress the bridge lever and bring down the other stop nut (4A2) until the paper is free, then very slightly unscrew this nut until the paper can again just be moved without tearing. Lock both nuts firmly in position and check that the adjustment is correct.

ASCENT OF MATRIX-CASE

Insert the link pin (a3AA), and loosen the cross beam lock nut (4A10).

Place the matrix-case in the central position and turn machine to casting position (220°).

Place one thickness of spool paper between the nut (4A9) and the bridge lever (b2AA), and bring down the nut until it just contacts with the paper. Lock the nuts firmly together and check setting. It is of the greatest importance that this adjustment should be carefully made; failure to do so will result in excessive wear on the matrix seat of the mould, and damage to the matrices.

TIMING THE CENTRING PIN

With the link pin (a3AA) inserted and the matrix-case still in the central position, with a character matrix in the

central position of the matrix-case, turn machine slowly until one thickness of spool paper can just be withdrawn from between the matrix-case and mould. Loosen the centring pin lock nut (5A2), and rotate the adjusting nut (5A1) to give ·018″ clearance between the underside of adjusting nut (5A1) and top of centring pin spring abutment (upper) (a5A5). Lock nut and check setting.

LOW QUAD MECHANISM

The mould blade is made in two pieces. Normally the blade works as one piece, but when low quads or low spaces are required, the upper section of the blade is moved and held forward underneath the matrix, so that a type body of reduced height is cast. The low quad mechanism is brought into action by matrices having no cone holes. These cause the centring pin to take a shorter stroke, and this actuates a lever which holds the upper section of the mould blade forward.

Place a normal wedge, of the largest set size that is likely to be used, in the 18-unit position, and see that the mould sizing screw (b14C1) is set to give the correct mould opening. Turn the machine to 200° with the centring pin in the coned hole of a character matrix. Loosen the cam plate nut (5A9) so that the cam plate is out of action, and loosen the lock nut (16E19) on the actuating lever adjusting screw (16E18). Screw down 16E18 so that it just touches the centring pin lever (b16EE), and then screw back one-quarter turn. Lock the nut, and check that the adjustment still holds, and that the upper mould blade is fully open.

MOVEMENT OF SELECTING LEVER

Turn machine so that the centring pin lever is in its highest position, and adjust the cam (5A7) horizontally so that it nearly contacts on the selecting lever (a16E20E). This can be checked by watching the end of selecting lever, and making the adjustment so that lever just breaks contact with the side of slot in which it operates, and then slightly moving the cam out of contact with lever.

Without moving the cam from its horizontal position, move it vertically till it just causes the selecting lever to break contact with the side of slot in which it operates. Lock the cam firmly in this position.

Turn machine to the quad position (on low space matrix), and see that the end of selecting lever clears the top of character lever as it passes across from character lever to low quad lever. Should it not do so, slightly raise the cam. Also see that selecting lever, when over the low quad lever, is just clear of the side of the slot in actuating lever.

When adjusting the centring pin for alignment, it may be necessary to alter slightly the horizontal position of the cam. Moving the centring pin in the direction of the selecting lever without readjusting the cam plate, will cause increased pressure on the centring pin. As a final check on the adjustment, place the machine in casting position with the centring pin in the coned hole of a character matrix. If the mechanism has been correctly adjusted it should be possible, with the fingers exerting about 15-lb. pressure, to lift the centring pin well clear of the mould.

IMPROVED LOW QUAD OPERATING MECHANISM

Remove the bridge and loosen the selecting lever fulcrum bolt lock nut (16E24). Move the cam lever (16E26E) so that it positions the selecting lever (a16E20E) over the space lever (a29A9A), and carefully adjust the eccentric bolt (a16E23) to give ·003″ clearance between the selecting lever and side of the slot in which it operates. Lock the bolt firmly in position and check that the adjustment still holds.

Replace the bridge, and see that the standard adjustments of the centring pin, etc., are correct. Then turn machine to 40° and adjust the actuating lever screw (16E18) so that the cam face of the lever (16E26) is just clear of the selecting lever. Firmly tighten the nut (16E19).

The centring pin can be adjusted for alignment without interfering with the setting of this improved mechanism.

NORMAL WEDGE LOCKING PIN

The normal wedge locking pin descends to between two teeth in the normal wedge, and holds the wedge in a definite position so that the mould blade will be adjusted accurately to the required size.

See that this part slides freely in its bearings without the slightest shake. Adjust the four-sided nut (14B5) on the top

of the locking pin stand to obtain this condition. If, in adjusting, the locking pin becomes too tight in its bearing, turn back the nut and tap it lightly on the top with a piece of wood or lead, and then tighten up again to within a short distance of its previous position. Never leave the nut off its seating.

LIFT OF NORMAL WEDGE LOCKING PIN

To obtain the correct lift, turn machine until the centring pin lever is at its highest position, and partly insert a normal wedge so that its plain part comes under the locking pin. Unscrew the nuts at top end of locking pin until locking pin rests on the normal wedge. Advance the lower nut to contact with the abutment piece (14B10) and then make exactly one-and-a-half turns more. This will raise the locking pin $\frac{1}{16}$" clear of normal wedge. Lock the nuts firmly together and remove, or properly insert, the normal wedge. When locking or unlocking the nuts at top of locking pin, always use two spanners; failure to do so may cause the threaded portion of pin to become loose in the lower end.

JUSTIFICATION WEDGE LEVER ARM RODS

The justification wedge lever arm rods raise the justification wedges so that the matrix jaws may move them to the required positions. At the same time they actuate mechanism for placing the pump out of action and for causing the galley cam to take the completed line to the galley.

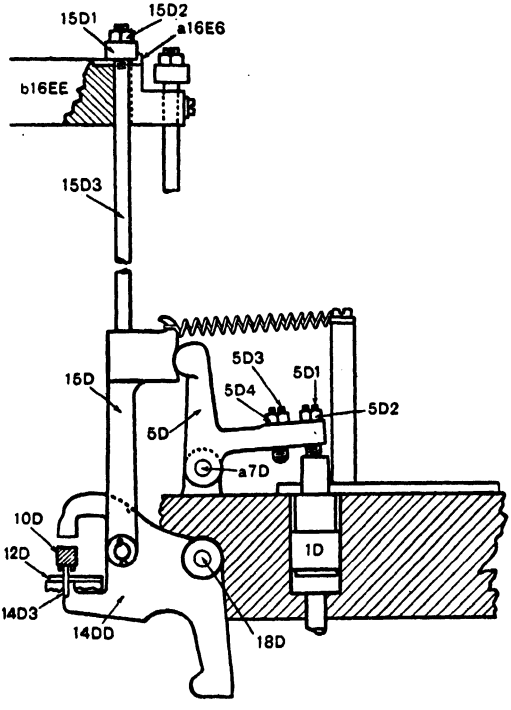
The points to observe in adjusting these rods are:—

The justification wedges must be raised so that their teeth are lifted above the fixed tooth; the projection at the end of each wedge must be sufficiently high for the matrix jaws correctly to engage it; the wedges must not be raised so high that they are forced against the underside of the locking bar (d13B).

See that the rods are screwed tightly into the lever, and unscrew the nuts (15D1 and 15D2) toward the top of the rods.

Engage the rods and turn machine so that the centring pin lever is at the top of its stroke, the matrix jaws are fully open, and the justification wedges are suspended in their 1-1 positions. Adjust the nuts (15D1 and 15D2) so that the top of the projection on each wedge is level with the top of the matrix jaw. Move the wedges so that the tooth which is

nearest the projection is directly under the locking bar, and test that the nuts on each rod will clear the centring pin lever plate (a16E6) when pressure is applied to the lower end of the corresponding justification wedge lever. If necessary, loosen the nuts and lock firmly in position.



TRANSFER WEDGE SHIFTER LEVER ARM ROD

With the centring pin lever in its highest position, adjust the nuts (57D1 and 57D2) at top end of rod to give $\frac{1}{32}$" clearance between the underside of nut (57D1) and top of retaining plate (16E2) on centring pin lever.

ROCK LEVERS ON JUSTIFICATION AIR PIN BLOCK

Adjust each of the bell cranks (4D, 5D and 6D) by the screw near the fulcrum, so that each lifting rod as it disengages from the centring pin lever will fall to position just clear of the retaining plate (16E2).

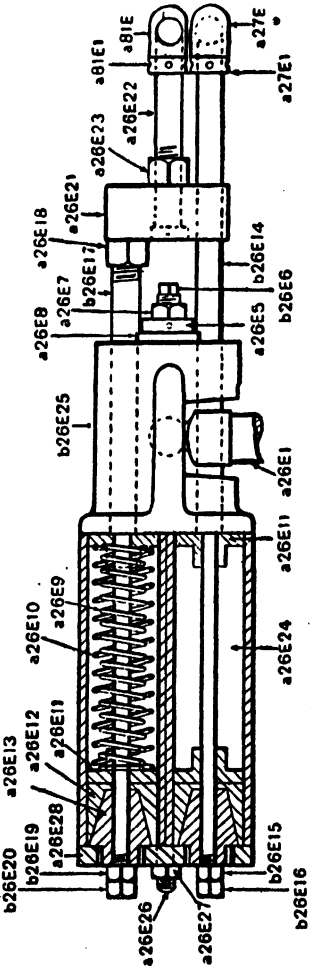
Screw down the abutment screws (4D1, 5D1 and 6D1) until the operating rods begin to move, and then unscrew one-and-a-half turns. Lock the screws firmly in this position.

JAW TONGS MECHANISM

On each side of the machine are two sets of tongs, each fitted with jaws at the end. One set is called the pin tongs, and the other the matrix tongs. The jaws of the pin tongs meet against a blown-up pin, and in doing so they move a stop rack to the position indicated by the pin. This stop rack is immediately locked in this position. As the pin tongs open, the matrix tongs close, the jaws of the latter carrying the matrix-case to the position indicated by the stop rack.

The tongs are actuated by a spring box, serving as a safety device should the matrix-case or stop rack become jammed.

Before putting the spring box on machine, adjust the two ball sockets (a81E and a27E) on the jaw tongs bell cranks so that the ball ends are quite free without shake. Then tighten the nuts (a81E1 and a27E1). Adjust the ball plug (b26E6) so that the ball extension (a26E1) is also free without shake. Adjust the plug button (a26E5) to centralise the ball extension (a26E1) in the opening in the spring box tube cap (b26E25). Tighten the nut (a26E7) and check that the ball extension is still just free. Make sure that the shoulders on the rods (b26E17 and b26E14) are in contact with the spring



abutments (a26E11), then rotate the nuts (b26E19) so that they lightly contact on the collars at end of spring box, and in this position firmly lock the nuts (b26E19 and b26E20).

Attach the spring box and bell cranks to the machine so that, when the lower end of the ball extension (a26E1) is contacting with the adjusting screw (a24E7) in cam lever, there is about $\frac{1}{8}$" gap between the top of cam lever and underside of the square portion of the ball extension. Make sure that the hole in the ball extension is parallel with the rod (b26E14) which passes through it, and tighten the two bolts (24E2) on cam lever.

Place matrix jaws in position; the shorter pair goes over the rear pin block, and the longer pair over the front pin block. Secure by the lock slides (a38E15). Next place on the pin tongs, keeping the spring posts (55E13 and 56E17) to the rear in each case. Place on the equalising spring, then the links (the long link (60E), is connected to the rear tong of the front pin tongs; the short link to the rear tong of the rear pin tongs).

The matrix jaws should just meet firmly at 108°, and in this position the striking edge of the front pin jaw on either block should be at least $\frac{5}{32}$" beyond the first pin. This result is obtained by turning the plug button (a26E5) to right or left, as required, without disturbing the adjustment of the ball plug (b26E6). When testing this adjustment, the ball plug lock nut (a26E7) should be tightened.

The front and rear matrix jaws should be made to close simultaneously by releasing the nut (a26E18) and turning the rod (b26E17) to the right or left as required. Tighten the nut (a26E18) and check setting. Turn machine so that the matrix jaws are fully open, and check that they are $\frac{1}{16}$" clear of their stops (11B and b10C). Perforate a piece of spool paper to raise the air pins Nos. 7 and 17. Turn machine to 320° and adjust the studs (a55E15 and 56E3) so that the pin jaws just grip one piece of spool paper when the nuts on the pin jaw studs are tightened.

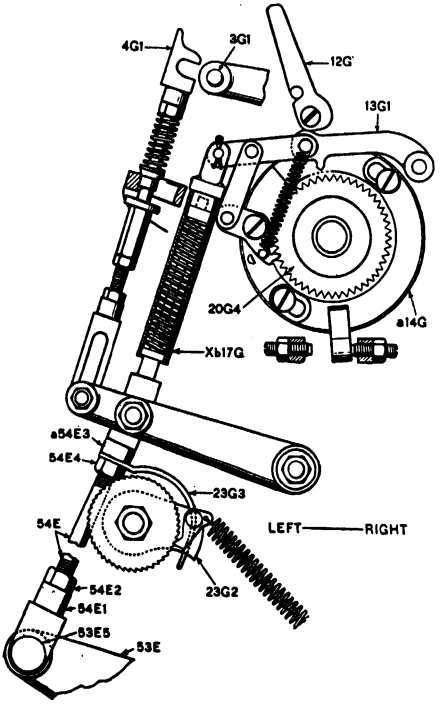
Again turn machine to 108° and, if matrix jaws are not correct to their original setting, loosen the ball plug nut (a26E7) and move the ball plug button to obtain the required

position. After this readjustment has been made, it may also be necessary to reset the pin jaw closing at 320°.

AIR TOWER

The air tower carries a crossbar in which is a set of 31 holes, corresponding with the full number of perforations that may be made in the paper ribbon.

Pipes lead from these holes to 14 pins on the front pin block for deciding which unit row of the matrix-case shall be brought over the mould. Another 14 pipes lead to 14 pins on the rear pin block for deciding which particular matrix in the row selected shall be brought over the mould. Three more pipes lead to three pins in a block in the centre of the machine; two of these start the mechanism for positioning the two justification wedges and the other brings the space transfer wedge into action when a space is to be cast.



The paper ribbon is advanced step by step, and after each advance it is clamped over the row of holes; compressed air is then released, and the perforations in the paper ribbon permit the compressed air to enter the corresponding pipes, and to be guided to the required pins.

Adjust the spring rod nut (17G7), at top end of spring box, so that rod is not loose in box.

Adjust the nuts (2G6 and 2G7), above both air bar springs, so that the distance from the top of screw to the top of nut is approximately $\frac{3}{64}$" when the nuts are pressing on the air bar.

Adjust the right-hand and left-hand stops (1G20) so that, when the projection of the paper feed pawl ring (14GG) is pressing firmly against them, the upper and lower pawls will engage quite centrally between the teeth of the pin wheel ratchet.

With the locking lever (12G) raised, adjust the tower operating rod (54E) to give one-third upward compression and two-thirds downward compression of the spring in the paper feed spring box.

Place four thicknesses of spool paper between the leather packing and cross girt and, with the hook disconnected from the stud (3G1), turn machine slowly until one thickness of spool paper is just gripped lightly between the projection on paper feed pawl ring and the right-hand stop screw (1G20). Unscrew the adjusting sleeve (a4G7) on the air bar connecting rod (4G); engage the hook and adjust the connecting rod so that the paper over the cross girt can just be withdrawn. Tighten nuts and check the setting.

With the paper still over cross girt, engage hook and turn machine so that the paper tower lever stud (a19G1) is approximately central in the slot in the connecting link (4G3); then adjust the sleeve (a4G7) so that the paper can just be withdrawn from under leather packing. Lock the sleeve firmly in position.

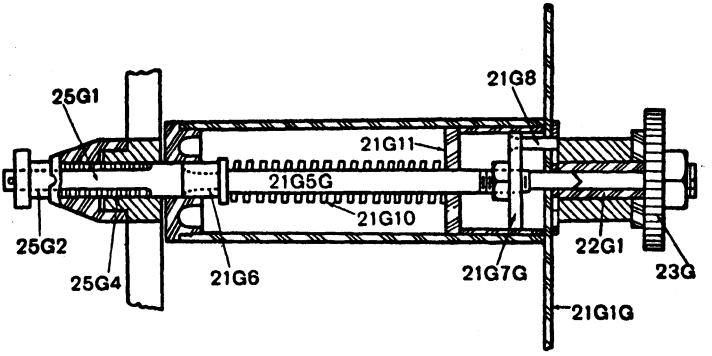
Disengage the hook and remove paper to allow the leather packing to contact on the cross girt, then adjust the air valve operating screw (3G3) so that one thickness of spool paper can just be withdrawn from between the screw and valve. The following points should be checked:—

When the operating rod is at the top of its stroke, it must be possible to depress the hook about $\frac{1}{16}$".

When the operating rod is at the bottom of its stroke, the spring (4G5) must not be solid, and the finger (23G3), which operates the winding spool driving ratchet pawl, must be clear of the casting which carries the ratchet.

PAPER WINDING SPOOL

To adjust this part, remove the shaft (21G5G) and adjust the driving disc (21G7G) so that when the button (25G2) is in its seating, and the shaft is held in position with the disc in contact with the driving shaft flange (22G1), there is $\frac{1}{64}$" clearance between end of button and shaft.

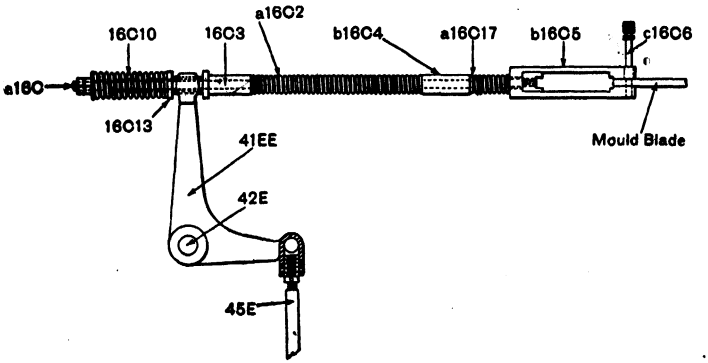


With the spool (X21G) removed, and the button (25G2) engaged in its operating slot, measure the distance that the winding spool spring box plunger (25G1) projects from the side of its bearing. With the shaft (21G5G) pressed inward by the amount of this projection, adjust the shaft driving disc (21G7G) so that the driving disc pin (21G8) projects $\frac{3}{32}$".

MOULD BLADE OPERATING MECHANISM

The mould blade cam lever moves a connecting rod first in one direction to pull the mould blade back prior to the casting of a type, and then in the opposite direction after casting to eject the type from the mould. Excess of lever motion in either direction is absorbed by springs.

Tighten the nut (16C9) on the end of the mould blade operating rod (a16C), and then unscrew one-half turn. Lock firmly in this position.



With a 12-set normal wedge in the 18-unit position, and the mould blade fully open to approximately 12 points, adjust the mould blade connecting rod (45E) so that there is $\frac{1}{8}$" compression on the sizing spring (16C10). Turn machine till mould blade is in its maximum forward position, and check that there is approximately $\frac{1}{8}$" clearance between the ejecting spring abutment (16C3) and the distance sleeve (a16C1).

TYPE PUSHER

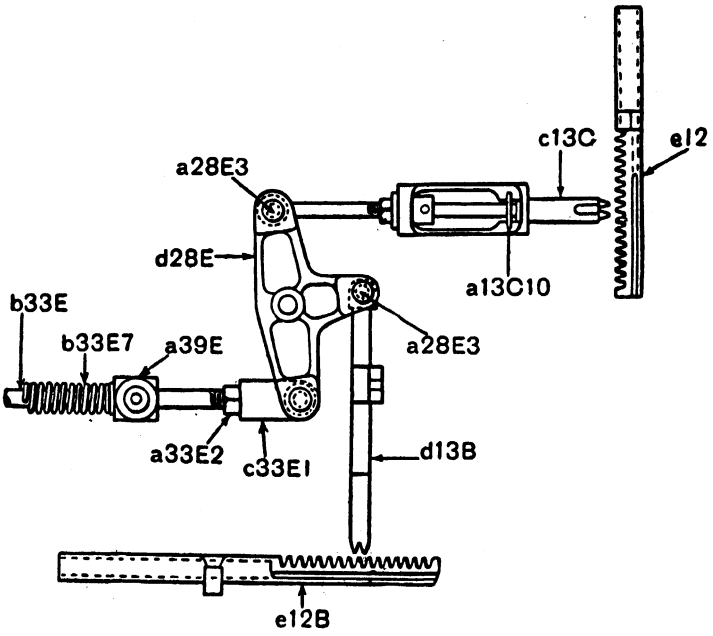
The type pusher ejects the type from the type carrier, pushing them type after type into a channel until the line is complete, when it is taken to the galley.

The only adjustment in connection with the type pusher is that it should push the type $\frac{1}{32}$" beyond the spring latches (a50F2 and a51F3) in the channel blocks. Adjust the type pusher connecting rod (77E) to obtain this condition.

LOCKING BARS

When the stop racks have been positioned by the pin tongs, they are firmly locked by toothed bars entering the teeth of the stop racks. Immediately the matrix-case has been moved to the position indicated by the stop racks, the locking bars are withdrawn and the stop racks are then free to be taken to any other position.

To determine the length of the rear locking bar (Xc13C), turn the machine until the front locking bar (d13B) is just clear of the stop rack, and in this position turn the adjusting



nut (a13C5) until the rear locking bar is also just clear of its stop rack. Firmly tighten the nut (a13C6) and check setting.

Adjust the locking bar operating rod (b33E) so that the locking bars withdraw $\frac{3}{32}$" clear of the stop rack teeth.

GALLEY MECHANISM

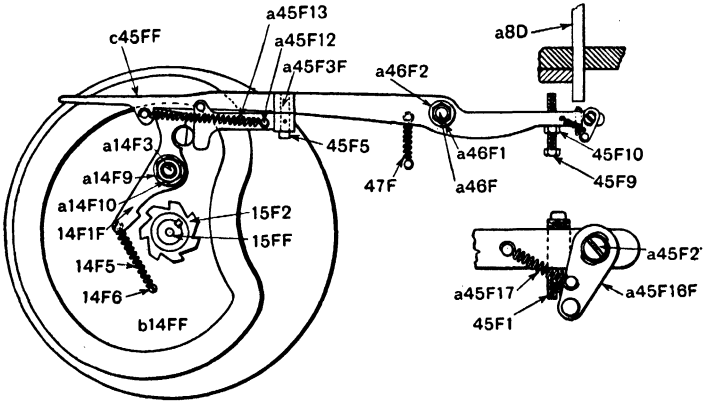
The line hook of this mechanism draws the completed line from the type channel to the galley mouth. The rule which prevents the last line in the galley from falling back then rises, and the line is pushed towards the galley; the rule descends, and the line hook returns to its normal position ready to draw the next line to the galley.

The galley cam may be tripped each time compressed air is passed through a *single* justification perforation, or an adjustment may be made so that the galley cam will not be tripped unless compressed air is passed through *two* justification perforations simultaneously. The two adjustments are termed respectively "single" and "double" justification.

The latter adjustment enables tabular matter to be cast containing many justified columns, as justifying the individual columns by single justification will not cause the galley mechanism to function; but when a last-column double justification is reached, the galley mechanism will be tripped and the complete line of many justified columns will be taken to the galley.

TRIP LEVER (c45FF)

Place the reversible plate (a45F16F) out of action, and adjust the trip lever stop screw (45F9) so that there is $\frac{1}{32}$" gap between pawl (14F1F) and bottom of trip lever hook.



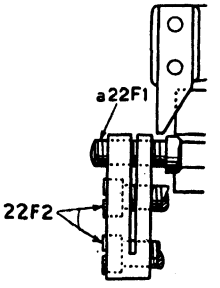
Release the pump trip handle, engage both justification wedge lifting rods, and turn machine until centring pin lever is in its highest position. Adjust the screw (45F1) so that the projecting part of trip lever clears the pawl by $\frac{1}{32}$".

LINE HOOK OPERATING SLIDE SPRING BOX

With the galley cam at the end of its revolution, bring the adjusting nut (27F8) lightly against the spring abutment (27F5). Lock firmly in position with the lock nut (27F9). Adjust the spring box rod (27F7) in the spring box rod eye (27F10) to give equal compression on the spring (27F4) at both ends of the stroke.

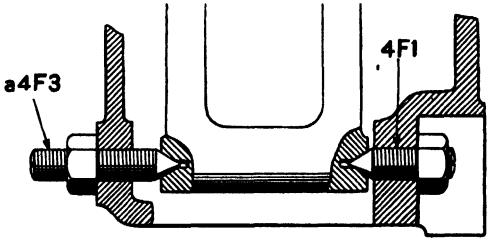
TRAVERSE OF LINE TO GALLEY ENTRANCE

Adjust the line hook operating bar stop screw (a22F1) at end of galley stand so that the line hook (X19F) brings the far side of the last letter cast in a line just clear of the end of the fixed type channel block (a51FF).



COLUMN PUSHER

Adjust the fulcrum screws (4F1 and a4F3) so that the column pusher moves freely, has no side shake, and clears the fixed type channel block by the thickness of one piece of spool paper.

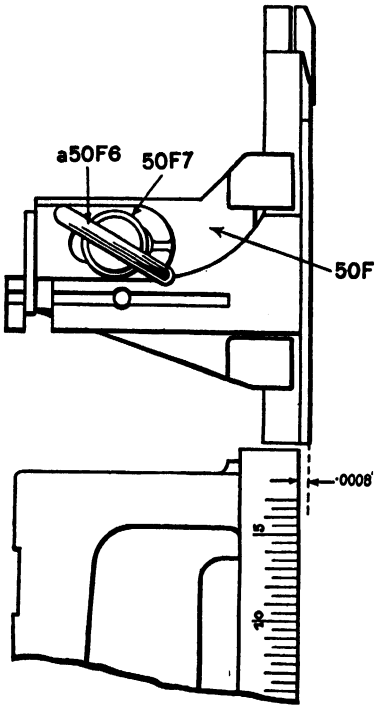


COLUMN PUSHER SPRING BOX

Release the galley cam driving pawl (14F1F) so that galley cam is set in motion, and turn machine until the column pusher is right forward. Engage the belt shifter and adjust the spring box so that there is ·010″ gap between the projections on the thick line slide (a30FF) and the stop slide (a44FF). This should leave the column pusher approximately $\frac{1}{32}$″ in advance of the column rule (a39FF).

COLUMN PUSHER ADJUSTING SCREW

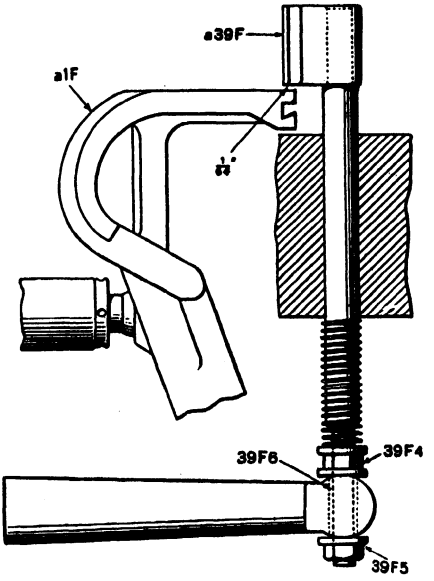
With the column pusher adjusting disc (a2F1) in the 12-point position and the column pusher at rest, the face of the column pusher should be ·008″ clear of the side of a piece of 12-point type. Adjust the stud nuts (3F3) to obtain this condition.



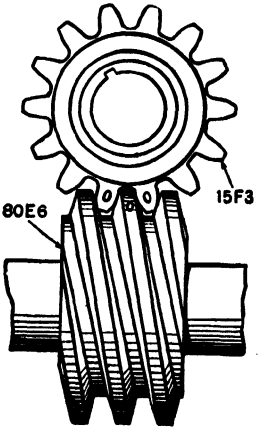
COLUMN RULE

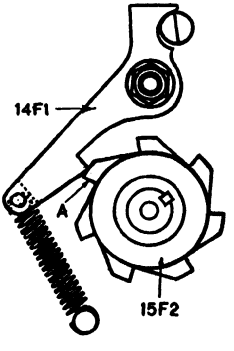
The rule lifting rod nuts (39F4 and 39F5) should be so adjusted that, when the column pusher has just started to move back, there is a $\frac{1}{64}$″ clearance between the top of pusher and the under edge of rule.

The galley cam is correctly timed if the tooth marked "0" on the worm (80E6) engages between the two teeth marked "0-0" on the worm wheel (15F3). This may be tested by engaging the two justification wedge lever arm rods in the



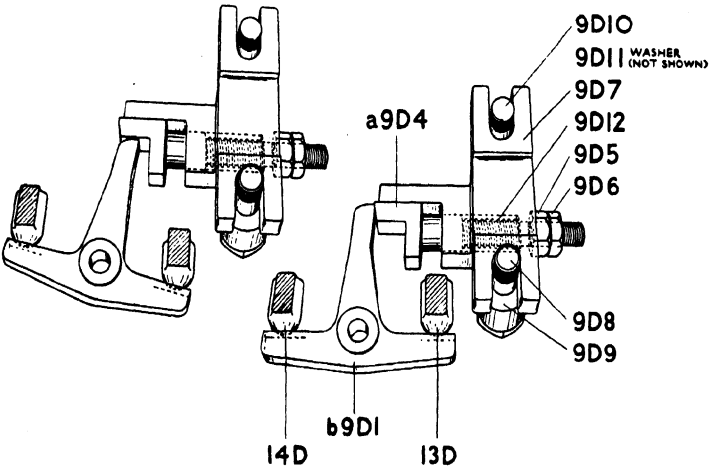
centring pin lever and turning machine slowly till the galley trip lever has released the galley cam driving pawl (14F1F). The pawl should then contact on the ratchet (15F2) about one-tenth of an inch past the engaging edge of a tooth so that the ratchet revolves nearly the distance between one tooth and another before engaging the pawl.





LINE CANCELLER

The line canceller enables the keyboard operator to cancel a line by depressing a ·0005" justification key should he have made an error in operating, and this implies that such line or part of a line will not be cast. The ·0005" justification perforation will cause the pump trip collar to remain in the path of the pump rocker arm latch until a ·0075" perforation has



been reached, when the pump will again proceed to function.

Release the pump trip handle and engage both justification wedge lifting arm rods; turn machine until the centring pin lever is just about to release them. Adjust the rock lever stop (line canceller) (a9D4) so that it just clears the side of the extension on the rock lever (b9D1). Lock firmly in this position.

The galley trip should be placed on double justification.

To ascertain whether the part is correctly adjusted:—

Engage the lifting arm rod which raises the justification wedge (11D), and turn machine until the centring pin lever returns to its lowest position. The extension on the rock lever should then be engaged in the line canceller.

Engage the other rod and turn machine through one revolution, and then see that the extension on the rock lever has become disengaged from the line canceller.

ELECTRIC MELTING POT ATTACHMENT

("ELECTRO FUNDITOR")

This attachment consists of a melting pot in which two elements are attached to a connecting box, and a box containing an automatic temperature regulator, double pole switch and ammeter.

The connecting box is inverted on machines equipped with lead and rule attachment.

CHANGING THE ELEMENTS

If an element gives trouble, unscrew the cover of the connecting box and detect the faulty element with the aid of a testing lamp. Having done this, remove the pump body and plunger and empty the melting pot, remove the pump body lifting levers (25HH and a26HH), disconnect the cable on connecting box, release element from connecting box and release the clips holding element in position. Then attach a new element and re-assemble all parts.

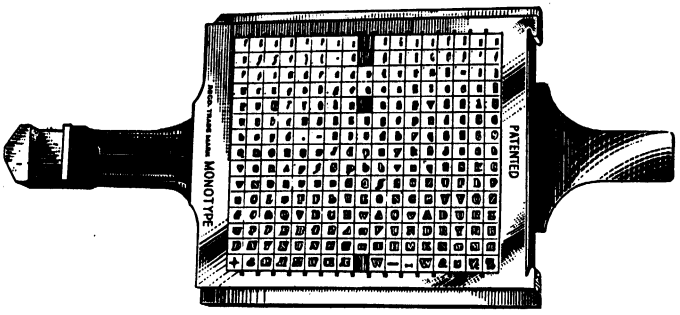
If facilities are not available for quickly detecting the faulty element, it is advisable to disconnect the two wires on the connecting box, remove both elements complete with box and replace with a spare set.

AUTOMATIC TEMPERATURE REGULATOR

A steel bulb containing mercury is inserted in the melting pot and connected to the automatic regulator by a metal tube of very fine bore; the other end of this tube is connected to a spiral. As the mercury in the bulb is expanded by the heat the spiral tends to unwind and press against a lever, which will then start to tilt a small glass tube containing mercury. In this glass tube there are two pockets into which the terminals are fixed. When the tube is horizontal, the mercury content extends from one pocket to the other and makes contact. When the tube is tilted by the movement of the spiral, the mercury accumulates over one pocket and breaks contact with the other.

The temperature at which the metal is to be kept can be adjusted by loosening the locking nut and moving the indicator to the desired position on the graduated scale.

EXTENDED MATRIX-CASE ATTACHMENT (15×17)



This attachment provides for the accommodation of 30 extra matrices in the matrix-case, making a total of 255. On the rear pin block there are two additional air pins and an air transferring device for dealing with the extra rows.

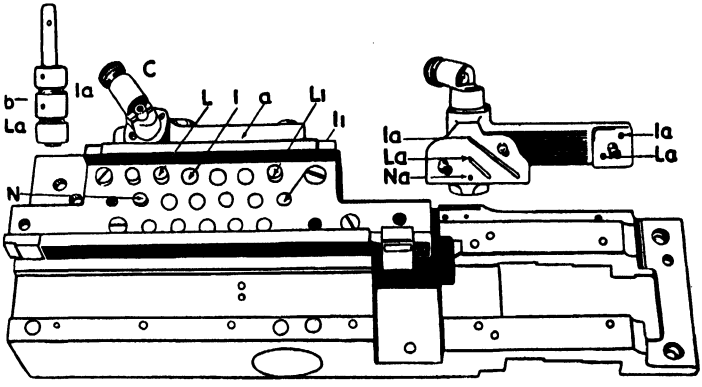
Beneath each air pin "I" and "L" is an air groove which, by means of the transferring device, conducts compressed air to the additional pins. These pins are designated I1 and L1. When the air pin "N" is raised, air beneath it passes along a channel to the underside of the control valve (30C4); this raises the control valve and causes two grooves around its circumference to connect two air channels, one from air pin I to air pin I1, and the other from air pin L to air pin L1, so that air from I can raise air pin I1, and air from L can raise air pin L1. It will thus be understood that the two additional pins can only be operated by the air supplied from air pin I or L when the air pin N is also raised. When air is beneath either air pin I or L alone it cannot escape to I1 or L1 respectively as the grooves around control valve will not be in alignment to complete the air circuit.

There are, therefore, occasions when three pins are raised simultaneously on the rear pin block, namely, NL and L1, or NI and I1, but it is the raised pin nearest the mould which controls the position of the matrix-case.

Either the standard matrix-case or the extended matrix-case may be used on a machine equipped with this attachment if the cross slide draw rod (b5C1) is adjusted to suit.

The effective length of this rod must be three-tenths inch less than standard when using the extended matrix-case.

When using the standard matrix-case, the control valve locking plunger (30C9) should be brought into action to prevent the possible raising of the two extra air pins.



A pin in the cross slide extension shoe (b6CC) checks overthrow in the forward direction. This prevents the possibility of the matrix-case fouling the carrying frame, or the cross slide contacting on the rear of mould or sliding frame when the standard matrix-case is in use.

LEADING ATTACHMENT

This attachment will lead 5 to 24 point composition matter with 1 to 6 point leads, or place rules between the lines, in any length from 12 picas to 48 picas, but is limited to either leads or rules of one particular point size at one setting. The special equipment includes: lead galley (X201F), column rule (Xa39F20), column pusher spring box (X8F7), valve box, galley cut-out valve, etc.

THE LEAD GALLEY (X201F)

This operates above the composition galley and is moved towards the column rule for leading, when air from the valve box causes the lead galley operating piston (202F9) to act on its lever (202F1). It must be adjusted so that its edge is exactly parallel with the column rule when it is working quite freely without shake.

THE COLUMN RULE (Xa39F20)

This is fitted with depressors for transferring the leads or rules from the lead galley to the composition galley below. Adjust as described for the standard column rule, and see that it is quite free throughout its movement.

COLUMN PUSHER SPRING BOX (X8F7)

When the lead galley advances towards the column rule it depresses a stop (44F25F) attached to the stop slide (44F20F). This allows the spring box to push the line of type just cast, sufficiently far for a lead or rule to be inserted beside it.

When the leading attachment is not in use the special spring box must be replaced by the standard part. Adjust the column pusher adjusting screw nuts as described for the standard caster whenever the spring boxes are changed.

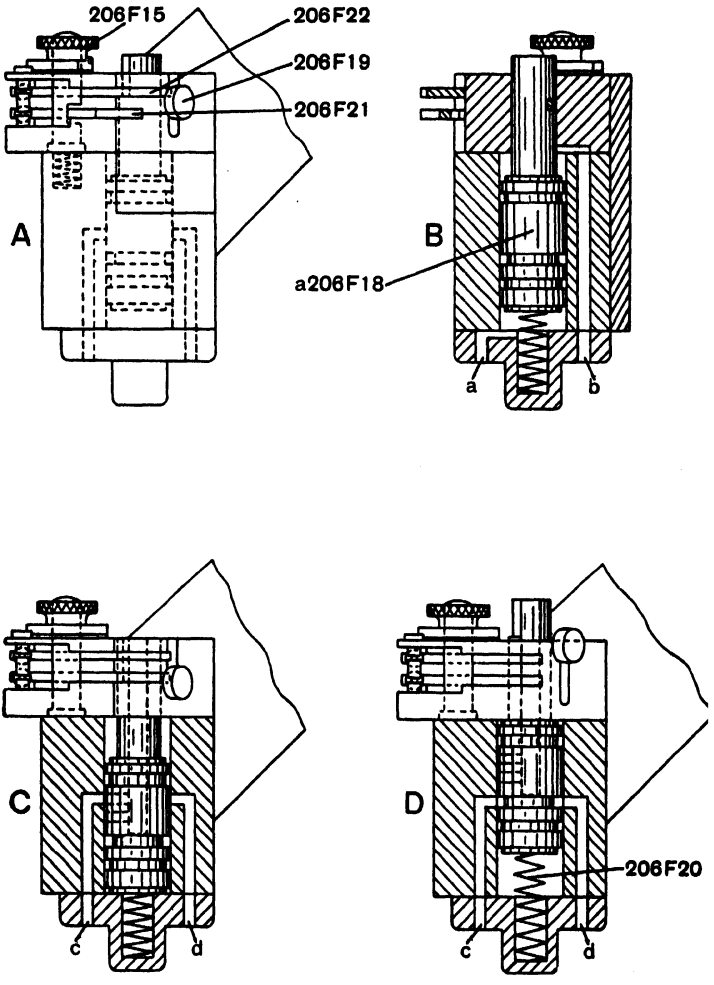
THE VALVE BOX

This includes a valve (a206F18), upper trip (206F22) and lower trip (206F21). When the valve is free of both trips, *i.e.*, "up", air can pass to the galley operating piston (202F9) and so advance the lead galley towards the column rule. When, however, the valve is held down by either trip, air cannot pass to the piston, consequently the lead galley does not move and "leading" cannot take place.

The upper trip is always in use. A plate (14F13) attached to the galley cam pushes the valve down under this trip at a suitable moment *before* the galley cam comes to rest. A pin (14F12), also fixed in the galley cam, releases this trip at a suitable moment *after* the galley cam has started, and the valve is pushed up by a spring.

The lower trip is available only when the switch is at "S" ("signalled" leading), and holds the valve down after the valve has been depressed by air from ·0005″ perforation.

A second pin (14F12) fixed in the galley cam, is positioned so as to release this lower trip just before the galley cam comes to rest, whereupon the valve rises to engage under the upper trip, from which position it may be pushed down or released up, according to whether the leading device is signalled to remain at rest or to function.



A. Shows two valve latches (206F22 and 206F21).
Switch knob (206F15), valve pin (206F19), operated by cam plate (14F13).

B. Valve at central position, held by upper latch. Air supply is cut off from lead galley actuating piston.
Valve (a206F18), air channel (a) from "S" perforation, air channel (b) from ·0005" perforation.

C. Valve at lowest position, held by lower latch, cutting off air supply to lead galley actuating piston.
Air channel (c) leading to lead galley actuating piston; air channel (d) for constant air supply.

D. Valve at highest position, held up by spring (206F20). Air supply passes around the valve, and enters air channel (d), leading to galley actuating piston.

When air from "S" perforation is admitted to the under face of the valve at the same time as air from ·0005″ perforation is admitted above it, the valve is not pushed down but remains under the upper trip ready to be released up when freed by the trip pin during the next revolution of the galley cam.

FOR "REPEAT" LEADING

The valve box switch must be set at "R". The device will then automatically insert the lead or rule each time the galley mechanism is operated.

FOR "SIGNALLED" LEADING

The valve box switch must be set at "S". The device will then insert a lead or rule only when specially signalled by perforations "S" and ·0005″.

ADJUSTMENT

The valve box must be adjusted for vertical relation with the plate on galley cam so that the plate depresses the valve a further $\frac{1}{64}$″ after the upper trip has dropped in.

GALLEY CUT-OUT (X208F)

This cuts off the air supply to the lead galley operating lever piston (202F9) if the line of type is shorter or longer than the galley entrance.

The lead galley then returns to its extreme position away from the column rule and the operator can correct the line of type without allowing the caster to stop.

The cut-out is placed in the pipe line from the valve box to the lead galley operating lever piston (202F9) and is operated by the operating lever latch (33F9).

The hook and valve should be uncoupled if the operator wishes to prevent movement of the lead galley when turning the machine with the galley mechanism tripped.

ADJUSTMENT

With the operating lever (a32F) in its running position, disconnect the valve coupling hook (208F7). Press the cut-out valve (208F4) into its cylinder to contact on the bearing bracket (39F24), and adjust the hook so that when its lock

nut (208F9) is tightened, the hook enters freely into the slot in valve and engages with the pin without withdrawing the valve or moving the operating lever latch (33F9).

LEAD GALLEY GUIDE BARS (201F4 AND 201F5)

Two setting gauges (201F13) for 1 to 1½ point, and (201F14) for 2 to 6 point, are supplied for setting the bars to suit the point size of lead or rule. Two leads or rules of the correct length must be used to set the bars the correct distance apart.

LEAD DEPRESSORS (a200F1 AND a200F9)

These are adjusted horizontally by being located as near as possible to the ends of the lead or rule. Their vertical position is determined by tripping the galley mechanism, turning machine until the column rule is in its highest position, and then adjusting them so that they just clear the upper edge of leads or rules when lead galley has advanced to the column rule. Lock the depressors firmly in position.

LEAD GALLEY STOP, ADJUSTABLE (202F16)

Load the galley with the leads or rules to be used. Set the valve switch knob at "R". Trip the galley mechanism, and turn machine so that the column rule is in its highest position and lead galley has moved towards it. Then adjust the lead galley stop so that the depressors have a maximum bearing on the lead or rule to be pushed into the composition galley without engaging the next one.

AIR THROTTLE VENT SCREW (207F29)

This must be adjusted so that the air supply causes the lead galley to make a sure and steady movement.

Any matrix-case that is to be used with this device must have its front end shortened to clear the column rule guide (205F1).

UNIT ADDING ATTACHMENT

When a machine is equipped with this attachment it is possible to add one, two or three units to the set-size of characters or spaces beyond the size decided by the position of the normal or justification wedges.

This is accomplished by automatically interposing a distance piece between the micrometer wedge and the transfer

wedges. The latter are then prevented from reaching their normal positions, and the mould blade can open wider to add one, two or three units of set according to the unit distance piece in use.

The special equipment includes a valve box, operating stand, spring box and suitable distance pieces.

VALVE BOX (a25D41D)

This is attached to the side of the main stand and may be placed in or out of action by rotating the valve box knob. Turning the knob in a clockwise direction places the box out of action; turning it anti-clockwise places the box in action.

Instead of air from the ·0075″ and ·0005″ perforations going direct to the justification air pin block, it goes *via* the valve box.

When the attachment is in action, the ·0075″ perforation is appropriated for the purpose of causing units to be added, consequently other perforations must be used for the justification signals. Perforations J, K and N have been selected for this purpose.

VALVE BOX OUT OF ACTION

·0005″ *perforation*. Air goes to valve box, through switch, thence to ·0005″ air pin.

·0075″ *perforation*. Air goes to valve box, through switch, thence to ·0075″ air pin: a branch pipe also leads to the air pin (25D37) in operating stand. (This places the unit distance piece into operation, but when the character perforations are reached the distance piece will be placed out of operation.)

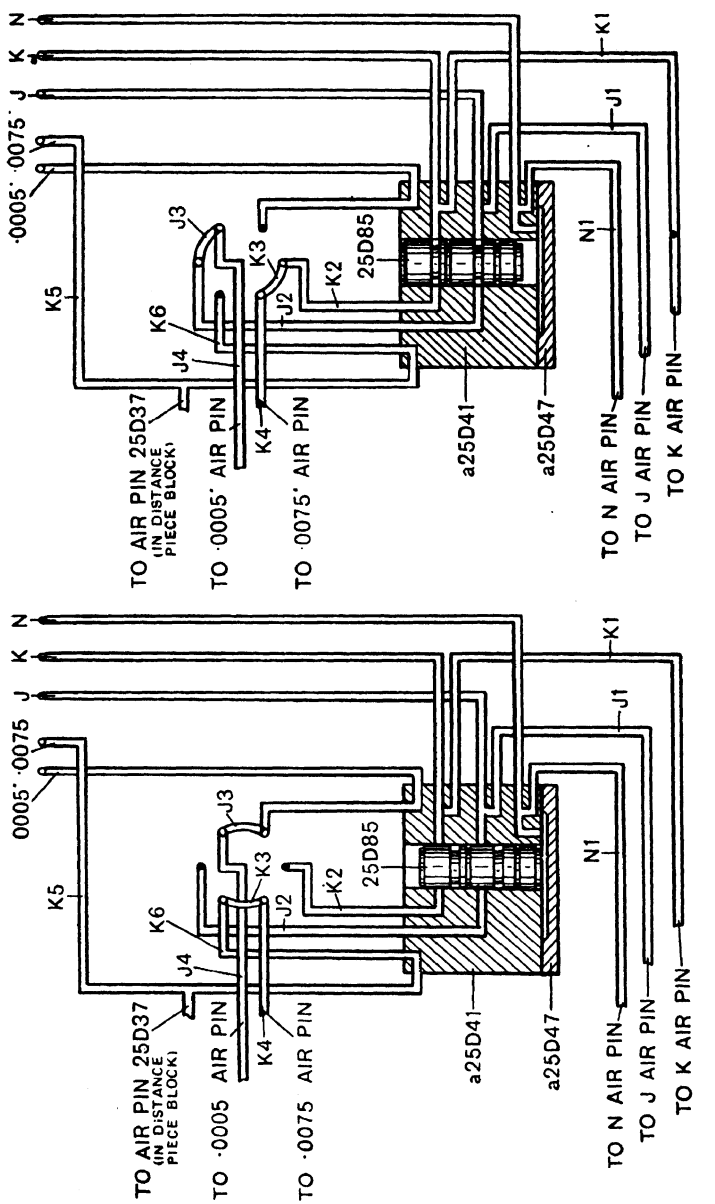
J *perforation*. Air goes to valve box, is checked by valve and branches to the J air pin.

K *perforation*. Air goes to the valve box, is checked by valve and branches to the K air pin.

N *perforation*. Air goes to the valve box, raises valve (a25D85) and branches to N air pin. Raising the valve does not affect anything, as in ordinary composition the perforations J and K never occur in combination with N.

VALVE BOX IN OPERATION

·0005″ *perforation*. Air goes to valve box and is blinded by the switch. It therefore does not function.


N
K
J
·0005
·0075
K5
K6
J4
J3
K4
K3
J2
K2
25D85
K1
J1
N1
a25D41
a25D47
TO AIR PIN 25D37 (IN DISTANCE PIECE BLOCK)
TO ·0005 AIR PIN
TO ·0075 AIR PIN
TO N AIR PIN
TO J AIR PIN
TO K AIR PIN

·0075″ *perforation.* Air goes to valve box and its normal exit to the ·0075″ justification air pin is blinded; a branch pipe leads to air pin (25D37) in operating stand, so that the distance piece will be raised when the character or space is cast.

J *perforation.* When this perforation is not in combination with N perforation the air goes to valve box, is checked by valve, and is branched to J air pin. When J and N perforations are in combination the air passing through N, raises the valve and permits the air from J to pass along the groove in valve, thence to the switch, and thence to the justification ·0005″ air pin. A branch pipe leads to J air pin.

K *perforation.* When this perforation is not in combination with N perforation the air goes to valve box, is checked by valve and is branched to K air pin. When K and N perforations are in combination the air passing through N raises the valve and permits the air from K to pass along the groove in valve, thence to the switch, and thence to the justification ·0075″ air pin. A branch pipe leads to the K air pin.

N *perforation.* Air goes to the valve box and raises valve; a branch pipe leads the air to N air pin. Raising the valve does not affect anything unless the air is in the pipes J or K (see the two preceding paragraphs).

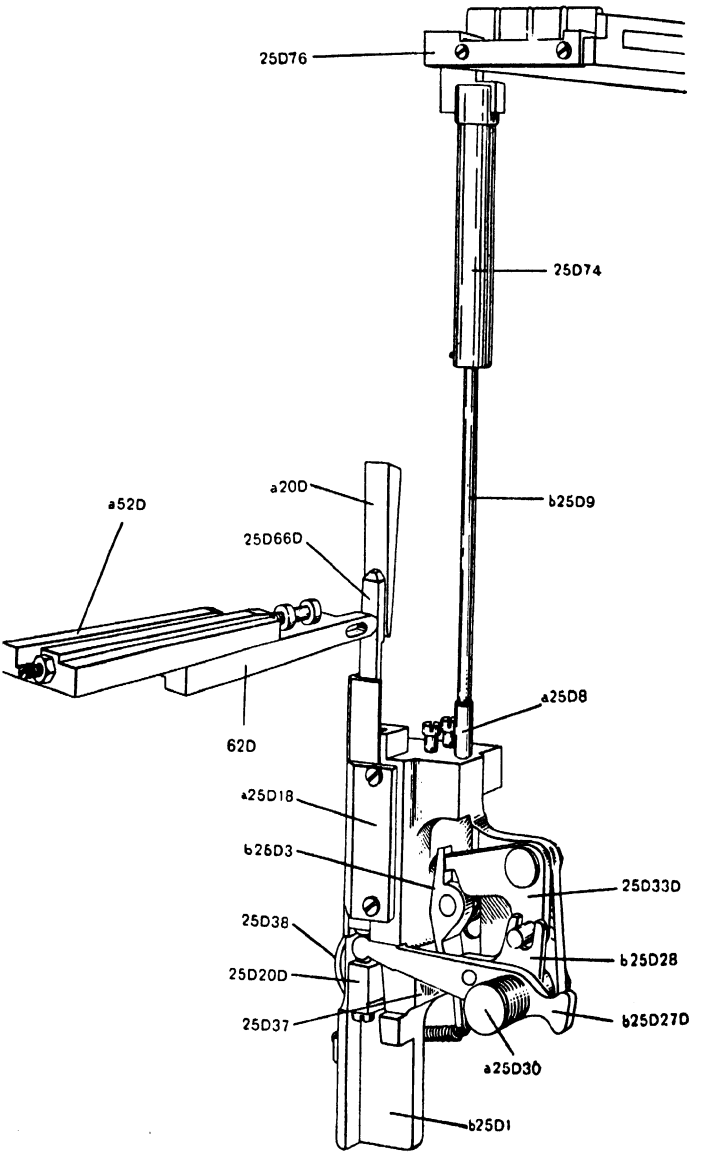
J, K *and* N *perforations in combination.* When J and N perforations are in combination the ·0005″ air pin is raised; when K and N perforations are in combination the ·0075″ air pin is raised; when J, K and N perforations are in combination both ·0005″ and ·0075″ justification air pins are raised.

THE OPERATING STAND

This is an attachment placed inside the machine base just under the micrometer wedge, and is connected to the centring pin lever by a lifting rod and spring box.

The lower end of the lifting rod is connected to a rock lever (25D3), which therefore moves up and down with the movement of the centring pin lever.

Normally the upper end of this rock lever is held to the rear by the action of a spring pulling on the lower end of rock lever, after it has been returned to this position by a


25D76
25D74
a20D
b25D9
a52D
25D66D
62D
a25D8
a25D18
b25D3
25D33D
25D38
b25D28
25D20D
25D37
b25D27D
a25D30
b25D1

cam face on rock lever contacting on a pin in the operating stand. When the rock lever is held in this (the normal) position it will, when lifted, be in a position to strike against a projection on the operating stand latch (25D33D), causing the other end of this lever to rock the slide fulcrum lever (a25D27D) and thus pull the unit slide (25D20D) to its lowest position. To the upper end of this slide is attached the unit slide distance piece.

When the unit distance piece is moved to its lowest position as just described, it rests against the micrometer wedge with its upper end just below the type transfer wedge. Both transfer wedges may, therefore, be drawn against the micro meter wedge in the usual manner, the unit slide distance piece being inoperative; the operating stand rock lever (25D3) is now free to slide up and down without opposition, whilst the machine casts ordinary composition.

When a unit-spaced type body is required, compressed air passes through the ·0075″ perforation and is conducted to behind the operating stand air pin, causing it to press against the rock lever, pushing its *lower* end to the rear. Whilst the rock lever is held in this position it is drawn upward, and a projection on the side of the rock lever engages the slide fulcrum lever (a25D27D), causing it to raise the slide and to interpose the unit distance piece between the transfer wedges and the micrometer wedge, thus permitting the mould blade to be opened further.

As the rock lever (25D3) descends, its *upper* end is returned to the rear by the cam face on the side of rock lever, but it returns to its operating position without having withdrawn the unit distance piece if the ·0075″ perforation is repeated.

The action described in the preceding paragraph is repeated all the while a ·0075″ perforation is in the paper ribbon, but on the return down stroke of the centring pin lever (should there be no ·0075″ perforation in the paper ribbon) the upper end of the rock lever gets under a projection on the operating stand latch and causes the unit distance piece to be returned to its lowest position when the centring pin lever rises. The distance piece will remain in this position until unit adding is again signalled by the ·0075″ perforation.

SPRING BOX

The nuts at the upper end of the rod (a25D9) in spring box must be adjusted so that, when the rod is pushed right down, and machine is at 220°, there is $\frac{1}{64}$" clearance between the top nut (25D71) and underside of the projection on centring pin lever when the spring box is connected.

UNIT SLIDE DISTANCE PIECE

This must be changed to produce one, two or three units of set, according to the set to be composed.

TO INSERT UNIT SLIDE

Turn the machine to the casting position. Insert right hand through aperture in main stand, and move the slide fulcrum lever (a25D27D) so that its end can be moved down until it lodges on operating stand. Next insert unit slide (complete with unit distance piece) in the slot in operating stand, keeping one finger under unit slide; use other fingers to move the end of slide fulcrum lever upward so that it springs into slot in unit slide.

If any difficulty is found in placing unit slide in the operating stand, it may be necessary to wind up micrometer wedge adjusting screw (a20D2) to give unit distance piece more clearance past the micrometer wedge; after inserting unit slide, return the adjusting screw to its original position.

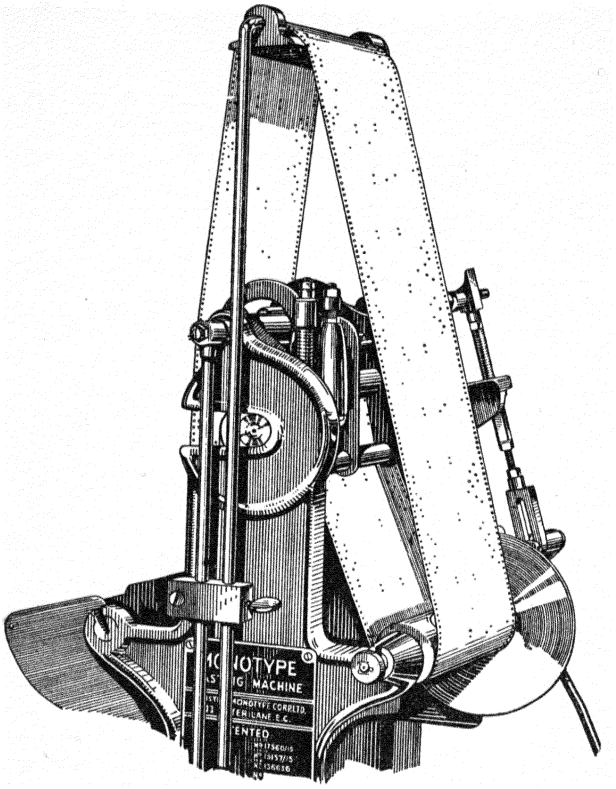
COPY REPEATING ATTACHMENT

With this attachment it is possible easily and accurately to join the ends of a strip of keyboard "copy", thus making it continuous for repeating lines indefinitely.

Attach it near the upper end of the air pipe (6G) and see that the collars on the support rod (26G8) are approximately central with the pin wheels on paper tower.

When a strip of "copy" is to be joined, lock the paper setting plate (26G1G) so that the pins (26G7) are projecting upwards; insert "copy" under air bar in the usual manner, bring the two ends of "copy" to the setting plate, and register them by means of the justification perforations. Then gum the ends together.

The paper setting plate is then unlocked, turned under the support rod and re-locked in this (the working) position.



The horizontal portion of the rod between the two collars serves as a guide for the paper ribbon.

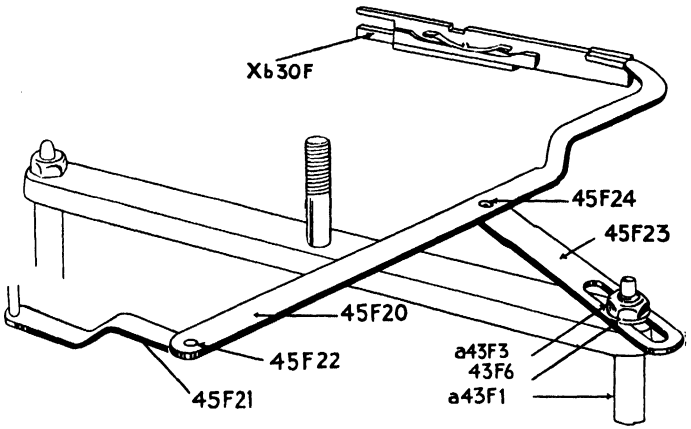
GALLEY AUTOMATIC TRIP ATTACHMENT

(For Sorts Casting)

With this attachment sorts matter may be stacked automatically in any given measure between 22 and 30 ems pica.

When the caster is operating and the galley has been set to the required measure, the line of sorts that is being withdrawn to the galley has its forward end supported by special line supports (Xb29F) for 5 point to 8 point inclusive, or (Xb30F) for 9 point to 12 point inclusive. When sufficient types have been cast, the line support will be pushed against the curved end of an operating lever (45F20), causing the

lever to fulcrum on its bar (45F23). This bar is attached to a special sorts tray support bar stud (a43F1), which replaces the standard part (43F1). The motion is transmitted by means of a link (45F21) to the trip lever (c45FF) and so pushes the trip lever out of engagement with the galley cam driving pawl. The pawl is thus released and galley mechanism is put into operation.



To adjust the device for the required measure: remove the sorts tray, release the nut at top of special support bar stud (a43F1), and adjust the position of the fulcrum bar (43F23) under the nut until the galley mechanism trips at required measure; tighten fulcrum bar firmly in position.

SEMITIC COMPOSITION ATTACHMENT

As Hebrew is read from right to left, it is necessary to punch the matrices in a direction reverse to that adopted for roman characters, and to apply a special galley attachment so that the completed lines may be pushed into the galley, also in a direction reverse to the procedure for roman composition. The galley on machines fitted with this attachment is, therefore, positioned to the left, over the galley cam.

See that all standard adjustments are correct. Then adjust the attachment as follows:—

Release lifting frame adjusting screw nut (137F3) and adjust the screw (137F2) to give approximately $\frac{3}{64}$" clearance

between lifting frame adjusting lever bell crank (139F1) and lifting frame adjusting lever bell crank slide (140F1). Lock the nut (137F3). Release lifting frame lifting rod nut (142F5) and adjust the rod (142F1) to give approximately $\frac{1}{8}$" gap between the rod end and lifting frame adjusting lever bell crank (139F1). Lock the nut (142F5).

Adjust the type channel block to suit the type to be cast. The adjustable type channel block must be parallel with the fixed type channel block and column pusher (132F1), which can be adjusted by the wing bolts (a50F6 and 149F2). Adjust the lifting frame plate (136F6) to its lowest position for 6 to 8 point.

Trip the galley mechanism by hand and turn machine until column pusher is right forward and at 160° on vernier.

Adjust the rule lifting rod nuts (39F4 and 39F5) to give $\frac{1}{32}$" clearance between the lower face of rule and column pusher. Then adjust the rule for parallel with column pusher by the wing bolt (a39F15).

Release the column pusher adjusting nuts (132F11 and 132F12), and column pusher rod nut (134F9).

Adjust the column pusher rod to allow column pusher to be in advance of rule by $\frac{1}{32}$". Check these adjustments by turning machine by hand. Bring the machine to the same position as previously, and (if adjustments remain correct) lock the nut (134F9), taking care not to twist the rod eye. Bring the adjusting nut (132F11) to face column pusher and lock with (132F12). This adjustment varies according to the size of type being cast.

Engage operating lever (a32F) and adjust the stop slide trip bar pin (148F2) to remove all looseness from the stop slide trip bar (148F1).

CHANGING FROM ONE SIZE OF COMPOSITION TYPE TO ANOTHER

Turn off water from mould.

Run metal pot down and swing it clear of mould.

Disconnect the air bar clamping lever connecting rod connecting hook (4G1).

Turn machine to 10°. In this position the matrix jaws are just beginning to close and the centring pin lever is at its uppermost position.

REMOVE SYPHON OILER.—[*If screwed pattern lubricating cups are in use they cannot be removed until the mould is taken off.*]

REMOVE MATRIX-CASE.—Raise end of cross beam lifting lever (42A1), and swivel other end under the carrying frame guide rod cross beam (a4A6A); press on lever until matrix-case is clear of cross slide (b5CC), then withdraw matrix-case.

REMOVE BRIDGE.—Remove pin (a3AA) and then the two screws (1A1); lift off the complete bridge, taking care not to bend the sliding frame draw rod (a9A1).

REMOVE MOULD.—Turn the machine to 195°. Remove the mould blade operating rod fork pin (c16C6), and the link connecting the mould crossblock to type carrier. Remove the three screws from the mould base, then the two mould clamps (a48E and a49E). Lift mould off carefully.

[*Remove the two lubricating cups (if screwed pattern) from the mould, also the equalising gear fulcrum block if mould numbered below* 20,000 *is in use.*]

Thoroughly clean mould, blow water out of the water course, oil the mould, replace crossblock link and screw, and store away in proper box.

REMOVE NORMAL WEDGE.—To do this press forward the matrix jaw latch (b7BB) and turn the latch upward so that it will rest on the top of matrix jaw. Hold the mould blade abutment slide forward by pressing the mould blade abutment slide spring post (14C8) towards the mould, and withdraw the normal wedge from rear of machine.

REPLACING MOULD, MATRIX-CASE AND NORMAL WEDGE

NORMAL WEDGE.—Partly insert the normal wedge of the required "set" number, then hold the mould blade abutment slide forward by pressing the mould blade abutment slide spring post (14C8) towards the mould, and slide the normal wedge into position until the end projection comes between the two matrix jaws. Push forward the matrix jaw latch (b7BB) and turn the latch downward so that it will be in position for operating the normal wedge, taking care that the pin (a7B1) is under the matrix jaw.

MOULD.—Screw on the equalising gear fulcrum block very tightly, and affix the two lubricating cups (if screwed pattern is in use). If syphon oiler is in use it should be replaced after

the bridge is screwed on. Make the base of mould very clean, and also the machine base where the mould is positioned. Slightly oil the base of mould to prevent rusting in case the water should leak between the mould and machine base. Place the mould on the machine base and screw on the two mould clamps (a48E and a49E) but do not use too much force, as they are only meant to position the mould and not to fix it. Screw up very tightly the three mould base screws; the two long screws go into the mould on the mould-blade side of mould, and the short screw on the crossblock side of mould. Connect the mould crossblock to the type carrier, and make certain the screw is very tight. Replace the mould blade operating rod fork pin (c16C6) and turn on water.

Always be certain that the nozzle is not flattened or burred near the point, and that it seats perfectly in the mould base. The point of the nozzle when seated in the mould should not protrude above the upper surface of the mould base, nor be more than about ·002″ below the surface.

BRIDGE.—(1) Turn machine to 10° and replace the bridge. In doing so place the end of the sliding frame draw rod (a9A1) in position in groove of matrix jaw; (2) engage the centring pin spring abutment (a5A5) in the fork at end of matrix centring pin lever; (3) position the low space lever on mould between the low space lever and character lever on bridge; (4) guide the low space cam into the slot of the low space actuating lever. When correctly in position replace the bridge screws (1A1).

MATRIX-CASE.—Insert matrix-case, keeping it towards the centre of the bridge; engage it with cross slide (b5CC). Connect the bridge lever connecting link (2A1) to bridge lever (b2AA).

MELTING POT.—See that the piston is clean and sliding freely in the pump body, and that the nozzle end of the pump body is correctly seated on its bearing pin (a26H3). Hold the piston in its uppermost position, and swing the metal pot carefully forward, so that the piston lever blocks (b18H1H) and pump body lever blocks (b24H1H) enter the piston and pump body. Screw up.

Turn the column pusher adjusting screw (2FF) to position according to point size of the mould on machine.

Adjust the type channel block according to size of mould. Size up the type, align up, adjust galley measure, set drive to required speed, and proceed.

NOTES ON CHANGING FROM ONE SIZE OF COMPOSITION TYPE TO ANOTHER

Should the type be more than ·002″ large or small, the mould blade must be adjusted by turning the adjusting screw in the mould blade abutment slide. If the type is almost correct, an adjustment of the micrometer wedge adjusting screw will be quite sufficient. For this reason the micrometer wedge should be approximately in its central position before adjusting the mould blade abutment slide.

After the mould blade has been correctly adjusted, before casting any type for use, the face of the type should be correctly aligned on the body of the type. This is done by loosening the centring pin stand bolts (6A3) and turning the centring pin stand adjusting micrometer screws (33A1) in the desired direction. Each time this adjustment is made the centring pin stand bolts must be tightened before casting type. Keep repeating until correct.

When adjusting the alignment, the "set matrix "(✚) should be positioned so that it comes exactly in the centre of the type body. A few cap. X's should then be cast, and compared with those already in use to see that their alignment is exactly the same. If the alignment is not identical, any corrections made from the old types will not range evenly. *The importance of this cannot be impressed too strongly upon attendants.* In the case of a first machine being installed, no type should be cast for the cases until the correctness of the alignment has been thoroughly proved, as all future founts must be cast to that standard. The non-kern characters must not overhang any side of the type body in the slightest degree.

The galley measures should not be altered after being correctly set.

CARE OF MOULDS

Upon removing the mould, blow out all water, taking great care that this is done thoroughly. If a mould is likely to remain out of use for a considerable time it is advisable to blow a little oil through the waterways. Always put the mould

away clean, with the base slightly oiled to prevent rusting. When replacing mould and bridge, see that all the surfaces of contact are *scrupulously clean*. Examine the mould crossblock to see that the jet piece is clean and working freely, and, in replacing, take care the jet piece does not fall out. Oil the link connecting the crossblock to the carrier. In replacing the bridge be sure not to knock the centring pin on the mould, or the latter may become seriously damaged should the blade or blade walls be struck. Regulate the water flow so that there is no undue pressure in the mould, or the water may work between parts of the mould where it should not be.

The 14-point mould for casting from ·2″×·2″ matrices has the upper blade bevelled inwards to 12 points, to permit the matrices to seat with a reasonable margin around the casting orifice; or a 12-point mould may be used, and the type leaded two points, the ascenders and descenders in this case overhanging the type body one point, an amount which makes no difference to the printing. In the latter case the automatic leading attachment should be applied. *Casting from ·2″×·2″ matrices cannot be done on a 14-point standard mould.*

LARGE TYPE COMPOSITION

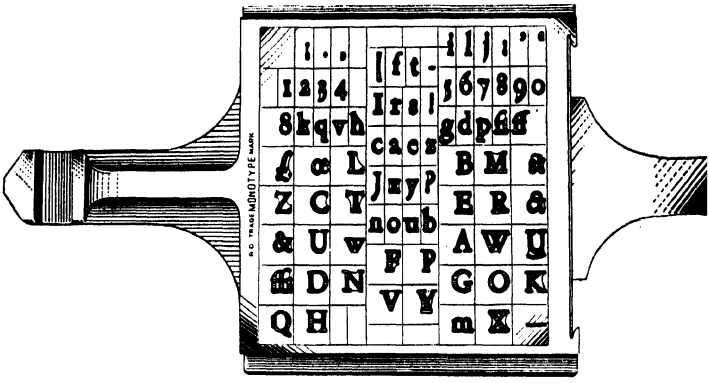
GENERAL INSTRUCTIONS

MATRICES.—These are made in two sizes, ·4″×·2″, and ·4″×·4″, and the storage area of the matrix-case is enlarged to 3·2″×3·2″. Setwise, the matrix-case will, therefore, carry 15 of the narrow matrices, or 8 of the larger size; pointwise, it will carry eight rows. Before starting to cast with this matrix-case in use see that the draw rods are correctly adjusted to bring matrix cone holes central with the centring pin.

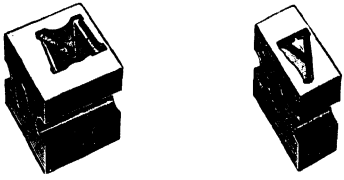
NUMBER OF CHARACTERS.—The number of characters varies according to the "set", as more matrices may be included in a 14-set fount than in a 24-set fount. The average number of characters is about 90, and includes upper and lower case, punctuation marks and figures.

MATRIX LOCATING.—Matrix locating is obtained in exactly the same manner as with ordinary composition matrices (see diagram of matrix-case).

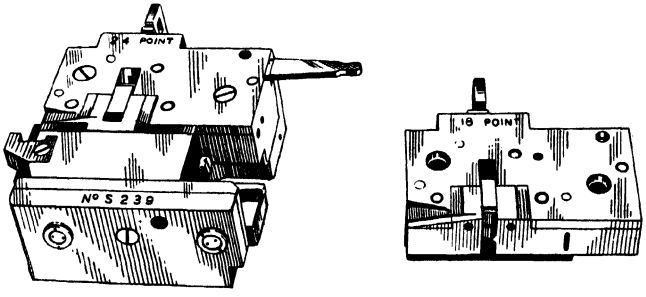
Pointwise, the cone holes are central in the matrices, and the matrices may be arranged so that all 15 positions of the normal wedge are utilized.



A LARGE TYPE COMPOSITION MATRIX-CASE



LARGE TYPE COMPOSITION MATRICES ·4″ × ·4″ AND ·4″ × ·2″ (ENLARGED)



LARGE TYPE COMPOSITION MOULD AND INSET FOR CHANGING BODY SIZE

Setwise, the cone holes of some of the matrices are ·2″ and some ·4″ apart. Other cone hole positions are ignored, except during positioning of justification wedges.

JUSTIFICATION SCALE CONSTANT.—For large type composition the justification scale "constant" is based on a transfer wedge difference of 1 unit of "set" instead of 2 units. A 4-unit variable space is therefore obtained from a 5-unit position. Over 24 set all "constants" are 3–8, and the justifying space is positioned in the smallest unit row.

VERY WIDE CHARACTERS.—Characters wider than the maximum unit row of matrix-case are sometimes cast in composition with an overhanging face. This overhang is supported by a high space, which is composed in advance of such letter. The overhanging characters are usually capitals "M" and "W". When casting sorts only, the mould blade should be adjusted to open wide enough to cast these sorts without any overhang.

SPEED OF CASTING.—The speed of the caster should be reduced for large type composition according to the "set" and point size of matrices. For sorts casting, the machine should be run slower when casting capitals than when casting lower case:—

TYPE	R.P.M.	GEAR
24-Point 24 Set	50 to 65	1-B-E or 2-B-E
18-Point 18 Set	65 to 80	2-B-E or 3-B-E
14-Point 14 Set	100	2-C-E

Speeds are largely governed by the "set" and the amount of capitals in the copy.

Where large type composition is limited to two or three founts of one point size, the speed of the caster may be reduced by a special pulley on the primary driving shaft, but where a variety of large-size composition is cast it is preferable to purchase the display type variable speed-gear, and thereby provide also for casting type in the largest display sizes. In the case of a motor-driven machine the slower speeds may possibly be obtained from the rheostat.

It is not advisable to cast for too long a period from any given matrix, otherwise the matrix may become overheated and be spoiled. Allow plenty of water to flow through the mould.

When using normal wedges of large "set" for the first time see that the corner of the mould blade abutment slide anvil (a14C3) (during type sizing) does not foul an adjoining step on the normal wedge, thereby causing imperfect line justification.

Accessories that may be required on the caster when ordering large-type composition equipment:—

Mould (complete or inset).
Matrix-case and Matrices.
Normal wedge.
Nozzle (with $\frac{1}{8}$" hole).
Centring pin auxiliary spring (X36A, etc.).
Mould blade cam lever compound lever (Xa44E6, X96E, etc.).
Pump trip latch (57H1, etc.).
Type carrier cam lever extension (a27E4).
Speed reducing gears or pulleys.
Strengthened pump spring group (Xa20H).

TRANSFER WEDGES.—No alteration is needed in the adjustment of transfer wedges, as this adjustment is provided for in the justification scale constant.

The difference in transfer wedge adjustment therefore remains at ·0184": or, in other words, with the justification wedges in 3–8 positions, type cast with the upper transfer wedge in operation will measure exactly the same as when cast with the lower transfer wedge in operation.

LOW SPACE ATTACHMENT.—Large type composition moulds are not made to be worked in connection with the old style form of low space attachment.

TYPE CARRIER CAM LEVER EXTENSION (a72E4).—If large-size composition moulds are used this extension must be changed, the extension to be used having three type carrier connecting positions: (*a*) for normal composition; (*b*) for large-size composition with inset composition moulds, used with the straight delivery fixed type channel block (a51FF); (*c*) for casting sorts from non-composition matrices and from display sorts moulds, used with curved type channel blocks (a51F10F and a50F14F).

MOULDS.—For large type composition special "inset" moulds are provided. These moulds have a frame common to

all sizes, and the mould blade and side blocks are made interchangeable so that they may readily be changed from one size to another.

Printers in possession of the older style display sorts moulds may use them for sorts casting in conjunction with 14, 18 and 24-point large-type composition matrices, but the nick will be cast on the back of the type body instead of on the front; for this reason we do not recommend this practice. Before first using the older style display sorts moulds in conjunction with large size composition matrices, the moulds should be returned to The Monotype Corporation for adjustment. Display sorts type moulds cannot be used for composition.

When first positioning new moulds for large-size composition it may be necessary to file the type pusher guide (Xa28B) to permit the mould to seat correctly.

HINTS ON LOCATING DERANGEMENTS

The following hints will be found useful should trouble arise:

WRONG CHARACTERS BEING CAST

A derangement should be traced to its source. For instance, should a machine be producing incorrect characters the attendant must consider all the conditions likely to cause such an occurrence. He should make certain that the keyboard operator has performed his work accurately, *i.e.*, that he has perforated the paper ribbon correctly, that the perforations are in alignment with the side guide perforations, that extra perforations have not been made, that punches have not failed to rise, and that the paper has not been fed on the twist. Being satisfied on these points, place the paper on the crossgirt (a1G5G), as in working position, with the paper feed locking lever (12G) raised and the paper feed pawl ring lug against the right-hand stop screw (1G20), and see that the holes in crossgirt are fully uncovered and not partly blinded. These conditions being correct, depress the air bar (2GG), and see that the air pins rise and drop quickly. See that the pin jaws do not commence closing before the air pins have blown up. Next examine the jaws to see that they close correctly and are not hanging up; also that the spring brakes (a26E12) are functioning smoothly, and that no spring box part has become loose. Also see that the matrix draw rods

have not become loose; that the air pressure has not dropped; that the paper is winding up reliably.

Air pins may not be rising freely (test every pin by blowing up each one separately).

With old machines paper dust may have choked the pipes either in paper tower or machine base.

Holes in air bar leather packing (2G2) or the slot behind the packing may be fouled.

Air-bar clamping lever screw (3G3) may have become loose.

Nuts on the jaw tongs spring box may have become loose.

The characters in matrix-case may not be in the positions as provided for on the keyboard.

Thoroughly examine every detail under the heading of "PAPER FEED".

When a line is cast containing incorrect characters, turn machine to 200°, and with the paper feed locking lever (12G) up, test every row of perforations in that line to see if the perforations come over the holes in the crossgirt, and that their corresponding pins rise when the air bar is depressed.

Should the fault be connected with the failure of an air pin to rise on the B pin block, the following characters (if English standard matrix-case layout is in use)—usually the first six—will be cast in place of the correct ones: quad W — . . Æ Œ *M W Æ Œ* @ ℔ % ℀ ✚ (in this event the lines will also be cast too long).

Should the fault be connected with the failure of an air pin to rise on the C pin block, the following letters (if English standard matrix-case layout is in use) will be cast in place of the correct ones: i s e o space o n d ff T w D m quad; (in this case the justification will not be affected).

By similar methods of investigation all derangements may be located.

METAL LEAKING BETWEEN MATRIX-CASE AND MOULD

In the case of large type, especially if an unusual number of quads or capital letters come together, the machine may be running too fast, causing the mould to become overheated.

Heads of type breaking off in matrix-case, caused through (1) machine casting imperfect type bodies; (2) matrices burred on the edges of the punching recess.

Bridge not correctly adjusted to mould, or dirt beneath bridge feet.

Centring pin not reaching base of matrix cone holes.

Dirt beneath mould blade; top of mould badly worn, causing burrs to be cast on type; burrs adhering to matrices, preventing them seating perfectly on the mould.

The screw in mould crossblock connecting hook may have worked loose.

Centring pin may not be entering cone holes of matrices, causing the letters to be cast partly off the type bodies.

The stop rack or locking bar may be broken.

Before commencing to cast from a new matrix-case, especially with a new machine, see that the matrix-case hook descends freely over the cross slide (b5CC) from both the 18-unit position and the 5-unit position.

Metal too hot, or insufficient water running through the mould.

The bridge or centring pin may be adjusted incorrectly, or centring pin set too tightly in bushing.

Matrix-case draw rods loose.

The carrying frame guide rods (4A1) not moving freely in the bridge bushings (1A6).

Should the piston spring rod (20H1) be allowed to seize in the piston lever operating rod cross head (a19H3), the pressure of metal will overcome the centring pin spring (a5A3).

Matrix jaws failing to close correctly.

HEADS OF TYPE BREAKING OFF

If it be found that the heads of characters are broken off, this may be attributed to one of the following reasons:—

Worn or damaged matrices.

The use of inferior metal.

The casting of hollow type bodies.

The temperature of the metal too high.

The matrix-case not being free in sliding frame or being tight over the cross slide plate (bearing for matrix-case) (a5C9).

The sliding frame fouling the piston guide on pump body (if new pump has been placed in machine).

The piston not working freely or not a good fit in pump body, or the nozzle and pump body not perfectly clean.

Incorrect setting of sliding frame or cross slide draw rods, or the draw rods may be pressing against the matrix jaws.

Faulty setting of low quad attachment or part (5A12) working loose on centring pin.

TYPE BEING MARKED OR DAMAGED

Should the type become damaged in any way, it may be caused by a burr on the fixed or loose type channel blocks, by type clamp being burred or not working freely, type clamp spring (a26B2) too strong, type support spring (b31B) too strong or broken, or improper adjustment of type carrier.

If the type is scored, remove both type channel blocks and cast a few characters. Should they then be perfect it will prove that the blocks are at fault. The latches (a50F2 and a51F3) may be too strong or a burr on either type channel block may cause the trouble. Should the type still be marked when the type channel blocks are removed, the trouble is likely to be connected with the type carrier. This should be removed and examined for the cause.

LETTERS NOT BEING CAST, ALTHOUGH PUMP MECHANISM WORKING (GENERALLY TERMED "STOP CASTING")

Metal too cold; or (when first starting), mould may not have warmed up, thus chilling the nozzle.

Piston not free in pump body, but hanging up after a very short stroke has been made; in this case clean off all burnt oil in pump body in path of piston.

Too much or too little metal entering beneath piston.

The nozzle remaining in contact with mould too long, causing metal to chill in nozzle; lower the nuts (28H4 and 28H5), causing earlier descent of pump body.

Mould blade not sliding freely; mould chilled by too much water passing through; defective metal; hole in the nozzle or pump body valve closed with dross or dirt.

TYPE TURNING IN TYPE CHANNEL

The adjustable type channel block (50F) may not be properly adjusted to the size of type in use.

The latch (a50F2) in adjustable type channel block may be strained. (The projecting portion of the latch should protrude beyond the face of the block.)

Type pusher may not be adjusted correctly. It should push the type $\frac{1}{32}$" beyond the latch hooks; if pushed too far or not far enough the result will be equally bad.

TYPE FALLING DOWN, BREAKING, AND CHOKING MOUTH OF TYPE CHANNEL

Read remarks on "TYPE TURNING IN TYPE CHANNEL

Type clamp (d26B) may not be sliding freely.

Type support spring (b31B) may be strained, too long, or fouling on the side.

Type carrier traverse may be wrongly adjusted. (Unlikely if the adjustment of the connecting rod (21B) has not been altered.)

Type may be cast with burrs or be hollow at the foot.

LINES NOT BEING DRAWN TO GALLEY

When the line hook remains stationary instead of taking the completed line to the galley, and type continues to be cast, examine the following points:—

The rock lever (b9D1), inside machine base, may have become disarranged.

The rock lever (9D1, if this older pattern is in use) may have been inserted wrong side forward. (Keep the curved side towards pulley side of machine.)

The galley trip lever adjusting screw (45F1) may have become loose.

The galley cam driving pawl spring (14F5) may have become disconnected.

The nuts on either of the justification wedge lever arm rods (15D3) may have become loose.

Line Hook Going to Galley, but Not Taking Line with it:—

Stray pieces of type beneath column pusher (a1FF) may be wedging the line hook.

Dirt in front of line hook projection. This may be cleared after removing the stud (28F) and drawing line hook back.

In turning the galley cam (b14FF) by hand, the line hook will not go forward to take hold of line if the machine has been stopped with the type pusher in type channel. Turn machine till the type pusher has receded.

When casting large type, after being on small type, the line will stop on reaching the column pusher (a1FF) if the adjusting disc (a2F1) has not been adjusted according to the size of type being cast. The same result will also occur if loose type accumulates beneath the column pusher spring box (X8F),

as the column pusher will not be able to recede to its normal position.

The column pusher will not send the line into the galley if the line hook adjusting screw (a22F1) is too far in, as the end type will come in front of the channel block (a51FF). Neither can the line enter the galley if there is dirt beneath the galley, or if the galley is bent, causing the edge of the galley base plate to be higher than the type channel plate (a49F). The galley bar (13FF) should not be adjusted to too narrow a measure at the lower end of galley, or the lines will become wedged.

BURRS ON TYPE

Dirt beneath mould blade, causing mould blade to be slightly higher than blade side blocks. This defect may be caused by using overheated metal, or through having mould blade adjusted downward too losely. This adjustment refers to moulds prior to 20,000; clean the mould.

Matrices not correctly adjusted to mould.

Mould worn on upper surface where matrix is seated. (Moulds, especially when they have begun to wear, should be kept to one machine.)

When burrs appear on feet and sides of type, the mould should be sent to the Monotype Corporation for overhauling and repair.

METAL LEAKING BETWEEN NOZZLE AND MOULD

Assuming the nozzle has been correctly squared to machine base, and no nuts have become loose on the pump body operating rod (a28H), and the spring (a27H) has not become detached, splashing under the mould is likely to be only due to the fact that the nozzle does not rise exactly in the centre of its seating in mould base. In rising slightly out of centre a flat wears on the nozzle, and leaking results, which gradually gets worse. Loosen the nuts on the studs (a12H9) beneath each side of pot, remove bridge, mould crossblock, *remove pump body piston*, run pot up, and adjust metal pot until nozzle rises *exactly* in centre of hole in mould base when turning the machine slowly by hand.

MACHINE CASTING QUADS ONLY

Machine will cast nothing but quads when the air has not been turned on, when the paper feed connecting hook (4G1)

is not engaged, or when a piece of blank paper is being passed through paper tower.

PUMP NOT FUNCTIONING

Should the pump mechanism remain stationary when it should be operating, i.e., *with the hand pump trip* (a35H12) *disengaged from stud* (a31F7), *the following are the probably causes:—*

The pump trip spring (50D) in machine base may be disconnected.

The pump trip collar (a49D1) may have moved along the tube towards galley side of machine.

The pump trip tube (a49DD) may have become bent, preventing it sliding freely; or it may require oiling.

The line canceller (b9D1) may be in action.

The justification wedges may be too far forward, thus preventing the pump trip collar getting into its normal position.

PUMP NOT STOPPING, *or* MACHINE CASTING ONE OR TWO UNNECESSARY LETTERS AT END OF LINE

Pump trip collar (a49D1) may be moved along the tube towards pulley side of machine.

When the pump trip collar is correctly set, the pump mechanism will stop when either of the justification wedge lever arm rods (15D3) *is inserted in matrix-centring lever* (b16EE), *or when the pump hand trip rod* (Xa35H) *is latched.*

The nuts on either of the rods (15D3) may have become loose.

PUMP MAKING KNOCKING NOISE

Pump piston fouled and hanging up.

Pump body spring rod stop nuts (31H13) set too high. (Only likely when pump adjustments have been interfered with.)

FAULTY ALIGNMENT

This is almost invariably due to running the machine in a careless manner, never troubling to see that essential parts are correctly adjusted, such as the following:—

Centring pin not entering cone holes of matrices exactly in the centre, or point of centring pin worn or burred.

Matrix-case not correctly adjusted to mould.
Centring pin not correctly adjusted to matrices.
Dirt allowed to accumulate in cone holes of matrices.
Matrix-case draw rods allowed to become loose.
Locking bars not correctly adjusted.
Jaw tongs and spring box incorrectly adjusted, or the spring brakes (wood) (a26E12) in end of spring box hung up.
A mould, the surface of which has become badly worn, being used on a machine other than that upon which it became worn.
Type carrier cam damaged and not holding carrier perfectly still during casting period (seldom likely).

FAULTY PAPER FEED

In connection with the paper tower, watch the following points:—

That paper seats correctly on both spur wheels. If paper be too wide or too narrow, only one side will seat correctly.
See that the character perforations of the paper ribbon are in alignment with the side perforations.
Having the air bar (2GG) lifted, the locking lever (12G) up, and the machine turned to, say, 180°, see that the points of the paper feed spurs come exactly in a line with centre of holes in crossgirt (a1G5G). Should they not do so, examine the following points:—
That the pawl spring (13G10) has not become detached.
That the ring (14GG) works freely, and does not require oiling. If it does not move freely, the projection on the ring may not always reach the stop screw (1G20).
The spring and rod in paper feed spring box (Xb17G) may not be working freely.
Air bar (2GG) may be clamping the paper before it has finished travelling, on account of the stop screw (1G20), or the studs (2G4), or nuts (2G6) being incorrectly adjusted.
See that the paper is winding up correctly on paper take-up spool.
See that the air-valve screw (3G3) is correctly adjusted.
Paper feed pawl ring pin (14G1) may be broken.
There may be obstruction in the leather packing (2G2).

PAPER NOT WINDING UP

Flange plate on winding spool (X21G) may be bent.

The pipe cover plate projection (held by the screw 8G4) may be binding on a part of the spool flange.

The disc (21G7G) in winding spool may have become loose.

The lifting finger (23G3) may not be lifting the pawl (23G1) correctly, or the operating spring (24G) may have become damaged or detached.

IMPERFECT JUSTIFICATION

Provided the keyboard operator has performed his work properly, imperfect justification is very unlikely to happen if the following conditions exist. The wedges must not be damaged, and must be kept clean; the type must be cast true to size without burrs or air blows; the normal wedge locking pin must be a proper fit in its bearing. The transfer wedge rods must be drawn fully back before the mould blade is operated, and the nuts at the end of the transfer rods must not be loose. The space transfer wedge must be correctly adjusted. The justification wedges must be taken to their correct positions, and the justification wedge centring tooth (12D) must not be loose. The mould blade must slide freely.

Lines will be cast incorrectly justified if the keyboard measure was not correct or if the wrong justification scale was used. On the caster a similar result will take place if the wrong normal wedge is in use. With a badly adjusted machine there are other causes. Moulds should be maintained in good working condition.

If the machine is casting wrong letters, see points under heading of "WRONG CHARACTERS BEING CAST".

GENERAL INSTRUCTIONS FOR CASTER ATTENDANTS

The adjustments of machines must not be tampered with, and *filing any part of machine should be strictly forbidden*, and emery cloth must not be used to clean any part of machine.

Every morning before starting machine, oil the crossblock, clean face of matrices and mould with clean rag, examine cone holes of matrices to see that they are perfectly clean. See that centring pin enters cone holes exactly in centre of matrix, and that the draw rods are not loose. If bridge has been removed to clean crossblock, on replacing, the alignment must be tested. When changing moulds blow water

out of mould water channels, remove crossblock, and carefully clean all metal from the mould before placing in its proper box.

Centring pins should be tested with a centring pin gauge from time to time, and any burr on point removed.

The pump should always be thrown out of action before stopping the machine.

The metal should not be skimmed until it has been at casting temperature one hour; it should then be thoroughly stirred before skimming.

The melting pot must always be lowered away from the mould when machine is not casting.

Pistons should be taken out overnight and the dross skimmed from the pot.

The caster should be periodically cleaned with dry rag, and nuts and screws examined to see that they have not become loose.

Once a week drill the nozzle from both ends, whether it appears to be needed or not; if allowed to become choked with hardened dross it becomes difficult to drill. (Careful caster operators will remove the nozzle every evening at finishing time, and drill it when cold every morning before commencing other work.) The composition nozzles are drilled $\frac{1}{8}$" to a distance of $1\frac{7}{8}$" from the bottom end, the remainder of the hole being $\frac{1}{16}$".

Once a week thoroughly clean and drill the pump body; see that the piston is clean, and that the grooves around the piston are free from dross.

As previously stated, every time the bridge is removed test the alignment before restarting to cast material for use. The surface upon which the types are rested, when testing for alignment, should be quite level, smooth, and free from dirt.

Always have the galley gauge set correctly before commencing a job, and then do not alter it.

Supply metal to the melting pot in frequent small quantities, so that an even temperature is maintained.

Always maintain the metal to correct quality.

Cover the machine every night with covers that are free from dirt or dust, but care must be exercised to see that the cover does not come in contact with the metal pot.

Always insist that any alteration in the arrangement of the matrix-case layout be written at the end of the spool.

Paper spools should be stored in a dry position, but not exposed to high temperatures.

Normal wedges should, if possible, be kept to their respective machines. They should not be touched with lap or stone, or the justification will be seriously affected. When the wedges are not in use they should be carefully stored; do not leave them lying loosely amongst the wrenches or other tools.

Proofs of each galley of type should be pulled as soon as possible after casting, so that any defect may at once be remedied.

The type as it passes into the galley should be carefully examined to see that no heads have broken off, and that a perfect face is being cast. The body and feet of type should also be examined from time to time to see that they leave nothing to be desired.

Only oil specially provided for the purpose should be used on moulds.

The compressor should be lubricated daily.

Twice a day blow out the condensed water in the air tank.

MATRICES

SIDE WALLS ON COMPOSITION MATRICES

Composition matrices are punched a certain distance from one particular side of the matrix body. With a few exceptions the following side walls apply:—

In English founts from 5 point to 11 point inclusive, the standard side wall measurement is ·035″; in 12-point founts it is ·025″. In some large type composition matrices the side wall is reduced to ·015″.

Didot roman founts from Didot 5-point to Didot 10-point inclusive, have ·035″ side wall; Didot 11-point ·025″; and Didot 12-point ·015″.

Didot Fraktur founts correspond with the English: Didot 5-point to Didot 11-point, ·035″; Didot 12-point, ·025″.

MATRIX TYPE LINE

The specimen book of "Monotype" machine type faces gives the "line" of all ·2″×·2″ composition matrices (such as Series No. 1, 10 point, Line ·129″). This indicates the

measurement from the rear side of matrix body to the serif line of the character. When the matrix is correctly aligned it is, during casting, exactly central (pointwise) over the mould blade; therefore, where the position of the serif line of the matrix is known, it is a simple matter to find the position of the serif line from the rear of the type body. Example:—

SERIES NO. 1, 10 POINT, LINE ·1290″

Line	·1290″
Half of matrix body	·1000″
Line below centre of matrix (and centre of type)	·0290″
Half of 10 point (·1383″)	·0692″
Line below centre of 10-point type ..	·0290″
Serif line from rear of 10-point type body	·0982″
Serif line from front of 10-point type body	·0401″
	·1383″

Therefore, by casting spaces ·0982″ thick, they may be used for gauging the serif line of this fount.

In the case of large type composition or display matrices the "line" given in the specimen book is the measurement from the rear face of type body to the main serif.

CARE OF MATRICES

Matrices properly treated will last for years, and the wear over a few years is almost negligible.

A point of prime importance in securing long life for a set of matrices is to take care that the matrix-case draw rods are adjusted so that the matrix-case is brought exactly into position for the centring pin to enter a matrix without pulling it sideways in any direction, and that the timing of seating the centring pin in the matrix is correct; particular attention must, therefore, be paid to the setting of the bridge and all adjustments connected with the movement of the matrix-case. The parts concerned should be examined each day in case any have become loose.

The correctness of the matrix-case adjustments should be tested before causing the machine to make one single revolution by power.

Careful attention should be paid by the attendant to the matrix jaws and pin jaws, which should always meet firmly; to draw rods; and to the centring pin, which should always be central with cone holes.

To enable the centring pin to do its work properly it must be seated in the matrix *before* the matrix has descended sufficiently to touch the mould. If not, bad work and undue wear upon both mould and matrices will be the inevitable result. Undue pressure on the mould bruises the faces of the matrices in time, causing the outer edge of the punching recess to close in, and this may cause the heads of the types to break away as the matrix-case rises from the mould.

The best method of cleansing the matrices is to wash them in clean paraffin, and then to blow out from the cone holes and faces the loosened dirt by means of a blast of compressed air.

Oil should be kept from the face of the matrices as much as possible while the machine is running, as it causes burrs to be cast on the type.

If by chance a character breaks off in the matrix, the matrix should not be dipped in the metal pot, as this tends to soften the matrix. The following procedure should be adopted: Place both justification wedges in the 18-unit position, perforate the paper ribbon so as to locate the matrix which is to be cleared, bring the space transfer wedge into operation (by holding in the rod 57D), and give the machine one or more revolutions with the pump mechanism in action. This generally clears the matrix.

On no account should the matrix be struck against anything hard. Should a matrix become damaged in a manner likely to affect the precision of the type to be cast from it, it should at once be discarded and replaced. When not in use the matrices should be carefully replaced in their boxes, or wrapped in a clean rag, so that no dust or dirt may settle on them.

The tendency to grow careless in handling matrices as soon as the sheen of newness has worn off must be resisted. They

have more bearing on the appearance of the product than any part of the machine, not excepting the mould.

With regard to the matrix-case, before inserting it in the machine, be certain that every matrix wire has been inserted, and that the spring clip which prevents these wires from working out has been placed in position; also see that the matrix-case enters the bridge quite freely.

Make it a rule, where possible, to use the same mould, matrices and normal wedge together on the same machine.

When the bridge has been removed, wipe the centring pin before replacing the bridge on machine.

When oiling the centring pin care must be taken that the oil does not overflow and run into the cone holes of the matrices.

New matrices should not be used on a mould that is indented by wear where the matrices seat, as this will cause the type to be cast with burrs on its upper corners, and the corners of the matrices will be damaged.

If a matrix wire becomes visible through the base of the cone hole of matrix, it indicates that the centring pin has become faulty through wear.

Cellular matrices should not be mixed with the non-cellular.

The life of the cellular matrices is greatly reduced if worked without bars (b8A8).

"MONOTYPE" COMPOSITION MOULDS

SMALL TYPE COMPOSITION MOULDS.—These are for composing and casting type in any size from 5 to 14 point. Type of one size only can be cast from these moulds. Two distinct patterns are in general use: (*a*) the pattern with numbers under 20,000; and (*b*) the newer pattern with numbers 20,000 and upwards. Composition moulds are made to any style of body size (point, English or foreign standards) and to any height. English "Monotype" type is ·918″ high; type body ·868″ high; matrix drive ·05″. Some moulds in use (numbered under 20,000) are fitted to work with the old style low space attachment; a special mould lever (on bridge) can be supplied to permit these old style moulds to be used with the present low space attachment.

When returning moulds numbered under 20,000 for repair, it is advisable to have them converted to the pattern

numbered above 22,000. It is also recommended to apply the present low space attachment in place of the original pattern.

The 14-point moulds for working from ·2″×·2″ matrices produce type with a slight bevel on the upper edge; this is to give the matrices a larger seating area on mould.

LARGE TYPE COMPOSITION MOULDS.—For composing and casting 14, 18 and 24 point. These consist of a frame containing interchangeable insets, and have the type nick on the right-hand mould blade block, similar to that of ordinary composition moulds, and if used for casting type from large type display matrices the type will be cast with the nick on rear side of type body. These moulds can only be used with the present style of low space attachment, and the special mould coupling hook (9606) must be used with them.

INSTRUCTION UPON "MONOTYPE" COMPOSITION MOULDS NUMBERED 20,000 AND UPWARDS

These instructions should be carefully followed before placing the mould on the casting machine.

1. Fill the hollow screw on end of mould with warm oil to prevent air lock, and secure the mould to the casting machine in the usual manner. Turn the machine until the mould blade is at the extremity of its ejection stroke, and note that the equalizing lever on the mould clears the mould blade connecting fork (b16C5) by four thicknesses of keyboard paper. Failing this clearance, the type will not be completely ejected.

2. The mould blade operating rod (45E) must be adjusted to the mould.

3. Place the bridge in position. (It is assumed the bridge has been correctly adjusted.)

4. Turn the machine to casting position, with the matrix-case central and loosen the adjusting nut (4A9). Place one thickness of keyboard paper between the nut (4A9) and the bridge lever (b2AA). Bring the nut down until it touches the paper, and secure it with the locking nut (4A10). It is of the greatest importance that this adjustment should be carefully made, as failure to do it will result in excessive wear on the matrix seat of the mould, and damage to the matrices. Moulds of this style are interchangeable as regards their overall height, and therefore when the bridge is once properly

adjusted it will serve for any mould of this style. Moulds with serial numbers under 20,000 vary in overall height, and it will be necessary to make this adjustment for each mould as it is placed upon the caster, but in no circumstance should an attempt be made to cast from moulds of the new form until this adjustment has been carefully made.

5. To cast types with smooth brilliant faces and solid bodies it is essential that the pump should be clean and the tapered portion of the pump nozzle should fit accurately in the conical aperture of the mould, and that the end of the nozzle is exactly coincident with the top surface of this aperture. A nozzle is supplied with each mould and has the same serial number as the mould. The mould should be used in connection with this nozzle only, and the nozzle should be used with no other mould. When returning a mould for repair, it is essential that its nozzle should be returned with it.

6. Before attaching the syphon oiler to the mould, fill the two tubes with warm oil. Before starting the day's work, fill the oiler and replenish it as soon as three-quarters have been consumed. The oiler should never be allowed to empty itself. Nothing but heavy pure mineral oil should be used; any other will cause tinning and seizure after a short run.

TAKING THE MOULD APART FOR CLEANING

Never take a mould apart so long as it continues to give satisfactory type. Should it become necessary to disassemble, prepare a suitable place, covered with clean paper, and proceed in the following manner:—

1. Remove the crossblock.
2. Remove the hollow screw (6294) on end of spring block.
3. Remove blade stop and support (5673).
4. Take off the blade cover plate (6327).
5. Take off cover springs (6328) (6329).
6. Remove the blades (5273) (6330) by pulling them straight out. The blade lever (4010) will swing out with the blades and clear itself.
7. Insert a few thicknesses of paper in place of the mould blades, and remove the side blocks by canting them towards the blade opening.

This is as far as the mould need be taken apart for cleaning. The two eccentric dowel pins which position the side blocks

must not be interfered with in any way as, in the event of their being moved, even slightly, the mould will be thrown out of adjustment.

Clean all parts thoroughly with clean naphtha, benzine or petrol. Rust or adhering metal may be scraped away with a piece of brass rule, care being taken that the sharp edges are neither dulled nor nicked. On no account use any grinding material for this operation.

TO REASSEMBLE THE MOULD

1. Place screw side block (6323) in position.
2. Place nick side block (6325) in position.
3. Replace blades and insert mould blade lever while so doing.
4. Advance the hollow screw (6294) in the spring block until it touches the helical spring, then give it an additional half-turn.
5. Replace the blade cover plate (6327) and screw down firmly.
6. Replace cover springs (6328) (6329) and screw down firmly. If the mould has been cleanly assembled, the blades will now work freely and without shake.
7. Add to the pressure of the helical spring by screwing the hollow adjusting screw (6294) firmly home.
8. Replace blade stop and support (5673).
9. Oil all parts thoroughly and replace the crossblock.

NOTE ON RETURNING MOULD FOR REPAIR

When returning a mould to the Works for repair, enclose in the box samples of type recently cast from it, together with a memorandum stating reasons for returning.