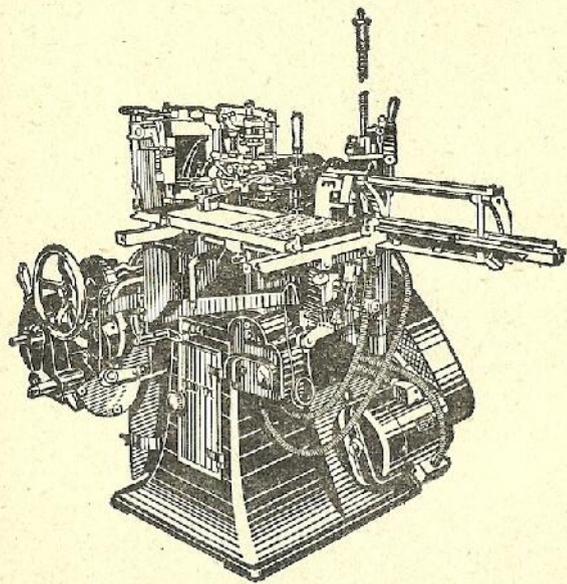


"MONOTYPE"  
DISPLAY MACHINE  
INSTRUCTION BOOK



A "MONOTYPE" DISPLAY MACHINE

# "MONOTYPE" DISPLAY MACHINE INSTRUCTION BOOK

*Prepared for the Guidance  
of Attendants and Learners*

THE MONOTYPE CORPORATION LIMITED

**PLEASE NOTE**

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# "MONOTYPE" DISPLAY MACHINE INSTRUCTION BOOK

## INTRODUCTION

In the following instructions "right", "left", "front" and "rear" are understood to be taken when the attendant is stationed with the pump mechanism on his right and the cams on his left. When referring to a part removed from the machine, right, left, front or rear are assumed from the position such part occupies on the machine, with the attendant stationed as stated.

### Variety of Product

The range of the machine is all sizes of type, spaces, borders and ornaments from 5 to 48 point.

Leads and rules in any of the usual thicknesses from 1½ point to 12 point.

NOTE: A Display Machine is normally equipped to cast type up to 36 points (48 points setwise). The extra parts for 42 and 48 point (60 points setwise) are only supplied to special order.

Generally speaking, the changes are in connection with the type carrier, the sizing and ejecting mechanism, and the pump.

### THE CAMS

The two sets of cams are geared together by means of an intermediate gear, two teeth of which are marked "0" and "1" respectively. The gear of the driven cam shaft is marked "0" and the gear of the driving cam shaft is marked "1" (this mark is positioned at 340°). At a certain position in the machine's revolution, the figures "0-0" and "1-1" must synchronise.

The A or type carrier cams bring the mould cross block and type carrier to position when casting type, and operate the mould blade when casting strip material.

The B or pump cams operate the mechanism which forces the molten metal into the mould.

The D or centring pin lever cams move the centring pin lever which takes the matrix-case to and from the mould, accurately positions the matrix upon the mould, and clamps it ready to receive the molten metal against the punched end.

The G or mould blade cams cause the blade to open to a position decided by the sizing wedges and to eject the type from the mould into the type carrier.

The H or type pusher cams cause the type to be pushed through the carrier into a channel leading to the galley.

The shear cam revolves with the driving cams and reciprocates the shear cam lever which works the shear blade for parting the strip at the required length.

### 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 off. The type is then ejected from the mould into the type carrier, and the jet is ejected into the melting pot. The carrier then 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.

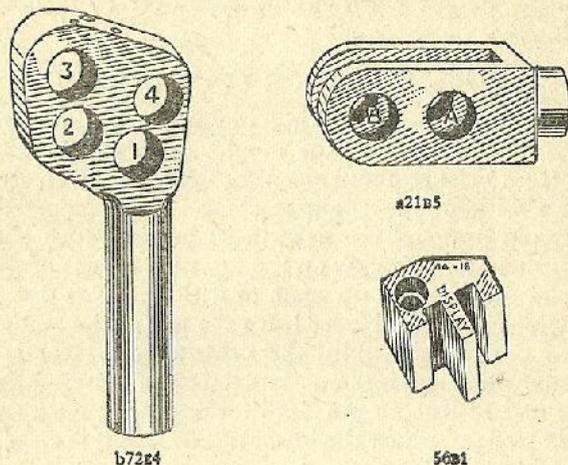
The type carrier extension a22B must be adjusted so that the face of the sleeve a22B2 against which the spring abuts is four inches from the end of the carrier.

When the type carrier connecting rod yoke a21B5 is connected to the cam lever extension b72E4 in the A-1 position, 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 the machine to casting position  $220^\circ$  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  $90^\circ$  and check that the face of the carrier against which the type is clamped is exactly  $1\frac{1}{2}$ " from end face of "B" pin block.

The various type carrier connections for different point sizes are as follows:



- 1 and A—Composition.  
 2 " B—14 to 36 point Display.  
 3 " B—14 to 24 point Large Type Composition. Use mould cross block coupling hook 56B1.  
 3 " B—14 to 18 point Display Type; use type channel block h51FF, and mould cross block coupling hook 56B1.  
 4 " A—42 and 48 point Display.

### TYPE SUPPORT SPRING

As the type is being delivered into the type carrier, it is prevented from falling on its side by a type support spring. Immediately the type is clear of the mould, the carrier proceeds to its left-hand position, and on its way the type is gripped by the type clamp; the support spring is then drawn away from the type, so that when the carrier is brought to rest, the pusher may eject the type into the channel leading to the galley. The above condition applies when producing types in set sizes of 24 points or less. For over 24 point, the cam on the type carrier shoe (long) should be raised as stated on the part so that the spring is out of action. Failure to do

this may result in the type support spring being badly strained.

#### TYPE CARRIER SHOE PLATE FOR OPENING TYPE CLAMP

The plate c24B2 has a tongue  $\frac{3}{16}$ " wide and is used when casting type from 5 point to 14 point. Use the plate a24B2 with a  $\frac{3}{32}$ " tongue when casting type over 14 points up to 36 points.

#### NORMAL WEDGE LOCKING PIN

The normal wedge locking pin holds the wedge in a definite position so that the mould blade will be adjusted accurately to the required size. See that it slides freely in its bearings without the slightest shake. If, in adjusting, the locking pin becomes too tight in its bearing, turn back the nut 14B5 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.

Turn the machine until the centring pin lever is at its highest position and insert a normal wedge. Unscrew the nuts on top end of locking pin until locking pin engages with a tooth in wedge. Adjust the lower nut so that it is clear of the spring abutment 14B10.

NOTE: 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.

#### 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 the wedges set to give an opening of approximately 12 points, adjust the mould blade connecting rod 45B so that there is  $\frac{1}{8}$ " compression on the sizing spring 16c10. Turn machine until 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.

#### MOULD BLADE COMPOUND LEVER b44E7, ABUTMENT a96E1 AND COLLAR b44E9

The mould blade must draw back far enough to permit type 48 points wide to be cast. This change in the stroke of the mould blade is made by taking the screw a44E8 and its collar b44E9 from the compound lever b44E7 and screwing it into the abutment a96E1, placing the collar between the compound lever and abutment.

For type cast from small composition moulds, the compound lever must be locked to its cam lever.

For type cast from large composition moulds, and display type up to 19 points setwise, the compound lever and collar must be connected to the abutment so that the *low* level of collar contacts on the lever.

For display type over 19 points setwise to the maximum opening of 48 points, the compound lever and collar must be connected to the abutment so that the *high* level of collar contacts on the lever.

#### TYPE PUSHER

The type pusher should push the type  $\frac{1}{32}$ " beyond the spring latches in the channel blocks. Adjust the type pusher connecting rod 77E to obtain this condition.

#### THE 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 piece of type. The nozzle is then moved away from the mould, so that it shall not become cooled by too long contact with 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.

## THE PISTON

The loose end on piston should be adjusted so as to have  $\frac{1}{32}$ " vertical movement.

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 through the grooves in the washer.

Two pistons are supplied for type casting; the longer of these is designed for a stroke not exceeding  $\frac{1}{2}$ " and is used for 2" x .2" composition moulds and display moulds up to 18 point. The other is for a maximum stroke of  $\frac{13}{16}$ " for use with large-type composition moulds and display type moulds from 24 point to 36 point.

There are also two pistons for casting strip material. The longer one in this case is marked "1 $\frac{1}{2}$ -4 POINT", and has only one slot in the loose end washer, instead of four as is the case with the other pistons. The other piston is the same as the display piston (5 to 18 point), and is used for casting 6 and 12 point leads and rules.

## PUMP CONNECTING RODS

Adjust the pump cam lever connecting rod 68E so that the pump body operating lever 34H contacts firmly on the pump rocker arm a33H without compressing plunger spring a33H6 more than  $\frac{1}{16}$ " 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, have the nozzle 14H in use, remove the piston, attach the nozzle gauge 8cr3 and place the machine and melting pot in casting position; release the pump hand trip, and turn machine to 220°.

Depress the operating lever 29H and see that nozzle seats quite freely in the gauge when the operating lever is released. Should it not do so, proceed according to the following instructions concerning squaring the nozzle.

## SQUARING NOZZLE TO MACHINE BASE

With the melting pot and machine still in casting position, place between the lifting lever a26III and the boss of the swing frame b37H sufficient packing just to fill the gap, then lower the melting pot.

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 8cr6 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 gauge and, if necessary, re-adjust the nozzle position.

## TIMING THE PUMP

With the mould and matrix-case in position, insert the piston in pump body, raise melting pot to casting position. See that the plates a63H1 and latch 57H1 are disengaged. Loosen the nuts at lower end of rod 31H1, so that they are well clear of the casting, release pump 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, with most of the  $\frac{3}{32}$ " clearance between pin and hole on the underside of pin. Rotate the upper nut 31H13 at lower end of rod 31H1 until it just contacts with the casting. Turn machine and lock the nuts 31H13 firmly in position.

## TIMING THE SEATING AND WITHDRAWAL OF NOZZLE

Place the four plates a63H1 in their operative position. Insert piston in pump body. Raise melting pot to casting position. Release the pump trip handle a35H12. Turn machine to 200° and adjust the nuts at top end of pump body operating rod so that the operating lever 29H has  $\frac{1}{16}$ " clearance in the deep slot of piston lever. Turn machine to 360° and adjust the piston operating rod crosshead stud a19H5 just clear of the lever 29H.

USE OF PUMP BODY SPRING ROD STOP PLATES a63H1,  
LATCH 57H1 AND PISTON SPRING xa20H

When casting small type and thin strip material, the piston stroke commences immediately the pump body spring rod

stop nut 31H13 reaches the casting of the swing frame post. For large type and the larger sizes of strip material, improved results are obtained by means of the stop plates, which can be placed in the path of the stop nut in order to vary the stroke of the piston for different point sizes and sets.

The following table gives the approximate number of plates to be used when casting the various sizes of type:

4 plates when casting 36 point by 36 point			
3	"	"	36 " " 27 "
2	"	"	36 " " 18 "
1	"	"	36 " " 9 "
3	"	"	30 " " 30 "
2	"	"	24 " " 24 "
1	"	"	14 " " 14 "
2	"	"	12 " " lead and rule
1	"	"	6 " " " "

The latch 57H1 should be brought into action when casting display type and strip material other than 1½, 2 and 3 point, in order that the piston spring may be compressed and then suddenly released, to cause a stronger and quicker pressure to be applied to the piston. Adjust the nuts 62H4 and 62H5 at top of latch stand shaft so that the latch will drop freely into position with the minimum of clearance.

The piston spring rod nut a20H8 should be at the extreme top of the rod a20H1 when using composition moulds up to and including 12 point. For other work the nut should be gradually screwed down, according to the point size and "set" of the type being cast, until solid type is obtained.

When casting 14 point, the nut will be, upon the average, about ¼" from top of rod, and when on 36 point large "set" letters (such as M or W) the nut will be approximately 1½" from the top of rod.

There can be no hard and fast rule about these instructions, as the quality of type metal varies considerably, and worn pistons and pump bodies give results different from those obtained on new machines.

The attendant should therefore make out charts to suit his own conditions and experience. After a little practice at the machine, carefully studying the effects obtained by the use of different numbers of plates and varying compression of the piston spring, the attendant soon acquires experience which

automatically induces him to adjust the pumping mechanism to suit the quality of the metal he is using and the product he is casting.

#### PUMP TRIP TUBE COLLAR

Release the pump hand trip and turn the machine to 100° so that the rocker arm latch engages with the pump operating lever. Adjust the collar b49D1 on the tube a49DD so that the side of collar is ¼" clear of the latch. Lock the collar firmly in position. (The lower clamping sleeve in collar has a boss round its lower end so that the collar can be freed by inserting a screwdriver end between the boss and the collar.)

#### CENTRING PIN LEVER AND BRIDGE

The function of these parts is to take the matrix-case to and from the mould, and to operate the centring pin.

#### 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.

#### BRIDGE LEVER FULCRUM ROD

See that the fulcrum rod a2A2 is screwed tightly into the rod yoke 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 1/8". 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 composition matrix-case in the central position, and machine at about 345°, remove the link pin xa3A, loosen the two carrying frame stop nuts 4A2 and insert two thicknesses of spool paper between the mould and the 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 matrix puts sufficient drag on the paper, so that if lightly pulled it can be drawn between matrix and mould without tearing. 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 drawn without tearing. Lock both nuts firmly in position and check that the adjustment is correct.

#### ASCENT OF MATRIX-CASE

The adjustment for this should not be made until the descent of the matrix-case has been correctly adjusted.

Insert the link pin xa3A and loosen the crossbeam 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.

#### TIMING THE CENTRING PIN

With the link pin xa3A inserted and the matrix-case still in the central position, turn the machine slowly until one thickness of spool paper can just be withdrawn without tearing from between the matrix-case and the 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 the nut and check setting.

#### CENTRING PIN AUXILIARY SPRING

When casting from small composition matrices, the matrix is held on the mould by the centring pin spring a5A3. For all other type casting a centring pin auxiliary spring xb36A should be placed between the centring pin spring abutments e5A4 and a5A5 so that the extra pressure applied to the pump piston cannot cause the molten metal to raise the matrix off the mould.

To remove the auxiliary spring, move the matrix-case so that the centring pin cannot enter the cone hole, turn machine until centring pin lever is in its lowest position, insert the gag 30Cr1 between the upper abutment and the washers, turn machine so that lever is in its highest position, and remove gag complete with bracket.

#### MATRIX HOLDERS

The position of the composition matrix-case is controlled by the holes in the extension in cross slide d5cc and by the matrix holder positioner 34R1.

NOTE: The hole marked "S" in the rear block is for standard matrix-cases. Use the other hole marked "E" when casting from matrices in an extended matrix-case. Adjust the sliding frame draw rod so that centring pin is central over a low space matrix, then position a character matrix over mould and see that the centring pin enters coned hole without moving the matrix-case.

#### POSITIONING THE MATRIX HOLDERS

To position the 1" x 1" display matrix holder a48AA, place the pointer 55B1 in No. 9 position, insert matrix holder, loosen the matrix holder positioning spring nut 48A3, turn machine carefully round until the centring pin seats in the coned hole, see that the spring has correctly positioned itself in the groove in top of sliding frame, and tighten the nut.

To position the electro display matrix holder a49AA, adjust the cone hole slide a49A17 to the point required, place the pointer 55B1 in No. 8 position, insert matrix holder, turn machine carefully round and adjust the draw rod until the cone hole is in line with the centring pin, release the two screws b49A2 that hold the position spring a49A1, back off the adjusting screw 49A22 in end of holder, turn machine carefully round until the centring pin seats in the coned hole, adjust the screw 49A22 so that the position spring correctly engages in the nick in the underside of sliding frame, lock the spring and adjusting screw in position.

The position springs and draw rod may need re-setting if the centring pin position is altered to obtain correct alignment.

#### SPEED REGULATING MECHANISM

When casting from small composition matrices, the machine should be run with the tumbler handle in the No. 4 position (at belt speed). For other work the speed of the machine, which depends upon the time required to cool the product in the mould, must be reduced. An index plate attached to the speed regulator indicates the position of the

three change levers to give the correct casting speed for type up to 36 points in body and set. Nineteen speeds are obtainable.

With tumbler in No. 4 position, adjust the belt shifter operating bar lever bracket 100E2 so that the face of the shoulder on the rear end of the belt shifter operating bar b97E1 comes  $\frac{1}{32}$ " in front of the belt shifter ring b5E when the starting handle 169E2 is in the position it occupies when the machine is at rest. Then, with tumbler at 1, 2 or 3, place the starting handle in its "running" position, and see that the clutch face of gear 104E1 is almost touching the clutch pin face of loose pulley. If necessary, re-adjust the bracket 100E2 to obtain this condition.

With the starting handle out of engagement, and the tumbler at 1, 2 or 3, adjust the speed bracket guide post nuts 122E15 and 122E16 so that there is  $\frac{1}{84}$ " clearance between the lug at the lower end of the belt shifter ring and the bottom of the notch in the clutch shifter plate lever a105E7. See that the belt shifter operating bar does not engage the belt shifter ring when the starting handle is moved into the running position.

Disengage the starting handle, move the tumbler to its No. 4 position and adjust the clutch control operating rod 102E1 to give  $\frac{1}{84}$ " clearance between the under face of the rear end of the belt shifter operating bar b97E1 and the bottom of the slot in the belt shifter ring b5E.

### INTERLOCKING LEVER MECHANISM

When the starting handle is placed in operating position, a cam face on the belt shifter operating bar b97E1 pushes down the interlocking lever operating rod b109E1, causing one end of the interlocking lever x108E to engage in slot in the quadrant shaft lever 129E3E, and the other end to engage with a tooth in the tumbler; this prevents the quadrant shaft lever 129E3E and the tumbler 133E1E being moved while the machine is in motion. Place the starting handle in its operating position and adjust the rod b109E1 to give the minimum possible clearance between end of rod and underside of the belt shifter operating bar b97E1 when the rod is held down by hand. Test with tumbler and quadrant shaft handle in each of their three positions.

### TYPE CHANNEL BLOCKS

5 to 24 point composition moulds, use xa51F, xa50F.

14 to 18 point display moulds, use xh51F, xa50F.

24 to 48 point display moulds, use xf50F, xk51F.

For 14 to 18 point display moulds use crossblock coupling hook 56B1. For other sizes use the coupling hook supplied with mould.

Use the type guide 13CT1 for directing the type into the galley when casting from 14 to 18 point display and composition matrices.

When using composition moulds on a display machine, connect the spring 60A5 between the blade lever and bridge holding down screw 1A21 for low space casting, and between blade lever and spring post x61A in galley pan shelf when casting characters or high spaces. (The spring post x61A is replaced by the crossblock oiler body pivot 32CT15 on machines equipped with crossblock oiler.)

### DISPLAY TYPE SIZING

Before sizing up, see that the wedges are correctly positioned, otherwise the characters afterwards cast will not be correct to size marked on their matrix.

A display normal wedge xb21D and display justification wedge b11D are used to vary the set sizes of display type (the front justification wedge is always at No. 8 position), but as their range is not sufficient to cover all the sizes from 2 $\frac{1}{4}$  points to 48 points, the following changes must be made:

2 $\frac{1}{4}$  points to 19 points. Use packing piece 32C1.

19 $\frac{1}{4}$  points to 36 points. Remove packing piece 32C1.

36 $\frac{1}{4}$  points to 48 points. Remove packing piece 32C1 and turn the mould blade adjusting screw back 12 points.

The packing piece 32C1 rests on top of the mould blade operating rod fork, straddling the mould blade abutment slide. A lug on the packing piece operates between the abutment slide adjusting screw c14C1 and end of mould blade.

When the screw a44E8 is in the abutment a96E1 and packing piece is in use, place the cam lever extension collar b44E9 in its "low" position. Turn to the high level when packing piece is out.

### DISPLAY MATRIX MARKING

Display matrices are marked with the face series number and the point size of the type to be cast from them; also with the set measurement in points. Thus, 199-18 towards one end of the matrix means that the face series is No. 199, and the body size is 18 point. At the other end of the same edge of the matrix is a number indicating the "set" size in points to which type must be cast from that matrix: such as  $16\frac{3}{4}$ , indicating that the sizing wedges must be adjusted to  $16\frac{3}{4}$  points.

The "set" size, taken into consideration with the body size of the type, is an indication of the speed at which the type must be cast. A chart is provided from which the speed of casting may be obtained from any matrix marking.

There are also in circulation a number of display matrices which are marked with the face series number, the point size, and wedge positions indicating the set size, thus, 159-24-9-6 or 159-24-9-6. This indicates 159 series of face, 24 point; with the asterisk it means  $9\frac{3}{4}$  points in set, and without the asterisk  $26\frac{3}{4}$  points. Omission of the asterisk implies an addition of 17 points. On these matrices the final 2 indicates  $\frac{1}{4}$  point, 4 indicates  $\frac{1}{2}$  point, and 6 indicates  $\frac{3}{4}$  point.

When a correct type size has been obtained by the method described under "DISPLAY TYPE SIZING" it is possible—with moulds of the square nick pattern and certain moulds of the round nick pattern converted to a larger opening—to cast types in all sizes from  $2\frac{1}{4}$  points to 48 points setwise. There are, however, a number of round nick moulds in which the maximum blade opening is not sufficient to allow the body of certain of the characters in the many extended faces to be cast in one piece. With these it is necessary to cast the body with the character overhanging, and then to cast a high space to support the overhangs.

Only the 1" x 1" display matrices are used for these founts, and the particular characters which are outside the range of the mould are—in the case of matrices with new style marking—indicated on the matrix by the set size being greater than the body size. For example: If a character of  $39\frac{1}{2}$  points set is to be cast on a mould with a maximum opening of, say 38 points, a high space must be cast to support the overhang of the character. Place the wedges in position for 34 points and

cast the type; subtract 34 points from the set size of the character to find the thickness of the high space—in this example it is  $5\frac{1}{2}$  points—place the wedges and 17 point packing piece in position for this size, change the matrix and cast again.

When using matrices with the old style marking, the characters which have to be dealt with in this way are marked with two asterisks (\*\*) in addition to figures indicating the wedge positions. The asterisks indicate that the wedges should be at 16-8 without the 17 point packing piece when casting the character; the figures indicate the wedge positions for the high space. For this the packing piece should be in position.

This method has been adopted as the one calculated to give the greatest degree of uniformity in wedge positioning, but in some instances it is possible to prevent the disadvantage of too great an overhang by departing from the above instructions; for by increasing the size of the body cast and decreasing the size of the supporting space the same final result is obtained, so long as the thickness of the space is decreased by exactly the same amount as the type body is increased. The design of the face in many cases demands that certain characters must overhang, therefore great care must be taken that the final dimensions of the type plus the space are correct.

### CASTING FROM COMPOSITION MATRICES WITH DISPLAY TYPE NORMAL WEDGE IN USE

It is possible to cast from any composition matrix by using the display type normal wedge xc21d in conjunction with the packing piece 32c1 and the two composition justification wedges 10d and b11d. This avoids the necessity of purchasing a special normal wedge for every "set" of matrices when casting type for case. A table, "WEDGE POSITIONS FOR COMPOSITION MATRICES", gives the positions in which the wedges must be placed to produce the required type sizes.

To size up before commencing to cast type for case from composition matrices, first ascertain the size of a type body (preferably an 18-unit body) from the card supplied with the machine, headed "TYPE SIZES FOR USE WITH NORMAL

WEDGES", then find the equivalent to this (or nearest larger size) on the table on the card, and position the three wedges as indicated. After sizing to this, and providing the wedges are positioned as indicated for the different sizes required, all the various types will be cast to correct width or to within .00025"; this possible inaccuracy is negligible, but any discrepancy can be adjusted by manipulating the micrometer wedge adjustment screw.

#### 42-48 POINT ATTACHMENT

When this attachment is applied to a display machine, the range of the machine is extended by introducing the cam lever extension b72E4 so that 42 and 48 point type may be cast, but in other respects the extension is the same as the standard part a72E4 and must be adjusted as described for that part.

When casting from 48 point Didot moulds, the type carrier connecting rod 21B may need a slight adjustment to position the carrier for correctly receiving type from the moulds.

*Type Support Spring Xc31B.*—This part is shorter than the standard spring b31B and is used only with 48 point Didot moulds.

*Type Carrier Shoe Plate.*—When casting 42 and 48 point type, the type clamp is opened wider by fitting a type carrier shoe plate with a wider tongue. The symbol for this part is b24E2.

*Mould Blade Compound Lever c44E7, Abutment b96E1 and Collar b44E9.*—When casting from 42 or 48 point mould insets, the standard compound lever and abutment must be replaced by the longer compound lever and the shorter abutment. These special parts can be used for all set sizes that can be cast in these moulds, but they should be replaced by the standard parts when casting from moulds having a body size of 36 points or less. The reason for using these special parts is that the mould blade is shortened to make correct sizing possible and therefore the standard parts would not give the correct stroke to the mould blade bell crank; for the same reason a mould blade operating rod fork pin d16c6 with elongated head is supplied.

A machine equipped with the 48 point attachment has a special compound lever stud b44E10 and collar 44E15 so that the compound lever may be quickly changed.

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#### 42-48 POINT ATTACHMENT

When this range of the lever extends cast, but in standard part that part.

When casting connecting the carrier for *Type Super* standard sp moulds.

#### *Type Car.*

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A machine equipped with the 48 point attachment has a special compound lever stud b44E10 and collar 44E15 so that the compound lever may be quickly changed.

#### 42-48 POINT ATTACHMENT

We no longer supply the 42 and 48 point attachment for the Composition Caster and Display Machine, but the information concerning this attachment is included for the benefit of those customers who already possess the attachment.

42 and 48 point type is included in the product available on the Super Caster.

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For types measuring below 14 points setwise, the compound lever must be locked to its cam lever.

For types measuring from 14 to 36 point setwise, the compound lever and collar b44E9 must be connected to the abutment so that the *low* level of collar contacts on the lever.

For types measuring over 36 points setwise to the extreme size, 60 points, the compound lever and collar b44E9 must be connected to the abutment so that the *high* level of collar contacts on the lever.

#### 42-48 POINT DISPLAY TYPE SIZING

The wedge positions for type from 42 and 48 point moulds must be obtained from a chart. When sizing up, the wedges must be correctly positioned, otherwise the characters afterwards cast will not be the correct size.

The standard display normal wedge xc21d1 and display justification wedge b11d are used to vary the set sizes, but as their range is not sufficient to cover all the sizes from 2 points to 60 points, the following changes must be made:

2 POINTS TO 14 POINTS: Use the 34 point packing piece a32c1.

14½ POINTS TO 31 POINTS: Use the 17 point packing piece 32c1.

31½ POINTS TO 48 POINTS: Remove packing piece.

48½ POINTS TO 60 POINTS: Remove packing piece and turn the mould blade adjusting screw back 12 points.

NOTE: If the mould in use is of the round nick pattern and does not open to 60 points, the body of certain characters must be cast in two pieces. The procedure for this is the same as for similar matrices in the ordinary display group, with the exception that the 34 point packing piece must be in position for the high space.

#### MATRIX MARKING 42-48 POINT

△ AND WEDGE POSITIONS: Use 34 point packing piece.

\* AND WEDGE POSITIONS: Use 17 point packing piece.

WEDGE POSITIONS ONLY: Packing piece not required.

\*\* AND WEDGE POSITIONS: If mould opens to 60 points, screw back the mould sizing screw 12 points. Otherwise, cast the type body in two pieces.

## PUMP BODY FOR 42-48 POINT TYPE

The pump body with this attachment has a bore 1" in diameter and is special for 42 and 48 point. In other respects the pump is equipped as for display type up to 36 points, and must be operated in accordance with the instructions under that heading.

For 42 and 48 point type above 36 points setwise place gear in 1AD (9 revolutions per minute).

## LEADS AND RULES

A display machine equipped with the lead and rule mechanism and suitable moulds can produce strip material in any thickness from  $1\frac{1}{2}$  points to 12 points, and cut them automatically to any desired length from 1" to 25". Continuous lengths beyond this may be cast, in which case they must be cut by hand.

## CHANGING FROM TYPE CASTING TO LEAD AND RULE CASTING

When preparing to cast leads or rules, it is necessary to remove the following parts from the machine: bridge; both type channel blocks; type carrier complete; type pusher and guide; bridge lever connecting link; galley pan support complete; pump body and piston.

Having removed all the foregoing parts, proceed as follows: The lead and rule pump body and its special nozzle should first be put in the melting pot to heat up. When they are hot, insert the piston (also hot).

NOTE: The longer piston for leads and rules is marked " $1\frac{1}{2}$  4 POINT", and has only one slot in the loose end washer instead of four as is the case with the other pistons. The piston for 6 and 12 point is the same as the piston for display casting and is supplied to ensure a close-fitting piston; use it only for leads and rules.

Swing the mould blade operating bar 53B1 from top of centring pin lever (where placed when not in use) into operating position.

Place the centring pin lever bracket xc134E on the centring pin lever from beneath and tighten the clamps.

## ADJUSTMENTS FOR THE LEAD AND RULE MOULD OPERATING MECHANISM

Before adjusting the auxiliary bracket, etc., attach mould and micrometer wedge stand to machine and connect the

spring box lever link 144E1 to the No. 2 position in the type carrier cam lever extension.

*To attach the Mould.*—Turn machine to  $15^\circ$ , withdraw the mould blade as far as possible, raise the right end of mould blade operating bar, connect it to the blade and lower mould into position. Use a standard side clamp a49E, special front clamp 89E1 and three holding down screws b50E1. (These screws are the same as the shortest screw used for attaching composition moulds.)

*To attach the Micrometer Wedge Stand x51B.*—Turn the machine until the mould blade is at the right-hand end of its stroke, and place the stand in the position normally occupied by the type carrier shoes. At the right of the stand are two holes; the right-hand hole positions the stand for a  $\frac{1}{2}$ " stroke of mould blade for casting rules, the left-hand hole for a  $\frac{3}{4}$ " stroke for leads. (Outer holes for  $\frac{1}{2}$ " stroke, inner holes for  $\frac{3}{4}$ " stroke.) A fine adjustment of the stroke can be made by raising or lowering the micrometer wedge adjusting screw 51B2.

*Auxiliary Bracket x136E.*—The adjusting screw 136E2 in this bracket must be adjusted so that the spring box is approximately level with the machine base.

*Spring Box x141E.*—This part causes the mould blade to bear firmly against its stops at each end of its stroke.

Back off the nuts at each end of spring box and turn machine to  $70^\circ$ . Adjust the nut 141E7 on *left* end of rod to give  $\frac{1}{16}$ " compression on the spring (measured by the amount the spring abutment is moved by the nut). Lock the nut with its lock nut 141E8. Turn the machine to  $220^\circ$  and adjust the nut 141E7 on *right* end of rod to give  $\frac{1}{16}$ " compression on the spring and lock the nut in position.

NOTE: When the machine is in this position the operating bar lever x138E must be clear of the lower end of the slot in which it operates. At  $70^\circ$  the lever must clear the boss on the centring pin lever. If incorrect in either position, the adjusting screw 136E2 must be adjusted to swing the bracket slightly one way or the other, and the nuts on spring box rod must be re-adjusted.

*Changing from  $\frac{1}{2}$ " to  $\frac{3}{4}$ " stroke.*—When changing from rules to leads or vice versa, adjust the nuts 141E7 and 141E8 on *right* end of spring box.

If for any reason the spring box is dismantled, care must be taken when re-assembling to see that the longer end of spring box is placed to the right.

*Mould Clamp Lever and Connecting Rod.*—The clamp lever on mould should be between horizontal and  $\frac{1}{8}$ " below horizontal when the centring pin lever is at the bottom of its stroke and the piece of product in mould is firmly clamped. (Check with machine running at 120 r.p.m.)

See that a piece of product of the correct point size is inserted in mould. Connect the clamping screw connecting rod fork eye to the mould lever and turn machine so that centring pin lever is in its lowest position. Adjust the nuts at lower end of rod so that the length of spring is  $3\frac{3}{8}$ " and lock the nuts firmly in position. (The rod should be screwed into the yoke a135E9 so that its end is level with the bottom of slot in eye.)

Adjust the nuts a135E13 and a135E14 at upper end of rod so that there is  $\frac{1}{16}$ " gap between the nut a135E13 and the top washers a135E15 when the centring pin lever is at the bottom of its stroke, with the mould warmed up and machine running at 120 r.p.m.

### AUTOMATIC CUTTER

*Shear Bell Crank* x108F.—The adjusting screw 109F1 which controls the position of the bell crank must be adjusted to prevent the shear blade interfering with the leads or rules entering the channel. Raise the melting pot into casting position and turn machine to 20°. Adjust the screw 109F1 so that the shear blade a83F2 just clears the rear side of the rule passage when pushed forward with the fingers to take up all play.

*Thrust Bar Operating Rod* x129F.—Disconnect the stacker rock shaft connecting rod 121F1. Trip the thrust bar so that it is in its front position. Back off the operating lever screw a101F4 and adjust the operating rod 129F1 so that, when the machine is turned and the cam lever descends to its lowest position, the end of cam lever is working in the curve on the top of thrust bar. Leave the cam lever in its lowest position in readiness for the next three adjustments.

*Thrust Bar* x122F.—With the machine in the position given in the preceding adjustment, adjust the thrust bar nuts 122F3

so that there is  $\frac{1}{32}$ " clearance between the projecting part of stacker guard 176F1 and the transfer bar hanger 96F2F. This should position the front of the rear transfer bar a96F1 slightly in advance of the channel bar a77F1. When tightening the nuts 122F3, take care that the thrust bar 122F1 is not twisted out of line with its operating rod 129F1.

*Transfer Bar Operating Lever Screw* a101F4.—With the machine in the same position as preceding adjustment, adjust the screw a101F4 so that the transfer bar hanger 97F4F also clears the stacker guard 176F1 by  $\frac{1}{32}$ ". Lock screw firmly in position.

*Stacker Rock Shaft Connecting Rod* 121F1.—With the machine in the same position as preceding adjustment, adjust the rod so that when rod is placed in position the lugs on the stacker rock shaft 91F1 are approximately  $\frac{3}{32}$ " inside the front face of the channel bar a77F1.

*Transfer Bars* xa96F (rear) and xa97F (front).—The transfer bars should be adjusted to open wide enough to clear the product as it comes from the mould, and to grip it tightly while transferring it to the stacker plate 90F1F. Adjust the transfer bar operating lever adjusting screw 102F1 so that the distance between the transfer bars is just slightly greater than the size of leads or rules being cast. *This adjustment must be made for each change in point size of product.*

*Guide Roller* 80F1 and *Channel Bar Support* a77F3.—These parts are for straightening and supporting leads and rules. As soon as the product being cast is fusing correctly, it should be tested for straightness by laying two lengths foot to foot on the galley. If they do not touch throughout their length, adjust the guide roller, cast new pieces, and test again. If long lengths are required, the channel bar support should be adjusted so that the lead or rule will just slide over and be supported by its top face.

*Length of Lead or Rule.*—To obtain any length from 1" to 25" inclusive, loosen the clamp screw 86F2 and slide the shear gauge x88F to the right or left on the tube 85F3 until the stop against which the lead or rule strikes is the required distance from the cutting edge of the shear blade. Firmly tighten the clamp screw.

NOTE: For lengths less than 20" the stop is the shear gauge lug 88F2. From 20" to 25" the lug must be pressed back so

that product contacts on the stop at right end of shear gauge x88r.

When casting long leads or rules, be sure that when the lead or rule has pushed the stop as far to the right as possible there is at least  $\frac{1}{32}$ " clearance between the end of shear gauge x88r and the friction plate 175r1. After the shear gauge has been adjusted as described, it can be adjusted to greater accuracy by rotating the shear gauge nut a88r5.

*Minimum length of Lead or Rule.*—This must be at least twice the stroke of the mould blade.

*Box for short lengths* 76r1.—This box should be attached to the stacker plate directly under the shear blade when casting leads or rules not long enough to stack. The connecting rod 121r1 must be removed when this box is in use.

*Guide Plate* x79r.—This part is for guiding thin material from the mould to the cutting mechanism. It is positioned by hooking its left end over the friction block adjusting screw on the mould and resting its right end on the guide roller 80r1.

## DIRECTIONS FOR THE CARE AND CLEANING OF DISPLAY MOULDS

Display type moulds are furnished with five interchangeable insets for casting type, high and low quads and spaces in 14, 18, 24, 30 and 36 points. Insets for casting special sizes can be supplied to suit customers' requirements.

Low spaces may be cast to any width setwise up to 2 points larger than their respective body sizes, *i.e.* a 14 point inset will cast up to and including 16 point low spaces. High or low quads may also be cast for any of the smaller point sizes by adjusting the mould blade setwise to correspond to the body size required. For instance, a 36 point inset will cast 3 em pica or 6 cm of 6 point, and a 24 point inset will cast either 2 em pica or 4 cm of 6 point, and so on.

On the old-style moulds with half-round nicks, characters may be cast to any width up to the following limits:

- 14 and 18 point body up to 30 points.
- 24 and 30 point body up to 36 points.
- 36 point body up to 38 points.

On new-style moulds with square nicks characters may be cast to any width up to the following limits:

- 14 point body up to 30 points.
- 18 point body up to 30 points.
- 24 point body up to 36 points.
- 30 point body up to 42 points.
- 36 point body up to 48 points.

*All inset display moulds can be furnished with insets to compose type in justified lines in 14, 18 and 24 point.*

The size of the mould is altered by removing one inset and substituting one of the point size required. To do this, proceed in the following manner:

1. Prepare a place covered with clean paper, have the hands clean and free from particles of metal.
2. Remove the cross block.
3. Open the blades to approximately 18 point.
4. Swing the blade operating lever spring box out of contact with the lower blade lever.
5. Remove the two small screws on the side of the base and the two large ones on top of inset.

The inset can now be removed by pushing it away from the back of the base in the direction formerly occupied by the cross block, at the same time holding it down on the base to prevent the blade operating levers from being bent.

When the inset is forward sufficiently to clear the aperture in the base which positions the inset, push end-wise to disengage the levers from the blades.

As the important sharp edges of the inset are unprotected when away from the base, extreme care must be taken that they are neither dulled nor damaged.

Blow the waterways clear, and wipe and oil thoroughly before placing it in its compartment in the mould box.

6. The required inset and the mould base must be thoroughly washed in clean naphtha, benzine or petrol, and dried with a clean white cloth; any small particle of type metal adhering to any part should be removed with a piece of brass rule. In no circumstance must grinding substances (such as emery cloth or oil stone) be used.

Smear a light coating of clean oil on the bottom of the inset and slide into position, engaging the blade levers by reversing the instructions contained in paragraph 5.

Insert the two small screws for holding the inset to the base and screw up firmly, then release and bring them just up to bearing. Insert the two large screws and screw down firmly, then release and bring them just up to bearing. Finally tighten the two small screws firmly; then the two large ones.

The cross block must also be thoroughly washed before replacing and care taken that the jet blade is in its correct position, *i.e.* the fluted end to the front. The cross block must be thoroughly oiled before inserting, and it should work freely; if not, it indicates that the inset has been replaced with dirt between it and the base, in which case it must be taken out and cleaned. The oil hole on the end of the inset must be filled with warm oil before placing the mould on the casting machine. The mould oiler is regulated to give correct lubrication if kept between full and half-full of oil.

To cast low quads and spaces, swing the blade operating lever spring box out of contact with the lower blade lever into the reverse position, abutting on the stop fixed to the lubricator. It is not necessary to remove the bridge to make this adjustment. When casting low quads or spaces it is important that a blank matrix be inserted in the matrix-case, otherwise pressure of molten type metal will spring the blades apart.

It is not possible for operators to repair moulds, as they have neither the special tools nor the necessary experience. Moulds should never be taken apart as long as they produce good type; neither should a mould be altered in any detail.

If it is found necessary to take apart an inset, proceed in the following manner: Prepare a suitable place and bear in mind that success or failure to make a satisfactory job will depend entirely on scrupulous cleanliness and the preservation of the sharp edges of the insets.

1. Drill  $\frac{1}{4}$ " hole in ingot of type metal.
2. Procure a steel punch of suitable size. This may be purchased from the Corporation.
3. Plan a method which will guarantee replacement of tapered dowels in the identical holes from which they were taken.
4. With the cover plate facing downward, place the inset on the ingot of type metal, with the dowel pin over the  $\frac{1}{4}$ " hole, and remove the pins with the punch by giving them a sharp tap with a small hammer.

5. Remove the four screws holding the cover and take off the cover plate. Remove the blade back stop screw in centre of intermediate plate.

6. In removing the blades they must be slid from front to rear. *Never lift the rear of the blade when passing it between the side blocks, nor try to force it over the nick pin, as this would injure the blade or nick pin.*

7. Clean carefully all parts which have been removed and insert blade. This is best done by placing the upper blade on the lower, and working backwards and forwards to make sure there is no dirt between them. Place the blades on the intermediate plate and hold them firmly down when sliding into position. These should also be worked backwards and forwards.

8. Before replacing the dowel pins pull a strip of clean cloth backwards and forwards through the holes.

9. Replace cover and clean and insert dowel pins lightly; replace the four cover screws and bring them just up to bearing. Tap the pins lightly and tighten screws a little. Tap the pins home and screw up firmly.

The water passages of the mould must be kept clean, and whenever the mould is taken off the machine blow water out and blow oil through them.

If any defects occur in the mould that cannot be corrected by following these directions, it is necessary only to return the particular inset which is troublesome. Return to us samples of the defective type and a memorandum giving particulars of the trouble.

### CARE AND CLEANING OF LEAD AND RULE MOULD

(FOR PLATE SEE PP. 50, 51)

*Mould Blade Stroke.*—Products for which a matrix is used (rules and high leads or clumps with all moulds, also medium clumps with column rule moulds) must be cast with  $\frac{1}{2}$ " stroke of the mould blade. Any more or any less than  $\frac{1}{2}$ " will throw the blade out from register with the matrix, and in addition to giving an imperfect product may injure the mould.

Product for which a cap and cap support are used are cast with a  $\frac{3}{4}$ " stroke of the mould blade. The stroke must never be made greater than this under any circumstances, but if

necessary it may be shortened, but never below  $\frac{1}{8}$ ". When the stroke is shortened, the cap and cap support must be moved to the right the amount by which the stroke is shortened, so that the blade and cap will register.

*Mould not to be taken apart unless necessary.*—It is not necessary to take the mould apart to change mould blades. If the mould blade shows signs of hanging up, stop the machine and thoroughly oil all moving parts of the mould so that it is properly lubricated. This will usually free a mould if the blade or vent pusher is hanging up. If the product being cast has become jammed, proceed as follows (refer to Figs. 11 and 12):

Lock out the pump, remove the shield G, matrix clamp T, and matrix U, also the right tie bar V from the top of the mould. From the rule being cast, cut some pieces about two picas long, turn the machine until the mould blade is at the left of its stroke, drop one piece of the rule into the mould blade opening, and turn the machine so as to push the rule out. Repeat until the mould is free from the rule which is binding. If the rule does not move when the machine is turned it will be necessary to take the mould apart as described in the following pages; in which case thoroughly clean the vent pusher slot with a piece of wooden reglet or brass rule.

*Parts must correspond when changing Mould Blades.*—To change from one style of product to another be careful to have all parts of the same series. The parts in a series are carefully fitted to work together, and cannot be interchanged with other sets of parts. They are clearly marked to prevent confusion.

*Lubrication.*—Use "Rule Mould Oil" (order by name). In case of emergency, mutton tallow or castor oil (lubricating or medicinal) may be used, but their continued use is not recommended. Standard "Monotype" oil, such as that used on other moulds and casting machine parts, will *not* work satisfactorily on the lead and rule mould. Keep the oil hole R in the left tie bar Q over the mould blade M constantly filled with one of these lubricants; also put a little on the end of the operating bar where it joins the mould blade M and on the end of the clamping screw F where it touches the type block K. This clamping screw F must be removed completely and

oiled its full length before the mould is put on the machine, and on long runs this must be done once a day.

*When changing product* (as, for example, changing matrices to get a different face or changing from rules to leads) always save a piece about 4" long of the product just cast (see next paragraph). In the case of taking off a matrix, wrap this piece with the matrix; in the case of low leads, wrap it with the mould blade cap.

*Before starting to cast*, insert between the type blocks a piece of the product for which the mould is then adjusted, and push this piece in far enough to touch the end of the mould blade. Loosen the knurled screw D on the friction block B to clamp this product sufficiently to prevent the incoming metal from blowing it out.

**NOTE:** When a new matrix is received without a piece of the product, proceed as follows: Insert between the type blocks, in the same manner as described above, a piece of lead or leads (either "Monotype" or foundry) to equal the point size to be cast. Before putting on the shield G, cover the mould blade opening between the matrix and the right tie bar V with common soap that is soft enough not to crumble, and also force a little down into the opening. Put on the shield G. Throw the latch 57H1 (operated by the piston operating rod crosshead) out of action and turn the machine by hand for several casts until the new product is properly started; then throw the latch in again.

*First Cast.*—Before starting to cast, turn the machine once by hand with the pump locked out, then release the pump and turn the machine again by hand to make the first cast. This is to see that the mould and machine are working correctly before starting under power.

*Temperature.*—For product from 2 to 6 point inclusive the temperature should not exceed 700°; for 12 point product it should not exceed 675°. These temperatures are for standard "Monotype" metal. For other metals, special care must be used to obtain the correct temperatures by trial; for example, linotype metal, frequently used in non-distribution newspaper offices, casts at lower temperature.

*Water Regulation.*—Use just sufficient water to give a perfect product. Too much will give imperfect faces and prevent perfect fusion of the joints; too little will cause blistered body.

*Putting on a Mould.*—Never attempt to put on a mould with the casting machine at any other than the 15° position. Also be particular to have the base of the mould and its seat on the machine perfectly clean and free from particles of metal.

*Alterations.*—Never attempt to lap any part of the mould or alter its shape. These parts are made by experienced workmen trained for this special work and supplied with the finest gauges and measuring instruments.

*Taking Apart.*—Never remove from the mould any other parts than those directed in the following under the heading "Taking Apart".

*Speed.*—The speed for a given point size is the same for all products; that is, rules and high and low leads, including the longer stroke for low leads.

#### SPEED AND TEMPERATURE TABLE FOR CASTING LEADS AND RULES

The temperature at which efficient casting may be made depends mainly upon the quality of metal in use.

The following table indicates the speeds and temperatures for casting "Monotype" leads and rules from standard "Monotype" metal:

SIZE	1½ pt.	2 pt.	3 pt.	4 pt.	6 pt.	12 pt.
Revolutions per min. . .	128	110	91	80	49	23
Gear Positions . . . . .	3CE	2CE	1CE	3BE	3AE	1CD
Temperature (Fahr.) . . .	725°	700°	700°	680°	680°	650°
„ (centigrade)	385°	371°	371°	360°	360°	343°

These speeds and temperatures are approximate and apply only when the mould is thoroughly warmed up.

*Adjustment of Nozzle.*—Always test the adjustments of the nozzle, especially in regard to its fitting into the mould, before starting to cast.

*Action of Clamp Screw.*—When the machine is running at 120 r.p.m. the moving end of lever E should be between horizontal and  $\frac{1}{8}$ " below the horizontal, when the centring pin lever is at the bottom of its stroke and the type blocks locked together in casting position. If the moving end of the lever E works down so that at the bottom of its stroke (machine running at 120 r.p.m.) it is more than  $\frac{3}{8}$ " below the horizontal it must be readjusted. Be sure that proper spring compression

is on the connecting rod to this lever E when making this test.

*Each time a Mould is put on the machine or one Matrix is changed for another, test the product by laying two long lengths foot to foot on the galley. If they do not touch throughout their length, adjust the guide roller 80F1 to straighten them, and the channel bar support to suit a77F3 (see p. 21).*

#### TAKING THE LEAD AND RULE MOULD APART

(FOR ILLUSTRATIONS SEE FIGURES 11 AND 12)

Prepare a suitable place for taking the mould apart. Spread down a clean sheet of paper, and as the parts are taken off the mould put them on it.

*Refer to Fig. 11.*—Before taking off any part, back off clamp screw F two or three turns, using lever E to turn it.

Remove, in the order here given, shield G, matrix clamp screw S, matrix clamp T, matrix U, upper mould blade shoe N, mould blade stop L, mould blade M (*do not drop vent pusher*), and two tie bars Q and V.

Take out two screws (a, Fig. 12) and their washers from the bottom of the mould. Then from the front remove four screws that hold the front type blocks J and K to the rear type block O. (These are all at the left end, two near the top and two near the bottom. The lower right one and the upper right one are reached through holes H.) Slide the type blocks J and K out toward the left, and remove the two-point blocks P and W (Fig. 12). (Note their positions when taking them off so that they will be replaced correctly; their corners are made to correspond with those of the type blocks.)

Remove the six short screws X (four are shown in Fig. 12, the other two are underneath) and the one long screw Y from the type blocks, and take the type blocks J and K apart.

#### CLEANING

Clean all parts thoroughly with a dry cloth free from lint. Never use waste, and be particularly careful to have the vent pusher slot N (Fig. 12) in the type block clean.

#### ASSEMBLING

Put the type blocks J and K together, insert the six short screws X and one long screw Y and bring them up to bearing.

Get the left ends of the type blocks exactly even; try them with a straight edge or feel with the finger nail across the end, and tap one or the other lightly with a block of wood to bring the type blocks into position, then tighten the screws and test again.

Then slide the type blocks J and K into position, putting a slight downward pressure on them so as to remove any dirt from their bearings. Remove the type blocks, wipe them off and repeat, this time leaving them in position.

**NOTE:** It is absolutely necessary to have the type blocks and their bearings in the mould perfectly clean; even the slightest particle of dirt will hold the type blocks out from position.

Move the type blocks J and K forward a little, slide in the mould blade, and press the type blocks back against the mould blade. Insert the upper point block P with the bevelled corner coinciding with the bevelled corners of the type blocks, press it down lightly with the thumb nail to take up all lost motion in the mould blade, and insert and bring just up to bearing its three screws, but do not tighten these screws. Turn the mould bottom up; insert, and bring just up to bearing the screws (a, Fig. 12). Insert the lower point block W with its bevelled corner coinciding with the bevelled corners of the type blocks, push it in until it is flush or below the surface of the type blocks and then insert and bring just up to bearing its two screws. Turn the mould right side up again and test the position of the upper point block by seeing that there is no up-and-down play in the mould blade. Then go over the two screws H, the two screws I, and the screws (a), tightening each a little until all are brought up solid. Again test the mould blade to see that there is no up-and-down play in it.

Pull out mould blade M. With the mould standing on its front side, and the left end toward you, put in the vent-pusher with the sharp edge up and the lug on the end toward you.

Slide in the mould blade again gently until the square slot in the blade engages the lug on the end of the pusher, and push both gently in together, swinging the blade ever so little, if necessary, to enter its end in its slot. If the blade and pusher do not go in readily, remove them and try again. *Never force the blade.*

Put on the upper mould blade shoe N with its two screws, and also the mould blade stop L (Fig. 11).

Put on the two tie bars Q and V and bring them toward each other so that the shield G will just slide easily into position between them.

Insert and tighten the nozzle seating plate screw.

Put on the desired matrix U, matrix clamp T, matrix clamp screw S and shield G.

**Friction Block.**—This does not need to be taken off when cleaning the mould, but if required it can be taken apart and reassembled as follows: Remove the two screws holding the trimmer, shown just to the left of screw D in Fig. 11, and take off the trimmer and its packing plate. Hold the clamp C to the rear and remove the screw D with its washer; then remove the clamp C and its spring. Remove the two screws A and take off the friction block B. To replace the friction block proceed as follows: Insert a piece of lead or rule (cast by this mould) into the opening from which it was ejected and push it in until it touches the end of the mould blade, which can be told by seeing that moving the mould blade moves the lead or rule. Turn the lever E over until the lead or rule just inserted is clamped tightly. Press the friction block B against its two bearing surfaces and slide it forward until it touches the lead or rule which is projecting from the mould; then insert and set up very tightly its two screws A. Remove the piece of lead or rule from the mould, insert the spring behind the clamp C, put this clamp C in position, and hold it to the rear while inserting and tightening the release screw D. Be sure the washer is on the screw D. Put in position the trimmer with its packing plate, and insert and tighten its two screws shown just to the left of the screw D in Fig. 11. Be sure the packing piece is inserted right side up so that its upper edge comes about flush with the top of the friction block. Back off the release screw D until it is just free.

Screw into bearing the clamp screw F, turning it by the lever E. Make certain that a piece of the product is left in the mould.

### CHANGING FROM RULES TO HIGH LEADS

High leads are cast from a special matrix of about .002" depth of drive. Changing from rules to high leads is, therefore, only a matter of changing matrices, as when changing

from one face of rule to another. Remove the shield G and the matrix clamp T, exchange matrices U, making sure that the new matrix is put on with the open end of face to the right, and replace the matrix clamp T and shield G. Changing back to rule casting is similar to above.

### CHANGING FROM RULES OR HIGH LEADS TO LOW LEADS

To change from casting rules or high leads to casting low leads requires a change of mould blades as follows:

Take off the shield G, matrix clamp T, and matrix U. Take off the mould blade stop L. Pull out the mould blade M, taking care not to drop the vent-pusher which is drawn out with it.

Clean thoroughly the end of slot N (Fig. 12) for the mould blade and vent-pusher.

Turn the mould on its front side and put in the vent pusher and mould blade in the same way as described under "ASSEMBLING" (see page 29).

Put on the mould blade stop L\* and tighten its screws.

Put on the mould blade cap with its support. The mould blade cap goes in the mould blade opening with its open side up and its notched end to the left; push the lug on its left end in under the point block until the vertical face of the notch comes up solid against the side of the point block, and then replace the matrix clamp T and shield G.

### CHANGING FROM LOW LEADS TO RULES OR HIGH LEADS

To change from low leads to rules or high leads, proceed in a similar manner to that described under the heading "Changing from Rules or High Leads to Low Leads". Substitute the high blade M for the low blade M, and a matrix U for the mould blade cap and its support. Be sure to have the open end of the matrix to the right.

### HINTS ON LEAD AND RULE CASTING

If short lengths of lead or rule are required use box for this 76F1. Remove galley 78F1F and stacker rock shaft connecting rod eye pin 121F4. The box can then easily be placed into position.

\* These are marked "H" for high lead and "L" for low lead

For cutting shorter than 6-cm pica in length remove thrust bar bell crank spring 126F1 and run machine on  $\frac{1}{2}$ " stroke. To centre the nozzle do not strip a mould, but use the gauge made and supplied for that purpose. Best results are obtained by using a special nozzle for each lead and rule mould, as more accurate seating is thus obtained.

For casting leads or rules from 6 point upwards use latch 57H1. If not already fitted it should be purchased.

Should the mould blade hang up, such as after a long run, clean vent blade race with a little graphite, using the vent piece to remove carbonization.

### DELIVERING FOUNTS IN LINES

Where much casting of body founts is general, it is usually desirable that the type should be delivered in lines in the galley, thus rendering the type easier to handle for storage or packeting, or for distribution in type cases. For this purpose the Display Machine should be equipped with the galley action mechanism of the composition caster.

### DRIVING AND HEATING

Power recommended:  $\frac{1}{2}$ -horse.

Electric heating per hour: 1.25 units.

Gas heating per hour: 20 cubic feet.

Water through mould per hour: 4.2 gallons.

### CASTING SPEEDS FOR 12 POINT AND SIZES UNDER 12 POINT

Casting speeds and ultimate output of the Display Machine depend on many factors, such as cubic content of metal cast per minute, quality of metal, temperature of mould, and incidental time-absorbing occupations (such as matrix changing, type sizing adjustments, clearing away sorts as cast, and so on).

The following table gives recommended maximum casting speeds for body founts for characters nine units in width and under, and for characters over nine units, in sizes up to 12 point.

Point Size	9 units and under	Over 9 units
6 and 7 point .. .. .	170	160
8 and 9 point .. .. .	160	150
10 point.. .. .	150	140
11 point.. .. .	150	140
12 point.. .. .	140	120

### FORMULA FOR DISPLAY TYPE CASTING SPEEDS

It is not possible to provide a perfect formula for estimating the speed at which any type may be cast, owing to the variation in conditions, such as quality of metal, rate of water flow through moulds, etc., but a reliable basis for calculating speeds required for non-cored type may be as follows:

Assume 12-point types of 12-point width may be reliably cast at 100 r.p.m., and that all types of proportional sectional area may be cast at speeds proportional to 12 point at 100 r.p.m. As types are all of one height, it is necessary only to consider the difference in points in the square area of the body of the type to be cast relative to 12 point. The formula therefore becomes:

$$\frac{A (144) \times B (100)}{C}$$

A—Square area (in points) of 12 point (144).

B—Speed of casting 12-point ems.

C—Square area (in points) of type to be cast.

*Example:* Find speed for casting 24-point type 12 points wide:

$$\frac{144 \times 100}{24 \times 12} = \frac{14400}{288} = 50$$

*Example:* Find speed for casting 36-point type 36 points wide

$$\frac{144 \times 100}{36 \times 36} = \frac{14400}{1296} = 11$$

The gearing on the Display Machine should be set to produce the indicated speed or the next lowest to it.

Hard metal needs a higher casting temperature than soft metal, and consequently takes longer to cool on account of the mould becoming highly heated. Solid type, especially in

the larger sizes, is more reliably obtainable by slow casting than fast, as it allows more time for the "break" at the base of the type body to be sealed before the return stroke of the piston can draw back from the core of the type body any metal that has not solidified. Hollow type bodies are due either to (1) air compression during casting, or (2) air expansion after casting whilst the piston is making its return stroke.

### GEAR SPEEDS

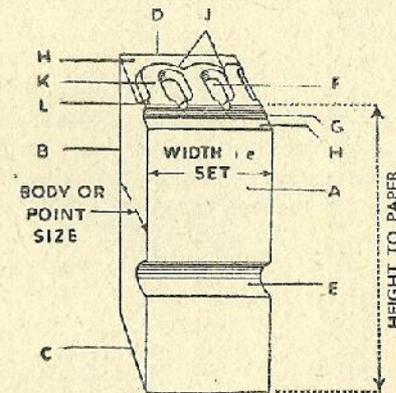
9—1AD	23—1CD	57—1BE
11—2AD	27—2CD	68—2BE
12—3AD	32—3CD	80—3BE
14—1BD	36—1AE	91—1CE
17—2BD	43—2AE	110—2CE
20—3BD	49—3AE	128—3CE

Based on direct drive speed of 140 r.p.m.

Should a speed lower than 9 r.p.m. be required, the pump should be held out of action during one, two or three revolutions between each cast.

### NAMES OF TYPE FEATURES

The following diagram illustrates all the main features of a type:



(A) front (of body), (B) back (of body), (C) foot, (D) head, (E) nick, (F) counter, (G) beard (shows depth of drive), (H) shoulder, (J) hair line, (K) main stroke, (L) serif. Depth of punching (English, .05").

**"MONOTYPE" TYPE UNIT**

The base unit of "Monotype" founts is .0007685". This is 1 unit of 1 set. A "unit" is the 18th part of an em quad. By multiplying the measurement of 1 unit of 1 set by any number the unit value of any larger set is obtained. Thus: .0007685" multiplied by  $8\frac{1}{2}$  gives .0065324" as the measurement of 1 unit of  $8\frac{1}{2}$  set, and the em quad would be .1175" (taken to the fourth decimal position).

An em quad in usual printers' language is a space which in width equals the point size of the type; in other words, it is perfectly square in section. "Monotype" em quads are 18 units wide, and are only square when the "set" equals the body point size, such as 8 point 8 set. They are *not* square when the "set" does not equal the body point size, such as 8 point  $8\frac{1}{2}$  set, or 8 point  $7\frac{3}{4}$  set, the width of the former being greater than the body point size and the latter narrower. "Monotype" figures are usually 9 units wide, or half the width of the em.

**TYPE BODY SIZES**

Lines to In.	Pts.	Eng. & Amer.	English (Old)	Didot	Pts.	
14.4	5	.0692	.066	Pearl	.074	5
13	$5\frac{1}{2}$	.0761	.0725	Ruby	.0888	6
12	6	.083	.0833	Nonpareil	.1036	7
10.3	7	.0969	.0972	Minion	.1184	8
9	8	.1107	.1083	Brevier	.1332	9
8	9	.1245	.118	Bourgeois	.148	10
7.2	10	.1384	.135	Long Primer	.1628	11
6.5	11	.1522	.145	Small Pica	.1776	12
6	12	.166	.1667	Pica	.2072	14
5.1	14	.1937	.188	English	.2368	16
4.5	16	.2214	.2166	2-line Brevier	.2664	18
4	18	.2490	.235	Great Primer	.296	20
3.6	20	.2767	.2626	Paragon	.3256	22
3.2	22	.3044	.289	Double Pica	.3553	24
3	24	.332	.3362	2-line Pica	.4144	28
2.5	28	.3874	.375	2-line English	.444	30
2.4	30	.415	—	—	.4736	32
2.2	32	.4428	.469	—	.5328	36
2	36	.498	.498	3-line Pica	—	—
1.7	42	.581	—	3-line English	—	—
1.5	48	.664	.6668	4-line Pica	—	—

**TYPES (EVEN SET ENS) PER LB.**

	6 pt.	7 pt.	8 pt.	9 pt.	10 pt.	11 pt.	12 pt.
1 lb.	1,152	848	648	512	416	344	288

Four square inches of solid type=1 lb. in weight (approx.).

**NUMBER OF ENS IN SQUARE INCHES OF TYPE**

Sq. In.	6 pt.	7 pt.	8 pt.	9 pt.	10 pt.	11 pt.	12 pt.
1	288	212	162	128	104	86	72
2	576	424	324	256	208	172	144
3	864	636	486	384	312	258	216
4	1152	848	648	512	416	344	288
5	1440	1060	810	640	520	430	360
6	1728	1272	972	768	624	516	432
7	2016	1484	1134	896	728	602	504
8	2304	1696	1296	1024	832	696	576
9	2592	1908	1458	1152	936	774	648
10	2880	2120	1620	1280	1040	860	720
11	3168	2332	1782	1408	1144	946	792
12	3456	2544	1944	1536	1248	1032	864
13	3744	2756	2106	1664	1352	1118	936
14	4032	2968	2268	1792	1456	1204	1008
15	4320	3180	2430	1920	1560	1290	1080
16	4608	3392	2592	2048	1664	1376	1152
17	4896	3604	2754	2176	1768	1466	1224
18	5184	3816	2916	2304	1872	1552	1296
19	5472	4028	3078	2432	1976	1638	1368
20	5760	4240	3240	2560	2080	1724	1440
40	11520	8480	6480	5120	4160	3444	2880
50	14400	10600	8100	6400	5200	4304	3600
100	28800	21200	16200	12800	10400	8600	7200

**"MONOTYPE" TYPE HEIGHT**

All English "Monotype" composition moulds are made to cast type .9195" high. This is slightly higher than foundry type height, which is .9185". Display type moulds are made to cast type .918" high, as there is practically no wear on the upper surface of these moulds.

The amount that a mould can be lower than this and yet be used depends entirely upon the class of matter run with it. If the type made by the mould be used with foundry or other "Monotype" type with cuts, or to correct standing matter, the mould should not be allowed to wear so that it makes type less than .916".

POSITIONS OF DISPLAY TYPE WEDGES FOR CASTING TYPE BODIES FROM 2½ TO 48 POINTS IN WIDTH

Normal Wedge	Special Just. Wedge	Width in Points	Width in Inches	Normal Wedge	Special Just. Wedge	Width in Points	Width in Inches	Normal Wedge	Special Just. Wedge	Width in Points	Width in Inches
2	2	*21	.3311	2		19†	.2653				
2	4	*22	.3343	2		19†	.2685				
2	6	*23	.3380	2		19†	.2722				
2	8	*3	.3415	2		20	.2759				
3	2	*34	.3450	3		19†	.2801				
3	4	*35	.3484	3		20†	.2846				
3	6	*36	.3519	3		20†	.2890				
3	8	*4	.3553	3		21	.2935				
4	2	*41	.3588	4		21†	.2980				
4	4	*42	.3623	4		21†	.3024				
4	6	*43	.3657	4		22	.3069				
4	8	*5	.3692	4		22	.3113				
5	2	*51	.3726	5		22†	.3158				
5	4	*52	.3761	5		23	.3202				
5	6	*53	.3795	5		23	.3247				
5	8	*6	.3830	5		23	.3291				
6	2	*61	.3865	6		24	.3336				
6	4	*62	.3899	6		24	.3380				
6	6	*63	.3934	6		24	.3425				
6	8	*7	.3968	6		24	.3469				
7	2	*71	.4003	7		24†	.3514				
7	4	*72	.4038	7		25	.3558				
7	6	*73	.4072	7		25	.3603				
7	8	*8	.4107	7		25	.3647				
8	2	*81	.4141	8		25†	.3692				
8	4	*82	.4176	8		26	.3736				
8	6	*83	.4210	8		26	.3780				
8	8	*9	.4245	8		26	.3825				
8	2	*91	.4280	8		27	.3869				
8	4	*92	.4314	8		27	.3913				
8	6	*93	.4349	8		27	.3958				
8	8	*10	.4383	8		27	.4002				
10	2	*101	.4418	10		27†	.4047				
10	4	*102	.4453	10		28	.4091				
10	6	*103	.4487	10		28	.4136				
10	8	*11	.4522	10		28	.4180				
11	2	*111	.4556	11		28†	.4225				
11	4	*112	.4591	11		29	.4269				
11	6	*113	.4625	11		29	.4313				
11	8	*12	.4660	11		29	.4358				
12	2	*121	.4695	12		29†	.4402				
12	4	*122	.4729	12		30	.4447				
12	6	*123	.4764	12		30	.4491				
12	8	*13	.4798	12		30	.4536				
13	2	*131	.4833	13		30†	.4580				
13	4	*132	.4868	13		31	.4625				
13	6	*133	.4902	13		31	.4669				
13	8	*14	.4937	13		31	.4714				
14	2	*141	.4971	14		31†	.4758				
14	4	*142	.5006	14		32	.4803				
14	6	*143	.5040	14		32	.4847				
14	8	*15	.5075	14		32	.4892				
15	2	*151	.5110	15		32†	.4936				
15	4	*152	.5144	15		33	.4980				
15	6	*153	.5179	15		33	.5025				
15	8	*16	.5213	15		33	.5069				
16	2	*161	.5248	16		33†	.5114				
16	4	*162	.5282	16		34	.5158				
16	6	*163	.5317	16		34	.5203				
16	8	*17	.5351	16		34	.5247				
17	2	*171	.5386	17		34†	.5292				
17	4	*172	.5420	17		35	.5336				
17	6	*173	.5455	17		35	.5381				
17	8	*18	.5489	17		35	.5425				
18	2	*181	.5524	18		35†	.5470				
18	4	*182	.5558	18		36	.5514				
18	6	*183	.5593	18		36	.5559				
18	8	*19	.5627	18		36	.5603				
19	2	*191	.5662	19		36†	.5648				
19	4	*192	.5696	19		37	.5692				
19	6	*193	.5731	19		37	.5737				
19	8	*20	.5765	19		37	.5781				
20	2	*201	.5800	20		37†	.5826				
20	4	*202	.5834	20		38	.5870				
20	6	*203	.5869	20		38	.5915				
20	8	*21	.5903	20		38	.5959				

\*When casting from 2½ point to 19 point inclusive abutment screw packing piece 32C1 is used.  
 † When casting from 19½ point to 36 point inclusive, abutment screw packing piece 32C1 is not used. This abutment screw packing piece affects the type width by 17 points.  
 ‡ When casting above 36 points, mould blade adjusting screw c14C1 must be adjusted back 12 points.

CHANGE SPEED GEAR TABLE

42 & 48-point Matrices

36-point (and below) Display Matrices

48 point	42 point	Set Points	Matrix Marking	36 point	30 point	24 point	18 point	14 point	12 point
1AD (9)	2AD (11)	36	18-8	1AD (9)	2AD (11)	1BD (14)	1CD (23)	3CD (32)	1AE (36)
1AD (9)	3AD (12)	32	14-8	2AD (11)	3AD (12)	2BD (17)	2CD (17)	1AE (36)	2AE (43)
1AD (9)	3AD (12)	29	11-8	3AD (12)	1BD (14)	3BD (20)	2CD (27)	1AE (36)	3AE (43)
3AD (12)	1BD (14)	26	8-8	1BD (14)	2BD (17)	1CD (23)	3CD (32)	2AE (43)	3AE (49)
1BD (14)	2BD (17)	23	5-8	2BD (17)	3BD (20)	2CD (27)	1AE (36)	3AE (49)	1BE (57)
2BD (17)	3BD (20)	20	2-8	3BD (20)	1CD (23)	3CD (32)	2AE (43)	1BE (57)	2BE (68)
2HD (17)	1CD (23)	18	*17-8	1CD (23)	2CD (27)	1AE (36)	3AE (49)	2BE (68)	3BE (80)
3BD (20)	2CD (27)	16	*15-8	2CD (27)	3CD (32)	2AE (43)	1BE (57)	3BE (80)	1CE (91)
1CD (23)	3CD (32)	14	*13-8	3CD (32)	1AE (36)	3AE (49)	2BE (68)	1CE (91)	1CE (91)
2CD (27)	3CD (32)	12½	*12-6	1AE (36)	2AE (43)	1BE (57)	2BE (68)	1CE (91)	3CE (110)
3CD (32)	1BE (57)	10½	*10-6	2AE (43)	3AE (49)	1BE (57)	1CE (91)	2CE (110)	3CE (128)
3CD (32)	2AE (43)	9½	*9-4	3AE (49)	1BE (57)	2BE (68)	1CE (91)	3CE (128)	4 (140)
1AE (36)	3AE (49)	8½	*8-4	1BE (57)	2BE (68)	3BE (80)	2CE (110)	4 (140)	
2AE (43)	3AE (49)	7	*6-8	2BE (68)	3BE (80)	1CE (91)	4 (140)		
1BE (57)	2BE (68)	6	*5-8	3BE (80)	1CE (91)	3CE (128)			
2BE (68)	3BE (80)	5½	*5-4	1CE (91)	2CE (110)	4 (140)			
3BE (80)	1CF (91)	4½	*4-4	2CE (110)	3CE (128)				
1CE (91)	2CF (110)	4	*3-8	3CE (128)	4 (140)				
2CE (110)	3CE (128)	3½	*3-4	4 (140)					
4 (140)	4 (140)	2							

The above table gives the positions for the Tumbler Section Lever and Back Gear on Display Type Attachment change speed gear; also the markings on Display Matrices (12 point to 36 point). The figures in parentheses indicate the speeds obtained.

Where the matrix marking indicates half way between two speeds on the speed plate of the casting machine always take the slower speed. Example: A 24 point matrix is marked \*8-8; the speed taken should be \*9-4 (68 revs.), and not \*8-4 (80 revs.).

For 48 point matrices above 36 point set, place the gear in 1AD (9 revs. per minute) and cut off the pump every alternate revolution of the machine.

For 42 point matrices above 36 point in width place gear in 1AD and cut off pump every third revolution of the machine.

Tumbler=1-2-3  
 Section Lever=A-B-C  
 Back Gear=D-E  
 4=Top gear of 140 r.p.m.

POSITIONS OF DISPLAY TYPE WEDGES FOR CASTING 42-POINT AND 48-POINT TYPE FROM 2 TO 55 POINTS IN WIDTH

MATRIX MARKINGS.— $\Delta$  2 to 14 points (use Packing Piece a32C1). \*14 $\frac{1}{2}$  to 31 points (use Packing Piece 32C1). With characters from 31 $\frac{1}{2}$  to 48 points no Packing Piece is required. \*\* Over 48 points.

INSTRUCTIONS FOR CASTING \*\*SIZES (TWO-PIECE BODIES).—Cast character from 16—8 wedge position. Cast high quad from  $\Delta$  wedge position as indicated on the matrix. Example: \*\* 9—6 (50 $\frac{1}{2}$  points); character from 16—8=46 points; high quad from  $\Delta$  9—6=44 points; total 50 $\frac{1}{2}$  points.

Width in Inches	Positions	Width in Pts.	Width in Inches	Positions	Width in Pts.	Width in Inches	Positions	Width in Pts.	Width in Inches	Positions	Width in Pts.	Width in Inches	Positions	Width in Pts.	Width in Inches	Positions	Width in Pts.
.0277	17	6	1764	4	21	.0321	5	3	344	4738	34	.0365	6	4	374	5127	38
.0311	16	7	1795	11	24	.0355	5	5	344	4773	34	.0399	6	5	374	5466	38
.0346	15	8	1833	11	24	.0389	5	6	344	4807	34	.0433	6	6	374	5805	38
.0380	14	9	1868	12	24	.0424	5	7	344	4842	34	.0467	6	7	374	6144	38
.0415	13	10	1902	12	24	.0458	5	8	344	4876	34	.0501	6	8	374	6483	38
.0450	12	11	1937	12	24	.0492	5	9	344	4911	34	.0535	6	9	374	6822	38
.0484	11	12	1971	12	24	.0526	5	10	344	4945	34	.0569	6	10	374	7161	38
.0519	10	13	2006	13	24	.0560	5	11	344	4980	34	.0603	6	11	374	7500	38
.0553	9	14	2040	13	24	.0594	5	12	344	5014	34	.0637	6	12	374	7839	38
.0588	8	15	2075	13	24	.0628	5	13	344	5048	34	.0671	6	13	374	8178	38
.0623	7	16	2110	13	24	.0662	5	14	344	5083	34	.0705	6	14	374	8517	38
.0657	6	17	2144	13	24	.0696	5	15	344	5118	34	.0739	6	15	374	8856	38
.0692	5	18	2179	13	24	.0730	5	16	344	5153	34	.0773	6	16	374	9195	38
.0726	4	19	2213	13	24	.0764	5	17	344	5187	34	.0807	6	17	374	9534	38
.0761	3	20	2248	13	24	.0798	5	18	344	5222	34	.0841	6	18	374	9873	38
.0795	2	21	2282	13	24	.0832	5	19	344	5257	34	.0875	6	19	374	10212	38
.0830	1	22	2317	13	24	.0866	5	20	344	5291	34	.0909	6	20	374	10551	38
.0864	1	23	2351	13	24	.0900	5	21	344	5326	34	.0943	6	21	374	10890	38
.0899	1	24	2386	13	24	.0934	5	22	344	5360	34	.0977	6	22	374	11229	38
.0933	1	25	2420	13	24	.0968	5	23	344	5395	34	.1011	6	23	374	11568	38
.0968	1	26	2455	13	24	.1002	5	24	344	5429	34	.1045	6	24	374	11907	38
.1002	1	27	2489	13	24	.1036	5	25	344	5464	34	.1079	6	25	374	12246	38
.1037	1	28	2524	13	24	.1070	5	26	344	5498	34	.1113	6	26	374	12585	38
.1071	1	29	2558	13	24	.1104	5	27	344	5533	34	.1147	6	27	374	12924	38
.1106	1	30	2593	13	24	.1138	5	28	344	5567	34	.1181	6	28	374	13263	38
.1140	1	31	2627	13	24	.1172	5	29	344	5602	34	.1215	6	29	374	13602	38
.1175	1	32	2662	13	24	.1206	5	30	344	5636	34	.1249	6	30	374	13941	38
.1209	1	33	2696	13	24	.1240	5	31	344	5671	34	.1283	6	31	374	14280	38
.1244	1	34	2731	13	24	.1274	5	32	344	5705	34	.1317	6	32	374	14619	38
.1278	1	35	2765	13	24	.1308	5	33	344	5740	34	.1351	6	33	374	14958	38
.1313	1	36	2800	13	24	.1342	5	34	344	5774	34	.1385	6	34	374	15297	38
.1347	1	37	2834	13	24	.1376	5	35	344	5809	34	.1419	6	35	374	15636	38
.1382	1	38	2869	13	24	.1410	5	36	344	5843	34	.1453	6	36	374	15975	38
.1416	1	39	2903	13	24	.1444	5	37	344	5878	34	.1487	6	37	374	16314	38
.1451	1	40	2938	13	24	.1478	5	38	344	5912	34	.1521	6	38	374	16653	38
.1485	1	41	2972	13	24	.1512	5	39	344	5947	34	.1555	6	39	374	16992	38
.1520	1	42	3007	13	24	.1546	5	40	344	5981	34	.1589	6	40	374	17331	38
.1554	1	43	3041	13	24	.1580	5	41	344	6016	34	.1623	6	41	374	17670	38
.1589	1	44	3076	13	24	.1614	5	42	344	6050	34	.1657	6	42	374	18009	38
.1623	1	45	3110	13	24	.1648	5	43	344	6085	34	.1691	6	43	374	18348	38
.1658	1	46	3145	13	24	.1682	5	44	344	6119	34	.1725	6	44	374	18687	38
.1692	1	47	3179	13	24	.1716	5	45	344	6154	34	.1759	6	45	374	19026	38
.1727	1	48	3214	13	24	.1750	5	46	344	6188	34	.1793	6	46	374	19365	38
.1761	1	49	3248	13	24	.1784	5	47	344	6223	34	.1827	6	47	374	19704	38
.1796	1	50	3283	13	24	.1818	5	48	344	6257	34	.1861	6	48	374	20043	38
.1830	1	51	3317	13	24	.1852	5	49	344	6292	34	.1895	6	49	374	20382	38
.1865	1	52	3352	13	24	.1886	5	50	344	6326	34	.1929	6	50	374	20721	38
.1899	1	53	3386	13	24	.1920	5	51	344	6361	34	.1963	6	51	374	21060	38
.1934	1	54	3421	13	24	.1954	5	52	344	6395	34	.1997	6	52	374	21399	38
.1968	1	55	3455	13	24	.1988	5	53	344	6430	34	.2031	6	53	374	21738	38
.2003	1	56	3490	13	24	.2022	5	54	344	6464	34	.2065	6	54	374	22077	38
.2037	1	57	3524	13	24	.2056	5	55	344	6499	34	.2099	6	55	374	22416	38
.2072	1	58	3559	13	24	.2090	5	56	344	6533	34	.2133	6	56	374	22755	38
.2106	1	59	3593	13	24	.2124	5	57	344	6568	34	.2167	6	57	374	23094	38
.2141	1	60	3628	13	24	.2158	5	58	344	6602	34	.2201	6	58	374	23433	38
.2175	1	61	3662	13	24	.2192	5	59	344	6637	34	.2235	6	59	374	23772	38
.2210	1	62	3697	13	24	.2226	5	60	344	6671	34	.2269	6	60	374	24111	38
.2244	1	63	3731	13	24	.2260	5	61	344	6706	34	.2303	6	61	374	24450	38
.2279	1	64	3766	13	24	.2294	5	62	344	6740	34	.2337	6	62	374	24789	38
.2313	1	65	3800	13	24	.2328	5	63	344	6775	34	.2371	6	63	374	25128	38
.2348	1	66	3835	13	24	.2362	5	64	344	6809	34	.2405	6	64	374	25467	38
.2382	1	67	3869	13	24	.2396	5	65	344	6844	34	.2439	6	65	374	25806	38
.2417	1	68	3904	13	24	.2430	5	66	344	6878	34	.2473	6	66	374	26145	38
.2451	1	69	3938	13	24	.2464	5	67	344	6913	34	.2507	6	67	374	26484	38
.2486	1	70	3973	13	24	.2498	5	68	344	6947	34	.2541	6	68	374	26823	38
.2520	1	71	4007	13	24	.2532	5	69	344	6982	34	.2575	6	69	374	27162	38
.2555	1	72	4042	13	24	.2566	5	70	344	7016	34	.2609	6	70	374	27501	38
.2589	1	73	4076	13	24	.2600	5	71	344	7051	34	.2643	6	71	374	27840	38
.2624	1	74	4111	13	24	.2634	5	72	344	7085	34	.2677	6	72	374	28179	38
.2658	1	75	4145	13	24	.2668	5	73	344	7120	34	.2711	6	73	374	28518	38
.2693	1	76	4180	13	24	.2702	5	74	344	7154	34	.2745	6	74	374	28857	38
.2727	1	77	4214	13	24	.2736	5	75	344	7189	34	.2779	6	75	374	29196	38
.2762	1	78	4249	13	24	.2770	5	76	344	7223	34	.2813	6	76	374	29535	38
.2796	1	79	4283	13	24	.2804	5	77	344	7258	34	.2847	6	77	374	29874	38
.2831	1	80	4318	13	24	.2838	5	78	344	7292	34	.2881	6	78	374	30213	38
.2865	1	81	4352	13	24	.2872	5	79	344	7327	34	.2915	6	79	374	30552	38
.2900	1	82	4387	13	24	.2906	5	80	344	7361	34	.2949	6	80	374	30891	38
.2934	1	83	4421	13	24	.2940	5	81	344	7396	34	.2983	6	81	374	31230	38
.2969	1	84	4456	13	24	.2974	5	82	344	7430	34	.3017	6	82	374	31569	38
.3003	1	85	4490	13	24	.3008	5	83	344	7465	34	.3051	6	83	374	31908	38
.3038	1	86	4525	13	24	.3042	5	84	344	7500	34	.3085	6	84	374	32247	38
.3072	1	87	4559	13	24	.3076	5	85	344	7534	34	.3119	6	85	374	32586	38
.3107	1	88	4594	13	24	.3110	5	86	3								

STANDARDISED FONT SCHEMES

(Based on lower-case founts of 1,000, 500, and 250 characters)

Lower-case	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	1,000	500	250
1 Strength (Body)	74	18	34	42	118	24	18	50	74	6	8	42	26	96	66	20	6	58	66	84	38	12	20	6	40	4	1,000	500	250
1 Strength (Jobbing)	30	10	16	20	58	12	10	24	36	4	6	20	14	32	32	12	4	26	32	40	18	8	10	6	10	4	1,000	500	250
Capitals	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1,000	500	250
1 Strength (Body)	28	6	6	6	12	6	6	8	10	4	4	8	18	8	8	4	4	4	4	4	4	4	4	4	4	4	1,000	500	250
1 Strength (Jobbing)	20	12	12	8	8	8	8	8	8	8	8	10	14	14	14	6	4	4	4	4	4	4	4	4	4	4	1,000	500	250
Figures, etc.	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	1,000	500	250
1 Strength (Body)	10	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1,000	500	250	
1 Strength (Jobbing)	16	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1,000	500	250
Ligatures	Æ	Œ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	Ɔ	1,000	500	250
1 Strength (Body)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1,000	500	250
1 Strength (Jobbing)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	1,000	500	250
Accents	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	1,000	500	250
Small Caps	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1,000	500	250
1 Strength (Body)	8	3	4	5	13	3	3	6	8	2	2	5	6	8	3	2	7	8	10	4	2	3	2	3	2	2	1,000	500	250
Signs	*	†	‡	§	¶	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1,000	500	250
1 Strength (Body)	6	4	2	2	4	6	4	12	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,000	500	250

The proportions of the "body" founts are based upon the average recurrence of the various characters in average English literature. The proportions of the capital letters of the "jobbing" founts relative to the lower-case characters provide for the greater use of capital letter composition when using jobbing founts. An all-capital fount should equal the strength of a "body" lower-case and capital fount combined. Em quads should be ordered separately; the quantity required should depend upon the nature of the composition. The number of em quads given above applies to the ems used in the composition apart from those required for short or white lines. The proportions of the body fount (upper and lower-case combined) serve as a basis for the capitals required for jobbing founts. As there is a great demand upon the capitals of jobbing founts, which becomes increased as the strength of the fount decreases, the following rule has been laid down for determining the proportions of the jobbing capitals. For capitals required for a full strength jobbing fount: Add body fount lower-case and caps together, and divide by 3; for half-strength founts, divide by 5; for quarter-strength founts, divide by 8. Keep to the nearest even number, and the minimum number of any capital letter should never be less than 4. The basis of the small capital fount is the adding together of the lower-case and caps of the full strength fount and dividing the result by 10. Thus A=74+18=92 ÷ 10=9.2.

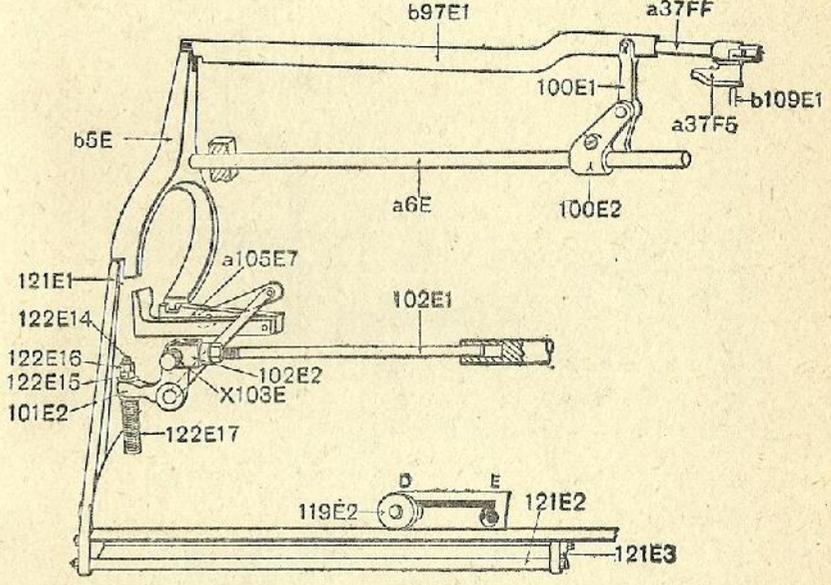


FIGURE 1

Belt shifter operating bar and clutch control operating rod. The object of this mechanism is to prevent any change being made in the speed of the machine whilst the driving belt is over the fixed pulley. When the operating lever a37F is placed in operating position the belt shifter operating bar b97E1 is moved to the left, carrying with it the cam a37F5 and the belt shifter ring b5E. The former pushes down the interlocking lever operating rod b109E1, and a step on the latter is placed in front of the end of the sliding gear shifter yoke handle 121E1. When the machine is being driven it is impossible to move the sliding gear shifter yoke handle 119E2, as the safety lever is held by the belt shifter ring b5E.

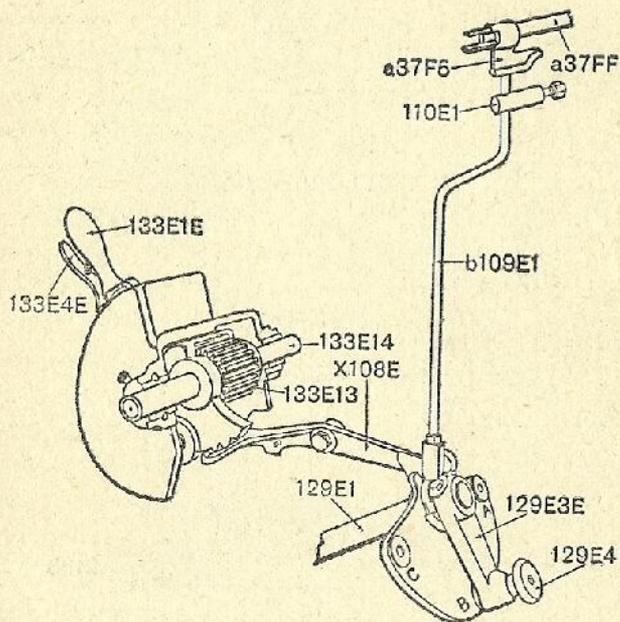


FIGURE 2

Interlocking lever mechanism. When the operating lever a32F is placed in operating position the cam a37F5 pushes down the interlocking lever operating rod a109E1, and this causes the interlocking lever X108E to engage a slot in the speed bracket quadrant shaft handle 129E3E, preventing the handle from being moved. The other end of the interlocking lever X108E engages a slot in the end of the tumbler 133E1E preventing the tumbler from being moved.

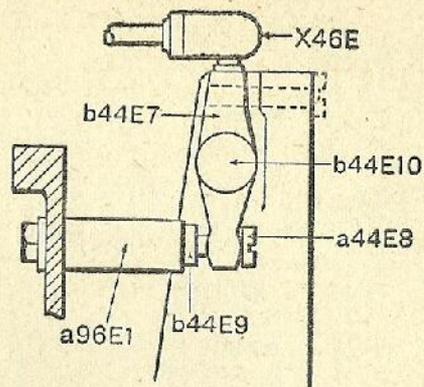


FIGURE 3

Mould blade cam lever compound lever. When the screw a44E8 connects the compound lever c44E7 to the abutment a96E1 greater movement is given to the mould blade type over 14 points up to 36 points in set. For casting type below 14 points in set the screw a44E8 must be connected to the upper end of the compound lever (as shown by the dotted line). If the 48 point equipment is applied to the machine, the abutment b96E1 must be used in place of a96E1; also the collar b44E9 must have two levels on its operating side. The lower end of the compound lever c44E7 then operates against the low level of b44E9 when casting type from 14 point to 24 point in set, and against the high level of b44E9 when casting type above 24 point in set. This is effected by loosening the screw a44E8 and turning the collar b44E9 90 degrees. The compound lever c44E7 is used in place of b44E7 when casting 48 point.

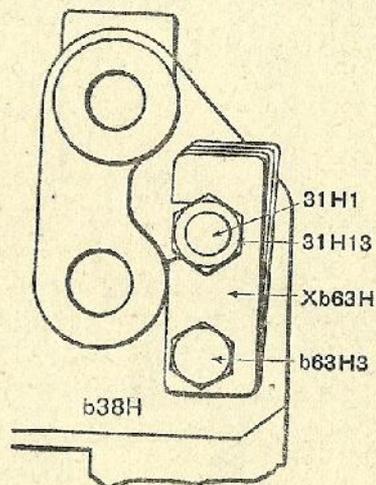


FIGURE 4

Pump body spring rod stop plates xb63H. For particulars of the use of these plates see page 8.



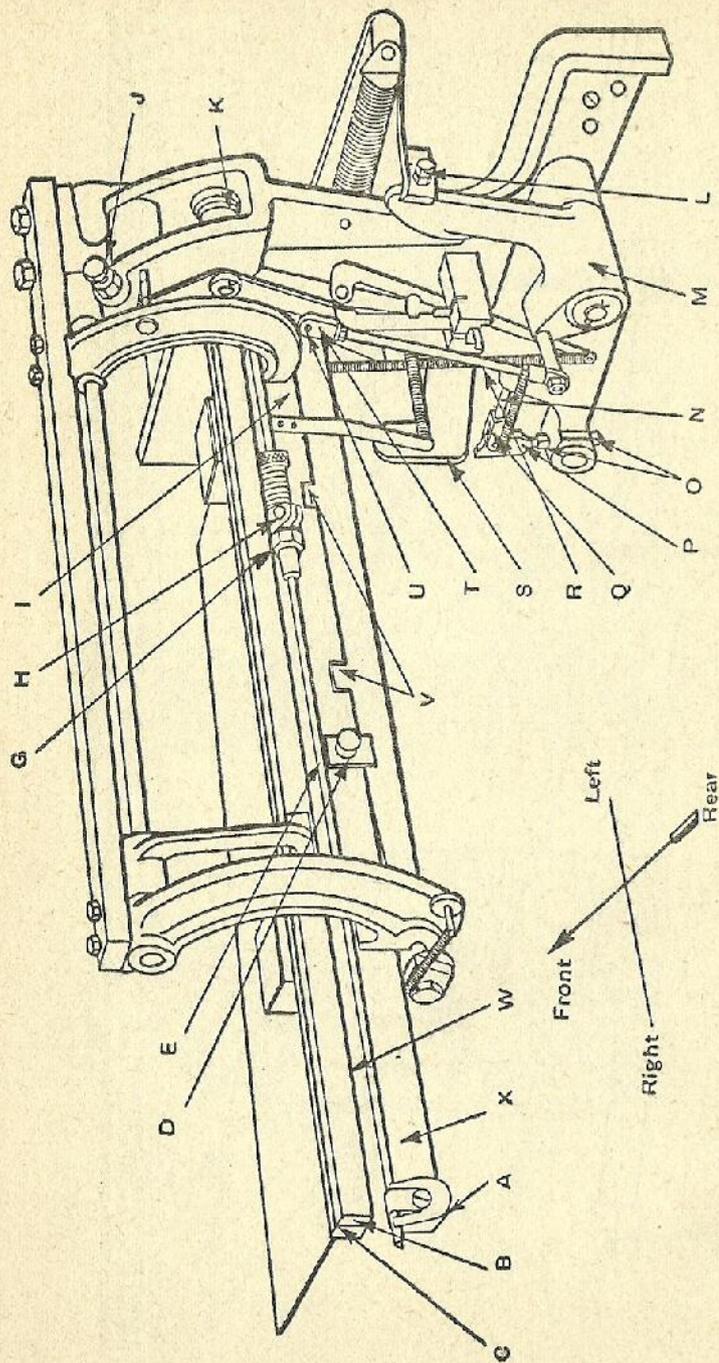


FIGURE 9

**Lead and Rule Cutting Attachment.** As the strip is ejected from the mould it passes along a guide until the end reaches the gauge G which decides the length to which the strip shall be cut. Contact with the gauge causes a trip mechanism to be operated, and a lever then causes the strip to be sheared to its correct length. The lengths of strip are then ejected upon a tray ready for use.

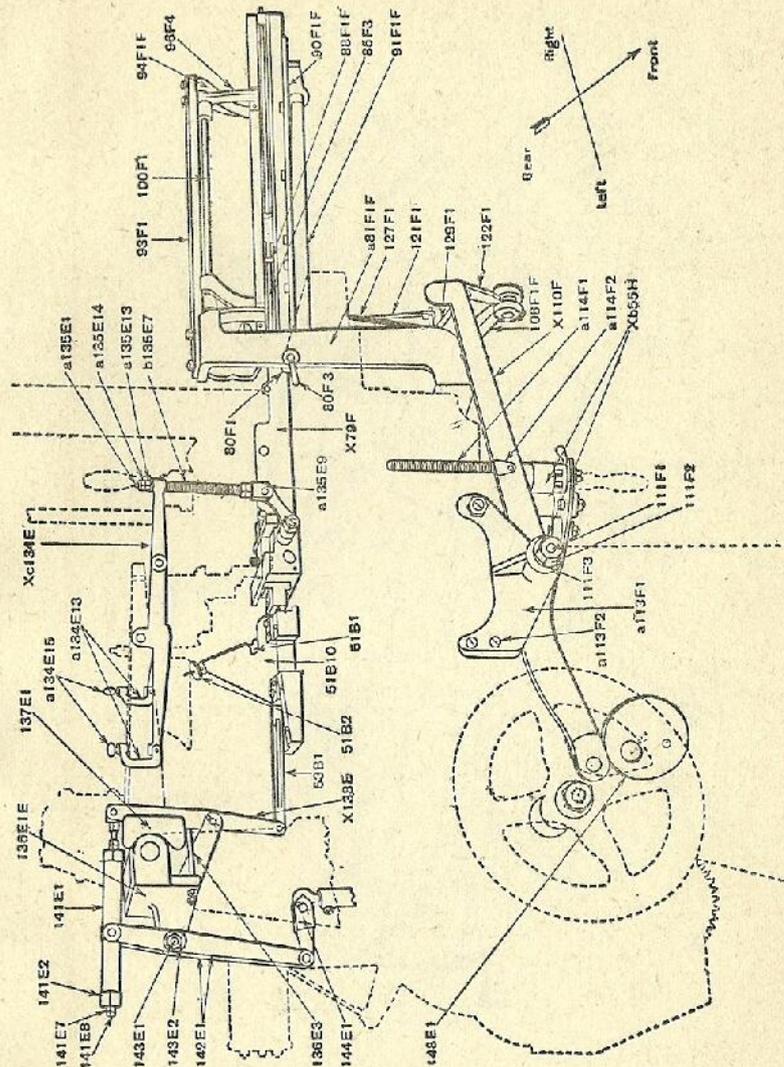


FIGURE 10

A perspective view of the lead and rule casting and cutting attachment combined. The cam (149F1) revolves with the driving cams and reaches the shear lever (1110F). When the strip gauge is reached the pressure upon it causes the bar (122F1) to get under the end of the shear lever (1110F), and the lever (108E1F) then works the shear for parting the strip at the required length.

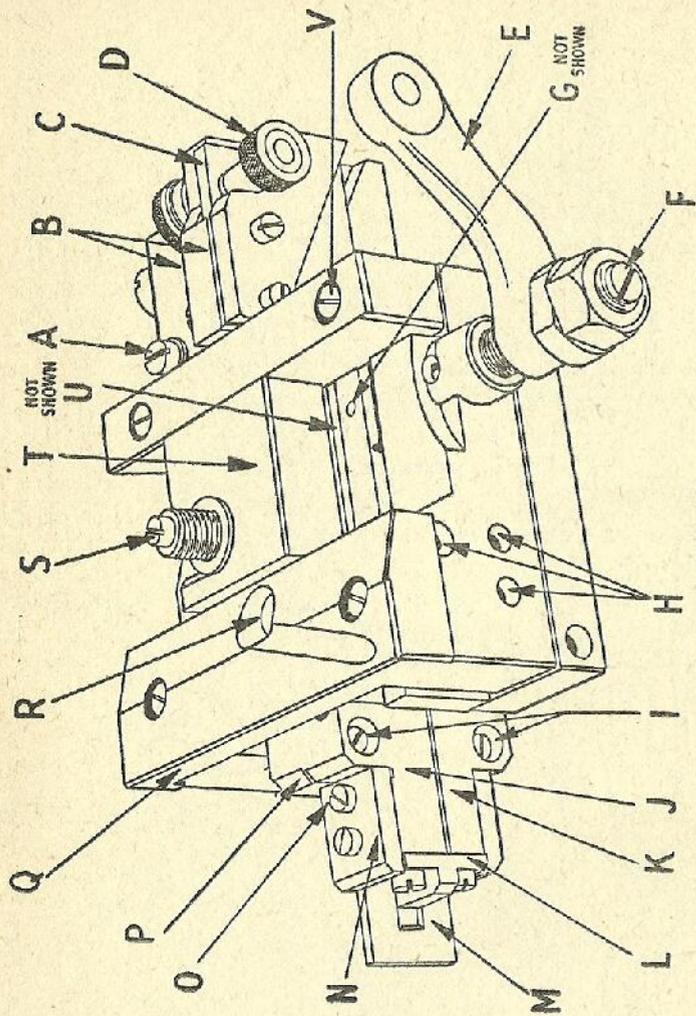


FIGURE 11  
Lead and rule strip mould, perspective view from above.

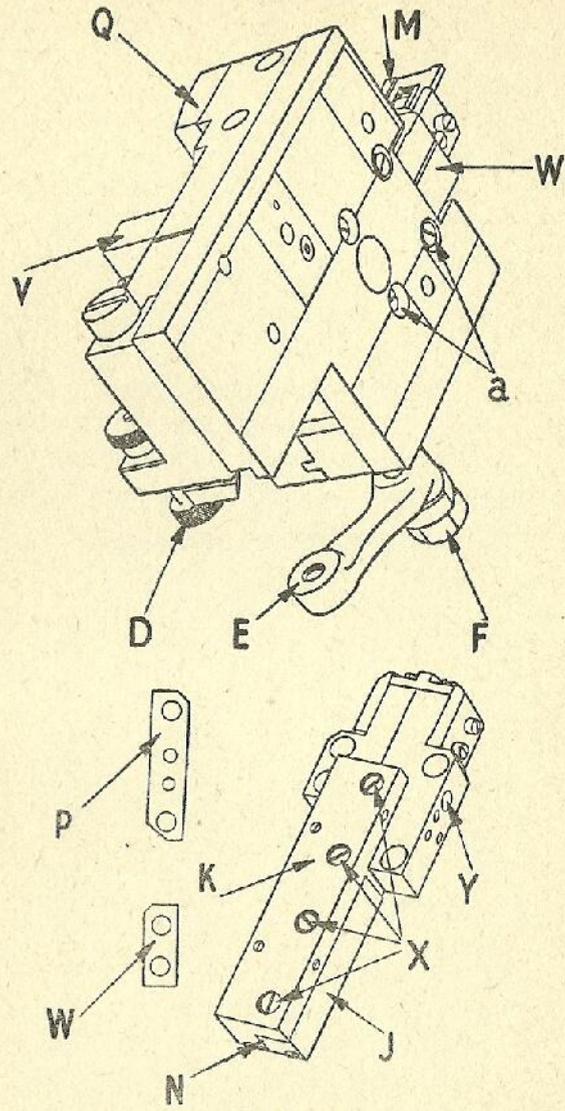


FIGURE 12  
Lead and rule strip mould; inverted perspective view.

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